

ADOPTION OF PRODUCT-SERVICE SYSTEM (PSS) BUSINESS MODEL INNOVATIONS IN GLOBAL DISTRIBUTER NETWORKS

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ABSTRACT

Offering product-service systems (PSS) is argued to result in significant benefits to economic, environmental and social sustainability but also entails a significant challenges related to relational dynamics between the manufacturer and the service providers belonging to the distributor network. As most large manufacturing companies operate globally, their delivery network partners also tend to be globally distributed. This adds to heterogeneity within the global distribution network, where products and services sales largely rely upon readiness and willingness of their distributors to sell PSS innovations successfully. Thus, firms must actively manage the resistance in the distributor network to adopt and implement PSS business model innovations. Therefore, the purpose of this paper is to investigate how manufacturing companies can facilitate adoption of PSS business model innovations among their global distributor network. In a single case study we interviewed 23 respondents from the headquarter, regional managers and distributor network which resulted in unique insights about the challenges, needs and expectations of the different functions and how they differ from each other. The data clearly reveals that the distributor network varies significantly in terms of their readiness and ability to offer advanced services. The distributors can be classified based on the PSS business models that they are currently offer or based on certain characteristics that influence their possibility to offer advanced services (e.g. customer characteristics, market characteristics and distributor capabilities). Based on this classification and the individual challenges of the distributors, support mechanisms for managing PSS adoption in a global distributor network were identified. The mechanisms differ based on the maturity of the distributor and based on whether they support the value creation, value delivery or value capture (business model elements). The findings show that the distributors need to be treated differently based on their maturity level in order to adopt PSS successfully and that the manufacturer need to be actively involved in the development of all distributors.

INTRODUCTION

In current global economy, manufactures can no longer rely on traditional product-focused business models to gain competitive advantage (Adrodegari et al., 2016; Kindström and Kowalkowski, 2014). The shift to increased revenues that are derived from services has been dramatic even for manufacturing companies and service innovation is crucial to fuel the further economic growth and to increase the productivity levels of services (Parida et al., 2015; Spohrer and Maglio, 2008). In this context the adoption of Product Service Systems (PSS) business models has shown to be one of the most effective ways to gain economic, social and environmental benefits by moving from product to service provision (Tukker, 2015). However, the dispersed nature and diversity of customer segments, each of which has specialized requirements and regional differences, makes managing global PSS a problematic undertaking requiring new organizational capabilities and business models (Baines et al.

2009; Parida et al. 2014; Reim et al., 2015; Wallin et al., 2015). More importantly, recent studies indicate that providers of service innovation need to align their agenda with their distribution network; otherwise they risk market failure and unexpected costs (Gebauer et al., 2013; Story et al., 2016). In contrast, much of the prior literature has focused on internal changes (e.g. capability development) of providers and the technical feasibility of PSS offers, and thus, the demand and preferences from the distribution and market side has almost been ignored in literature (Tukker, 2013). Even though the definition of PSS explicitly concerns the fulfillment of customer needs through marketable sets of products and services (Goedkoop et al., 1999), the acceptance and diffusion of the developed PSS offers among customers is a major barrier to PSS success (Mylan, 2015; Rextfelt and Hiort of Ornäs, 2009; Rönnerberg Sjödin et al, 2017).

As most large manufacturing companies operate globally, their delivery network partners also tend to be globally distributed. This adds to heterogeneity within the global distribution network, where products and services sales largely rely upon readiness and willingness of their distributors to sell PSS successfully (Durugbo and Riedel, 2013; Parida et al., 2015). Without the alignment of the providers PSS strategy to the distributors demands and requirements the customers will not be able to take advantage of the full PSS potential. Hence, the adoption of new PSS business models is crucial to success. Even though the importance of business model development for PSS provision has been highly emphasized in literature (Ferreira et al., 2013; Parida et al., 2014; Reim et al., 2015; Richter and Steven, 2009), there is a gap in literature on how to manage the resistance in the distributor network to adopt and implement PSS business model innovations (Barquet et al., 2013; Gudergan, 2010). To fill this gap, the purpose of this paper *to investigate how manufacturing companies can facilitate adoption of PSS business model innovations among their global distributor network*. Our results build on an exploratory case study with a global provider of construction equipment and related services and representatives from their distributor network operating in more than 125 countries. The results show that the distributor network varies significantly in terms of their readiness to offer PSS. Therefore, all distributors need to be treated differently based on their maturity level in order to achieve PSS adoption. The manufacturer needs to be actively involved in the development of the distributors and still focus on alignment to create a common vision within the distributor network. The paper presents guidance on how to classify their distributor network based on their characteristics and their maturity as well as it proposes detailed mechanisms to support the adoption of PSS within the distributor network. The next section provides the theoretical background to this study. This is followed by a description of the research methodology. In section four the key findings from our case study are presented and afterwards the framework development is described. Finally theoretical and managerial contributions are presented together with suggestions for future research.

THEORETICAL BACKGROUND

Global PSS distributor networks

The PSS concept with its high potential for economic, social and environmental benefits is currently one of the most pursued research streams. The concept was launched in a report from Goedkoop et al. (1999) defining PSS as a marketable set of products and services that are capable to jointly fulfill customers' needs in an economical and sustainable manner. There are many different types and categories of PSS ranging from simple consultancy services up to outsourcing of whole operational processes to providers (Rönnerberg Sjödin et al., 2017). Through the years many categorizations have been made mainly around the three categories product-oriented, use-oriented and result-oriented (Brax and Visintin, 2017; Parida et al., 2014; Tukker et al., 2004). The implementation of PSS is a frequent topic in the emerging literature; however focus is only on the internal implementation processes or on the relation

between provider and customers (Barguet et al., 2013; Stroughton and Votta, 2003; Tukker, 2004). The crucial intermediate service providers that are usually part of the distributor network are an understudied actor that is essential to convince customers and perform the services appropriately. Especially, Manufacturers rely upon the readiness and willingness of their global and heterogenic distribution network to sell PSS successfully to their customers (Durugbo and Riedel, 2013; Lockett et al., 2011; Parida et al., 2015).

Existing literature states several problems and challenges related to global service provision. Zarpelon Neto et al. (2015) mention local regulations, resource allocation, internal culture, commercial feasibility and lack of knowledge as the main problems in global service provision. Compared to selling products globally, global service provision is considered to be much more risky and complex which leads to a situation where local in-house service organizations are best suited to respond to local service demands (Kowalkowski et al., 2011; Reim et al., 2016; Wilson, 1999). Other authors transform challenges into capabilities needed for global service provision. Customer understanding, engagement, knowledge management and trust-based interaction are main capabilities that can be found in literature (Bagheri et al., 2014; Parida et al., 2015). This list can be further extended by the need for aligned objective, risk transfer, shared values and a common IT system across the enterprise (Harrington and Srai, 2012; Lockett et al., 2011; Nohria and Ghoshal, 1994; Rönnerberg Sjödin et al., 2016). However, the current literature mainly focuses on organizational structures and general problems of selling services globally without studying the critical role of the distributor network (Kucza and Gebauer, 2011). Therefore, there is a need for studies on the relation between manufacturer and service providing distributor network and how distributor network support and development can be framed to improve PSS adoption and implementation (Durugbo and Riedel, 2013; Hakanen et al., 2016; Kowalkowski et al., 2011; Tabibzadeh and Wireman, 2003).

PSS business model adoption

The business model approach has been shown to be crucial for a successful development and implementation of PSS (Barquet et al., 2013; Reim et al., 2015). Business models are defined as the design or architecture of how an organization creates, delivers and captures value (Osterwalder and Pigneur, 2010; Teece 2010). Prior research has shown that an inferior technology with a superior business model will most often outperform more advanced technologies (Chesbrough and Rosenbloom, 2002). Also for servitizing manufacturing companies business model innovation has shown to be crucial to success and without a coherent business model it is impossible to manage the transition towards a service provider (Kastalli et al., 2013; Maglio and Spohrer, 2013). When it comes to innovation, the concept of diffusion has shown to be very helpful in understanding the sequence in which different actors or groups adopt an innovation. These groups can be categorized as innovators, early adopters, early majority, late majority and laggards; and specific initiative can be specified to reach the adoption of each group (Rogers, 1995). Literature even describes a process for industrial adoption based on the steps (1) awareness, (2) interest, (3) evolution, (4) trial and (5) adoption (Ozanne and Churchill, 1971).

The initial literature on the PSS business model concept has commonly been used to categorize different types of PSS such as product-, use-, or results-oriented (Meier et al., 2010; Tukker, 2004). Other studies on PSS business models have mainly developed frameworks that focus on specific elements that are part of a PSS business model (Adrodegari et al., 2016; Barguet et al., 2013; Lewandowski, 2015). Another common topic in many prior studies on PSS business models is the focused on transitioning from providing products to solutions and on methods to develop PSS business models (e.g., Dimache and Roche, 2013; Ferreira et al., 2013; Palo and Tähtinen, 2013; Storbacka et al., 2013) without concerning the required transition of external delivery partners or customers.

In order to make better use of the business model concept its three components (create, deliver, capture) can even be looked upon separately to better understand the needs and consequences for overall PSS implementation. In more detail, *value creation* in PSS happens through taking over work tasks from customers and accomplishing them more efficiently, which also improves the relationship with the customer and their loyalty (Meier, 2010; Tukker, 2015). Furthermore, value is created through positive effects on the environment in terms of reduced material use and higher levels of resource utilization (Mont, 2002; Tukker, 2004; Vezzoli et al., 2015). *Value delivery* is characterized by the high skill, competence, and experience levels required to control the entire process of providing sustainable PSS (Meier, et al., 2010, Reim et al., 2015). In addition, new organizational structures and new partners need to be integrated into PSS provision. For *value capture*, it is important to design PSS such that customers are willing to pay for the added value (Mont, 2002). At the same time, costs need to be handled efficiently. In addition, the profitability of PSS is difficult to show because cash flows are uncertain and quantifying savings is difficult (Erkoyunku et al., 2013; Gebauer et al., 2005). Although the business model concept is visible in PSS studies, literature is rare when it comes to integrated business models for networks and distribution channels through which most large, global manufacturing companies have to provide their PSS offers (Barquet et al., 2013).

Even though adoption of PSS has been discussed, the distributor network was not considered and only the relationship of manufacturer and customer was studied (Baines et al., 2009). However, the customer acceptance is crucial and can only be reached by service providers that are close to the market (Cenamor et al., 2017; Morschett, 2006; Rexfelt and Hiort af Ornäs, 2009). Furthermore, the PSS implementation at the distributor network should not only be driven by the manufacturer but also by the service provider itself and they need to have power to steer certain aspects (Cavanagh and Freeman; Kowalkowski et al., 2011). Hence, the adoption of new PSS business models by the distributor network is crucial to success and there is a gap in literature on how to manage the resistance in the distributor network to adopt new PSS business models (Barquet et al., 2013; Gundergan, 2010).

RESEARCH METHODS

The present study is based on an exploratory single case study involving a global Swedish manufacturing company (hereafter Alpha) that actively offers PSS. We studied the case company from three different levels, strategic development, regional development and distributor network. This research design was chosen because there is limited knowledge about how PSS implementation is affected by the characteristics and readiness of the distributor network. Information from rich real-life cases can help identify new aspects and phenomena derived from reality (Eisenhardt, 1989; Yin, 2003), such as relationships between provider and distributor that form the conditions for successful PSS implementation. Alpha was chosen as the case company because of its long experience with PSS provision and operations in global markets through company owned as well as independent distributors. In particular, Alpha has directed significant attention to dealer development due to its global operations and need to manage high diversity in customer requirements and value chain configurations. Furthermore, Alpha has undertaken significant steps to restructure the organization and processes to ensure successful PSS operations to global markets. Thus, Alpha represents an appropriate case for the present exploratory study.

Alpha is a global provider of construction equipment, and it conducts sales through internal and independent dealers globally (see Figure 1). Currently, it offers several services in addition to its machines, including maintenance contracts, extended warranties, up-time services, and close attention to error codes and fuel consumption as well as advanced services such as an agreed-upon availability level. In total, we interviewed 23 respondents from headquarter (9), regional managers (6), and the distributor network (8) who have been actively

involved in the PSS development and operation in their part of Alpha or the distributor network.

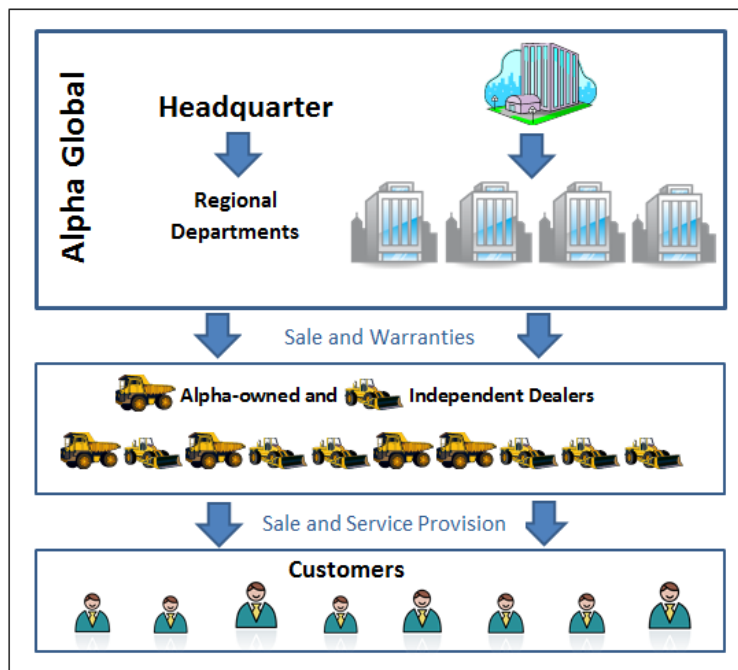


Figure 1: Organisational Structure of PSS provision at Alpha

The present study's research approach was qualitative and based on semi-structured and open-ended interviews. The interview guide was designed to explore the differences between the distributor networks, their challenges and readiness level. Furthermore, questions about the needed support and future PSS plan were asked to compare the maturity in PSS provision between the different global settings.

The face-to-face interviews lasted between 60 and 90 minutes, and interviews were recorded and transcribed in addition to the notes the researchers took during the interviews. The companies also shared internal documents before the interviews that were used to help the researchers understand their operations. These documents and the transcribed interviews and notes built the basis for the analysis.

The data analysis was based on open coding content analysis where headings were written into the transcriptions based on different risks that were mentioned (Elo and Kyngäs, 2008). This first-order categories were then analysed for links in order to cluster them into theoretically distinct groups, the second-order themes, and finally aggregate theme or dimensions were identified (Nag et al., 2007). The preliminary results of the present study were shared at the validation workshop, and the participants commented and added to the findings.

EMPIRICAL FINDINGS

The diversity among global distributors and service providers is enormous. In order to provide appropriate support for the implementation of more and more advanced PSS it is necessary to know how mature and ready the distributors are and adapt the support based on their specific needs. Therefore, the first step in this analysis is to classify the distributor network based on their maturity. The analysis has shown that differences in distributor maturity can be expressed in two different ways; first, based on the current service offers of the distributor, and second, based on the distributor characteristics including capabilities, customers and their market. Connected to Rogers (1995) categorization for the diffusion of innovations we will use the categories early adopters, majority and laggards to classify the maturity and readiness level of the global distributors.

Classification based on service offers

The simplest form of services offered by the case distributors are so called *care inspections*. These inspections are not related to any contract but lead often to additional service provision or future agreements. The regional manager for Middle East explained: “We use care inspections quite a lot because most of them will send their technician to the customer ... and then you quite often they find a lot of faults and that may be a foot in the door.” Distributors that only offer this simplest type of services could be seen as the laggards in terms of PSS adoption and will need much support and development to reach more advanced levels of PSS provision.

Another service called *extended warranty* has been widely promoted by Alpha and is also widely used by the majority of distributors. The German distributor explained: “the extended warranty concept is used intensively and most of the new machines are sold with extended warranty which basically is a repair contract.” However, distributors that offer more advanced service see differently on the benefits of extended warranty as the distributor from the Netherlands highlights: “We want to stay away from extended warranty and offer a total warranty because otherwise you come into discussion and everything that breaks down will be for free”. With the extended warranty the provider takes over most of the risk of the service provision from the distributor that is not willing or able to bear the risk on its own.

Furthermore, *maintenance contracts* are a type of PSS which is widely offered and they exist in a huge variety with regard to what is covered, how long they last and how payment is handled. Many of the distributors offer at least a simple version of maintenance contracts that cover standard services during the first years and are paid in advance or over time. For example a distributor from UAE stated: “We try and provide every machine that goes out with a proposal and a quotation for a maintenance contract .We try to follow up and convert as many maintenance contracts we can to guarantee after-market business.” However, not all dealers are ready to offer this type of PSS as a global product manager said: “Many of our dealers worldwide are not even convinced that normal maintenance contracts are a good idea or they are not even mature to manage those or to sell those.”

Many of the distributors are also offering some type of *leasing or rental* services to their customers which is a typical use-oriented PSS. Because the ownership is sustained at the distributor which also is responsible for all maintenance this is a good way to enter more advanced service business. The Australian distributor exemplified that: “A lot of the larger mining companies they have larger machines on lease and then part of the leasing package is the maintenance package or servicing package as well.” Thus, leasing and rental can be handled more or less sophisticated and even reach up to a result-oriented PSS, offering e.g. transportation, for the most advanced distributors.

For more advanced services that only the early adopters already offer there are plenty of varieties and they are based on different types of data analysis or responsibilities. First, services related to the data from telematics or remote control can be used for *operation optimization*. Analyzing the data tracked by sensors in the machine can be used to e.g. improve fuel consumption or to train operators based on their driving behavior. The German distributor explained: “There is a huge demand for fuel efficiency consultancy, especially for customers with huge fleets.” He further explained that customers even can get personal coaching where they get messages on their phone when their driving behavior is changing, including advices for improvement. Another type of service that is based on the telematics system in the machines is *proactive maintenance*. Mainly this means that the provider receives alarm codes from the machines and will send a technician to the side to fix the problem. One respondent from the UK distributor exemplified the benefits like this: “we managed to diagnose lot of problems before so that we can get them repaired under warranty where the same fault would have kept happening until a point when something major happened”.

Some distributors even develop their own service agreements. For example the distributor in the Netherlands is offering something they call *total care*. Our respondent explained: “Last year we launched, that was our own development, which was called total care. We offer the leasing or the financing of the machines, we offer a service contract with the machine and we offer all the insurances with the machines so if the machine breaks down and anything else is covered.” The distributors in these cases bear all risks themselves and are not dependent on the support from Alpha for these advanced service packages.

Another PSS type that has been used by some of the quite mature distributors is the *availability contract*. In those cases the distributor guarantees a certain percentage of availability to the customers. The respondent from the distributor in UAE illustrated this advanced offer: “we have in the past guaranteed availability to one or two previous contracts ... you have to agree to a certain time assurance with penalties if not achieved.” Even more advanced, some distributors considering offering a result-oriented PSS that is similar to Rolls-Royce famous “power-by-the-hour” concept, in this case based on *cost-per-ton*. One distributor responded: “I think the future is probably ... selling a cost per ton to and end user so would pay per ton of material moved rather than paying for the machines, operator, fuel, maintenance and so on.” These types of services would basically utilize the full potential of PSS but also require a very high maturity level from the distributors.

Table 1 gives an overview of the different services and how distributors can be classified based on which services they offer.

Table 1: Classification based on service offers

Offer	Early Adopters	Majority	Laggards
Care inspections			x
Extended warranty		x	
Maintenance contracts	x	x	
Leasing/rental	x	x	
Operation optimization (fuel consumption, operator training, ...)	x		
Proactive maintenance	x		
Individual Service Packages (e.g. Total Care)	x		
Availability contracts	x		
Cost per ton	x		

Classification based on distributor, customer and market characteristics

In order to analyze the maturity and readiness of the distributor network to offer PSS it is important to look at relevant characteristics surrounding the distributor network. These antecedents of PSS adoption are not only limited to the characteristics of the distributor itself, it also needs to include an analysis of the characteristics of the potential customers as well as the characteristics of the market. For all these areas, specific attributes can be identified that will guide positioning the distributor in one of the previously identified categories early adopters, majority and laggards. An overview of these attributes can be found in table 2 including a continuous rating scale and they will be explained in the following.

Distributor characteristics

One of the key characteristics a distributor needs to sell PSS is the *willingness and ability to invest in service provision*. One of the regional managers responsible for central Europe exemplifies the distributor’s hesitance very well: “It can be for example the unwillingness in doing investments, because some of the services might need investments both in equipment or investments in hiring or adding new people to the organization. The distributors have to take

care of these investments.” When the willingness to offer services does not exist, distributors are very far away from offering advanced PSS and a lot of effort to convince them of the benefits of PSS is needed.

Another major hinder for the distributors to offer services is the *access to well-trained technicians*. It is impossible to become a reliable service provider if you do not have the capacity to fulfill the promised services. The regional manager for Middle East exemplified this perfectly: “The distributor is lacking about 15 technicians for providing the standard services promoted by the manufacturer.” More sophisticated distributors however train their own technicians to handle this potential problem. The distributor in Germany explained: “It is not always easy to find new staff but therefore we train the people ourselves.” Of course the manufacturer has the possibility to take the responsibility of offering training to minimize this hinder. This also connects to the *ability and resources to use telematics*. The more advanced services the distributors offer the more depended they will be on the analysis of the telematics data. This needs dedicated resources and competence that is a prerequisite for services such as availability guarantees.

In addition, the *relationship to the manufacturer* has shown to have a huge impact on the readiness of the distributors. For example Alpha has both company-owned and independent distributors. As the regional manager for central Europe states: “It’s always somehow a bit easier to convince an own distributor.... They have another kind of belongingness.” The closer the collaboration of the manufacturer and the distributor is the higher the chance that the distributor is convinced and engaged in the service provisions strategy of the manufacturer.

An *existing leasing or rental business* can also be a very good prerequisite to get more advanced services on the way. “All the machines on our rental fleet have maintenance contracts on them,” explains the distributor of UAE. The rental business could be a perfect setting to test more advanced service offers and to introduce them later to the regular business.

Finally, in order to drive their own service offers independent from the manufactures overall service strategy, the early adopters need to be *able to bundle their services into own contracts*. One distributor explains how this should look like: “The dealer rolls out bundles as one package, made up of various components from [the manufacturer] and may be some components not from [the manufacturer], similar bringing in of things like lubricants, drivers and fuel. The distributor would bundle everything into one package for the end user.” This shows clearly that providing the most advanced services requires to look beyond the manufactures service templates and to create individual and customized offers. However, this will only be possible if the distributor is *able to handle risks* related to the services themselves. Distributors depended on the risk coverage of the manufacturer will clearly lagging behind and only provide those services that are required from the manufacturer and fully backed up. The very advanced distributor from the Netherlands exemplified this: “We take the risk ourselves ... but I can imagine for small countries it could be good to have a little bit more support because for them it’s more risk.”

Customer Characteristics

The various global distributors also face very different customers and this certainly influences their PSS adoption. One crucial factor geography including is the *distance to customers*. The regional manager for Middle East puts this very simple: “It is almost no point trying to sell a maintenance contract in Sudan for servicing a machine then you have to drive 2000km round trip just to do it.” The same is valid for Australia where certain services are not feasible due to distance: “Generally, serving machines that are far away requires accommodation, because the engineers that travel a certain distance or certain time due to Union and safety regulations they have to stop so the travel and accommodation and all starts

adding up and it becomes expensive to carry out service agreements.” In contrast, the German distributor has much better prerequisites for PSS implementation: “In most of the area we reach our customers within max one hour.” Therefore, the distance to customers will have a major impact on the ability and willingness of distributors to adopt PSS.

In addition, it was noticeable that the *customer size* had a significant influence on the process of PSS adoption. Even though the medium large customers are most suited to try out new things and fit to the early adopter distributors, it is clear that the large and not too small customers have the highest demand for different PSS solutions. This is perfectly illustrated by the distributor from the Netherlands: “It depends a bit on the size, if we take the big fleet owners they are very much on [advanced maintenance contracts], ... they want to know exactly about the running costs and lifecycle costs for the machine and you see that the smaller ones they are very much attracted to total care, because they take care of the machine they wash and clean it nicely, they operate it in a decent way so they don’t have so many damages or big repairs on those machines. So they want to know of course up front what are the risks and cover the risks to a certain level so they are very much attracted to this solution.” Close connected to this is the *customers’ ability to perform repairs and maintenance* themselves. For example the regional manager for the Oceania area stated: “Most of the machines are under operators who look out for their machines and service themselves.” This is of course a big barrier for the distributors because it will be much harder to convince customers about the benefits of service contracts. Another issue is the *urgency of work to be performed* by the customer. The regional manager for northern Europe explained: “I know as long you have projects with deadline here there is always an intention with availability support. Because if you cross a deadline you will get penalized with lot of money.” On the opposite this means that machines that are just used occasionally have a much lower demand for advanced services as the downtime costs are very low.

Finally, the *customers concerns about safety and sustainability* are important factors that influence the attitude and demand for advanced services. Especially services based on monitoring and remote control improve the safety and environmental impact of the machines. If the customer does not care, then the significant benefits for safety and environment will not attract them in any sense. The distributor in UAE illustrated that clearly: “some of them they don’t care about safety, and all the environments ... some of the older customers with older way of thinking just want a machine to do a job and that is a daily battle in terms of machine and aftermarket sales trying to promote the premium quality and premium technology and premium price.” In contrast, the Swedish distributor emphasized the value and importance of safety issues: “When it comes to safety, Scandinavia has come quite far.” This implicates also that they see the added value of services that improve safety and sustainability.

Market Characteristics

Besides the distributor themselves and their customers, there are higher level characteristics that describe the situation on the market which is among others influences by cultural differences or local regulations. First, there is the *market volume* that affects the adoption of PSS. A very low market volume makes it hard to successfully implement PSS because of the low customer base you can offer PSS. The regional manager for Latin America exemplified that low volumes are a challenge for service provision: “The only projects we had here were more than 10 machines with the advanced maintenance agreement, really hard to sell one maintenance agreement for one machine for one customer. I think I never sell that in our market.” The regional manager for central Europe illustrated the huge market variance of the distributors: “We have many different sizes of distributors, distributors with maybe 5 machines a year to distributors up to 2500 deals a year.”

Another crucial factor is the *attitude towards services in the market*. Not all cultures are open for service agreements and the attitudes can be a major challenge for distributors to

successfully implement service provision. The distributor from UAE explained the unwillingness in the market to adopt PSS: “Not everybody wants the highly sophisticated piece of equipment and the telematics that go with, they just want a basic machines and [Alpha] needs to understand that as it is very technologically advanced organization but they also need to be design the products to suit the markets, to make them more accessible, do away with the stuff that people don’t want or need and they are a little guilty of getting too advanced and dealing all the end users in the same way. There are lots of guys here that can’t read or write, we got to remember that.”

Furthermore, the *local regulations concerning services and telematics* influence the convenience of implementing PSS. The regional manager for central Europe illustrates the differences in regulation: “In Germany for example when it comes to telematics you have quite a lot of hard to ensure data security laws in Germany. While in Holland it’s not the same, it’s not that hard, it was easier to launch telematics from the start also the thinking of the customers is different in these two countries.” When laws and regulations challenge the implementation of advanced PSS, also the distributors will hesitate to adopt PSS.

Finally, the availability of *alternatives to authorized distributors* affects the power of the distributors in the aftermarket and their ability to sell PSS easily. The distributor in Australia explained this problem: “The customers have alternatives in Australia like local mechanics or their own mechanics to work for, so it’ll be difficult.” In contrast the regional manager that is responsible for Cuba described the situation like this: “the customers they don’t have any influence, they can’t buy parts anywhere else, it’s quite easy to sell the contracts in Cuba.” Figure 1 shows a summary of the characteristics that can be used to classify the distributors.

DEVELOPMENT OF A BUSINESS MODEL ADOPTION SUPPORT FRAMEWORK

Based on the analysis of the characteristics that influence the maturity and readiness of the distributor it is possible to draw conclusions about the support mechanisms that are needed to help the distributor to adopt to the provision of the different types of PSS. This is supported by data from the interviews about the distributors and managers own ideas about potential support. The business model concept will be used to categorize the support mechanism in order to make the support more directed whether the problems are connected to value creating, value delivery or value capture. Figure 2 shows the framework to support the distributors’ adoption of PSS. In general it can be stated that all distributors have to develop continuously regardless of their maturity and that there is a need for a common vision throughout the manufacturing company and its distributors about selling solutions to even promote the willingness to learn from each other and to show coherence.

Support mechanisms for laggards

Those distributors that are lagging behind in terms of PSS adoption need basic support and help to reduce the distributors’ responsibility. For value creating this would implicate support in form of promotion campaigns to understand the benefits of PSS and to get convinced that they should get started with it. They also need basic training in e.g. work planning or pricing to be able to offer PSS in a way that created value. For the delivery of value there are several things that would strongly support lagging distributors. First, a competent help center would assure them support in trouble cases and be a partner that they can rely on or ask questions. Second, different calculation tools provided by the manufacturer would make tasks like price setting much easier because it built on previous experience from more advanced distributors. Third, help with logistics would be appreciated. This includes not only when and where e.g. spare parts are, but also support with take-back agreements for unneeded extra stocks of equipment. Finally, providing the distributors with standardized contracts that they can use for basic service agreements will give them the security to have well-developed contracts. To support the value capture of lagging distributors, the manufacturer should offer them some

type of insurance that back them up in cases of unexpected situations and give them the security to not lose a lot of money on PSS. In addition, especially monetary incentives will help promoting the benefits of PSS and significantly support the adoption of PSS.

	Characteristic	Early Adopters	Majority	Laggards
Dealer Capabilities	Willingness and ability to invest in services	High		Low
	Access to well-trained technicians	Easy		Hard
	Ability and resources to use telematics	High		Low
	Relationship to the manufacturer	Close		Minimal
	Leasing/rental business to get services started	Exists		Does not exist
	Ability to bundle service into own contracts	High		Low
	Ability to handle risks	Insurance/ Portfolio		Not able
Customer Related Characteristics	Distance to customer	< 1h		> 2000km
	Customer size	Sufficient	Big	Too Small
	Customers' ability to perform repairs and maintenance	Low		High
	Urgency of work to be performed	Deadline Projects and critical tasks (Pavers)		occasionally used
	Customer concerns about safety and sustainability	High		Low
Market Related Characteristics	Market volume	3000 machines per year		5 machines per year
	Attitude towards services in the market	Open		Hesitant
	Local regulations concerning services and telematics	Supportive		Problematic
	Alternatives to authorized dealers	Few		Many

Figure 1: Categorization based distributor, customer and market characteristics

Support for majority distributors

Distributors that have started offering simpler types of PSS and can be classified majority will need more specific support and optional ways to secure the value in the process. To improve the value creating, distributors would need specific and individual training on more advanced ICT or tools that will increase their diversity and degree of PSS offers. This could for example be training in telematics or proactive maintenance which would improve the distributors' ability to offer advanced PSS. To support value delivery, the manufacturer can

provide the distributors with the necessary infrastructure and tools to run all service elements by themselves reducing the dependency on the manufacturer for the service delivery. For value capture, the main support majority distributors need is some type of ceiling option that would help out in cases of major financial losses related to PSS. It would lead to some security but still encourage the distributors to take own responsibility for financial outcomes of the services.

Support for early adopter distributors

Also the most matured distributors that offer the highest levels of PSS need to be supported to further develop and to get inspired. To facilitate an even higher value creation, advanced and selective trainings should be offered to keep up with latest developments and trends. Furthermore, those distributors should be included into pilot studies to test new service offers and evaluate them. To support the value delivery, early adopter distributor should be able to freely bundle service offers out of modules defined by the manufacturer. This will secure that they stay in line with the overall service strategy of the manufacturer but will still give them the freedom of own bundling. In terms of value capture, the manufacture should expect that those distributors can take the risks themselves and avoid major support to ensure the market profitability of the offered services.

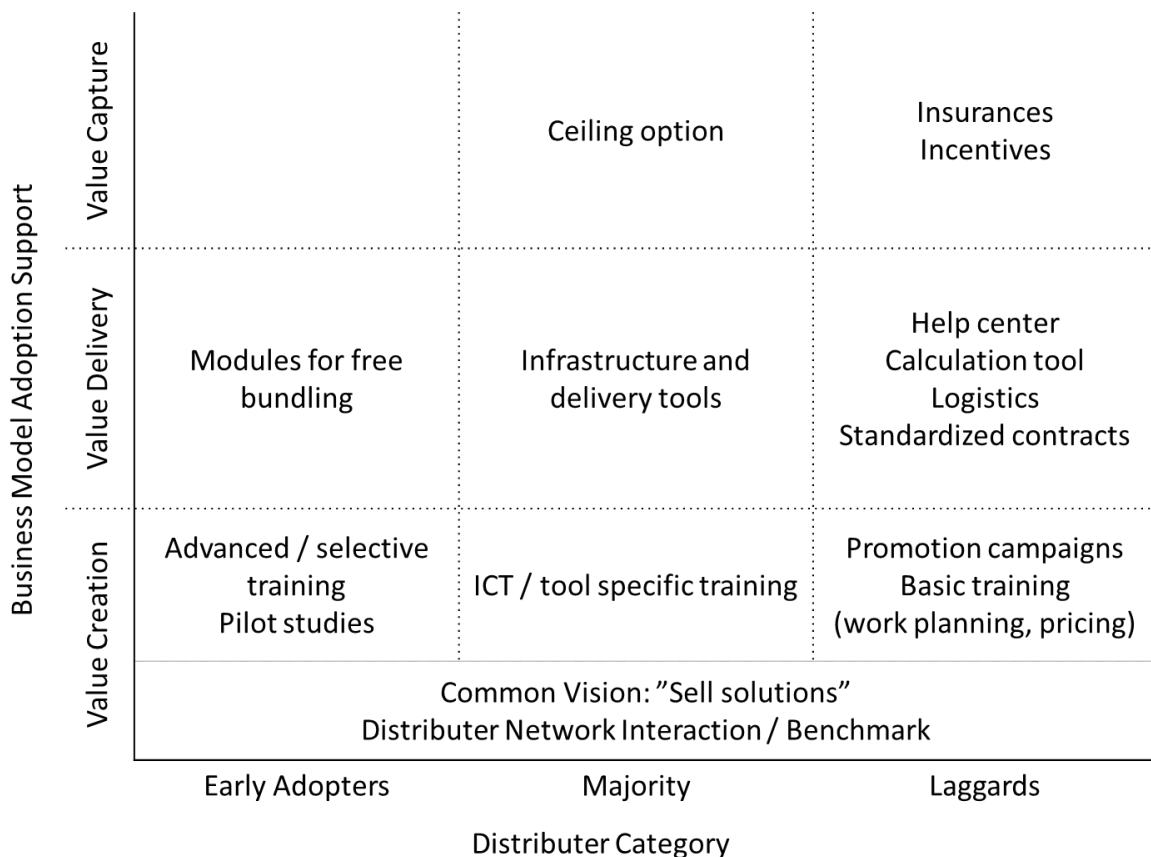


Figure 2: PSS Adoption Support Mechanisms

DISCUSSION AND CONCLUSION

Theoretical implications

The present study makes several theoretical contributions. First, the categorization of distributors into early adopters, majority and laggards provides an empirical maturity assessment for the service provider that is crucial to support the adoption of PSS by the distributor (Durugbo and Riedel, 2013; Kowalkowski et al., 2011). This is especially

important because global distributors are very different from each other and there is no one fit all solution to support them in the process of becoming a PSS provider (Wilson, 1999; Zarpelon Neto et al., 2015). Furthermore, the categorization of the distributors utilizes an adaptation of Rogers (1995) well-known groups of the diffusion of innovation process. In contrast to common PSS categorizations, this builds on the capabilities of the service providers and not the characteristics of the offers as commonly used (Meier et al., 2010; Tukker, 2004). More important, the categorization highlights the different characteristics that influence the readiness level of global distributor network and divides them into distributor specific, customer related and market related characteristics. These different prerequisites for the adoption of PSS business models by the distributors have received scarce attention in the present literature (Bagheri et al., 2014; Harrington and Srari, 2012). Thus, the present study contributes to the categorization discussion within PSS literature by providing in-depth assessment of the readiness and maturity of PSS service providers.

The second contribution of the present study is to develop a PSS business model adoption support framework that builds on the different maturity of the distributors. Specifically, we identified several support mechanisms that the manufacturer can apply to drive the adoption process of their distributors forward. This emphasizes the need for directed support of all distributors adapted to their maturity including the development of manufacturer –distributor interaction (Kowalkowski et al., 2011; Tabibzadeh and Wireman, 2003; Wilson, 1999). The framework presents a way for the manufacturing companies to respond to and solve the main hinders of PSS adoption which include the different cultural conditions, risk aversion and not aligned objectives (Lockett et al., 2011; Parida et al., 2015; Zarpelon Neto et al., 2015).

Finally, a key contribution of the present paper is to utilize the business model concept for the directed support of PSS adoption by the distributor network (Barquet et al., 2013). Derived from the need for business model innovation, this paper analyzes the adoption process of the distributor network that is required for successful PSS provision. Using Teece (2010) business model components (value creation, value delivery and value capture) this paper provides in-depth recommendations to bring forward all business model aspects to guarantee consistence and success. However, by dividing the support mechanisms of the proposed framework into business model components also enables the support of just one specific component that is most challenging for the specific distributor. Thus, the paper adds to the ongoing discussion of PSS business model implementation (Meier et al., 2015; Reim et al., 2015; Tukker, 2015) underlining the importance of a holistic business model analysis to successful implementation of PSS throughout the value chain.

Managerial implications

For managers responsible for developing PSS offers, it is especially important to realize that the adoption of PSS business models by the diverse distributor network is crucial in order to reach out with the PSS strategy to the customers. There are many reasons why distributors hesitate to adopt PSS business models and the readiness level varies significantly. Therefore, understanding of the fact that the distributors have to be treated differently based on their prerequisites and characteristics is crucial. However, the distributors are not only influenced by their own characteristics, the customers they serve and also the overall market conditions contribute significantly to the differences of the distributors. Categorizing the distributors into early adopters, majority and laggards will lead to a valuable understanding of the opportunities and challenges the distributors are facing. Furthermore, this understanding will significantly improve the relationship between manufacturer and distributor because of the more adapted support actions. To guide the choice of the right support mechanism the framework developed in the paper will help to provide the most appropriate support to the specific dealer and also related to the business model component that is most challenging. However, it is important to understand that the communication of shared values such as a

vision to become a solution provider needs to happen across the whole organization by attracting both early adopters and laggards in PSS adoption.

Limitations and future research

Although the results provide several contributions to the emerging PSS literature, the present study has certain limitations that should be considered when interpreting the results. Accordingly, the limitations provide a starting point for future research. First, by choosing a case in which a company is actively working to develop its PSS offers, we gained insights from their long experience in PSS offerings and operations. The insights are limited to a single case study design, however, thus adopting a multicase study design would provide the potential for cross-case analysis, which is not possible at present. Thus, we do not strive for generalizability in our results. Future research could also conduct further empirical studies to validate or extend the findings of the present study through quantitative studies. Second, the present study analyzed the PSS adoption by the distributor network from the manufacturer's view. More specifically, the support that the manufacturer can give to facilitate adoption by the distributor network and the distributors' own and customer-driven reasons that lead to adoption are neglected. Therefore, we recommend that future research takes a different view and develop adoption strategies that are based on the internal activities of the distributors that lead to PSS adoption. In particular, an integrated approach covering internal and external aspects of PSS adoption would further advance the PSS literature. Third, the present study was based on a Swedish manufacturing company, and the results could differ in another cultural or industrial setting. Future research should investigate whether these findings hold under other conditions (e.g., companies from Asian countries). Fourth, the present study identifies criteria that affect the choice of the support mechanisms. Our list may be incomplete, however, and the mechanisms are not established in relation to one another to create a weighting to determine the most critical criterion. Creating this weighting would be very beneficial for future PSS adoption.

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