

“Critical issues during servitization: an in-depth case study.”

Fredrik Nordin¹, Luigi Servadio²

Paper presented at AMA Servsig, International Service Research Conference

Hanken School of Economics, Helsinki, Finland, June 7-9, 2012

¹ Associate Professor at Stockholm University School of Business (Sweden)

² Research Assistant at Stockholm University School of Business (Sweden)

Abstract.

Purpose: the study develops a conceptual framework focusing on critical issues during the servitization of manufacturing, drawn from three research streams (namely organizational, procedural, relational) and illustrates how the critical aspects affect each other through an in-depth observation of the phenomenon.

Design/methodology/approach: based on a literature review, the study develops a conceptual framework of six propositions corresponding to central critical aspects when manufacturing firms expand their offering with new services. The conceptual framework is examined empirically by a single case study at ABB Robotics focusing on the development of a Remote Service Assistance.

Findings: the conceptual framework and the propositions find wide support from the empirical ground. However, the in-depth study reveals several contextual factors (exogenous as well as endogenous) that act as moderators and deviators in a hypothetical linear process toward servitization.

Research implications: the research provides an original conceptual framework and six propositions that contribute to the literature on servitization. Furthermore, the interdisciplinary character of the study contributes to the interplay of the different research communities.

Practical implications: the conceptual framework and the propositions provide guidance of the servitization in practice, including several criticalities especially in terms of operational management.

Originality/value: the study provides an original holistic picture of servitization that leads to deeper understanding of servitization in theory and practice.

Preliminary Keywords: criticalities, servitization, holistic, operational management

Type of paper: research paper

Introduction

Manufacturer firms are even further moving away from stand-alone products by adding services to deliver more value to their customers (e.g. Vandemerwe and Rada, 1988, Wise and Baumgartner, 1999; Shepherd and Ahmed, 2000; Galbraith, 2002; Oliva and Kallenberger, 2003; Davies, 2004; Davies et al., 2006, 2007; Neu and Brown, 2005; Gebauer, 2008; Baines et al., 2009). This business practice has been defined for the first time by Vandermerwe and Rada (1988) as “servitization” which means “fuller market packages or bundles of customer-focussed combination of goods, services, support, self-service and knowledge” (Vandermerwe and Rada, 1988, p.314).

During the last decades, Scholars have studied this phenomenon from many different angles and the body of knowledge results to be fragmented, with different theoretical perspectives mixed in a rather unstructured way - from product to service marketing, from organizational to managerial approach, from transactional to relational perspective. What is more, besides some notable exceptions (i.e. Galbraith, 2002; Davies et al., 2006, 2007) the literature has an inclination toward a descriptive rather than descriptive approach (Baines et al., 2008). This poses some difficulties and issues when trying to portrait an outstanding picture of the idiosyncrasies of the servitization of manufacturing, because it is problematic to summarize and to conceptualize a useful framework as a unique tool that managers can apply when approaching to the servitization. As a result, to make sense of the literature and to specify which are the main critical aspects when manufacturers ‘servitize’ their business, we have grouped the literature in three main research streams according to the perspective of the analysis.

In the first research stream, Scholars have portrayed the process of servitization by putting at the centre of the investigation the management of a new organizational model, based on the firm’s inclination to be customer-centric instead of product-centric (above all: Galbraith, 2002, Oliva and Kallenberg, 2003). This organizational dimension of servitization is further enriched by another body of knowledge interested in understanding the impact of the switch from products to services, in terms of organizational values and culture (e.g. Grönroos, 1990; Neely, 2008; Martinez et al., 2010; Gebauer et al., 2006, 2010). Common for this literature is that an internal perspective in the analysis aiming to understand the servitization from the company’s inside is adopted.

Related to the organizational dimension, we have conceptualized a second notable stream of research: the procedural dimension of the servitization of manufacturing. The literature in this area looks specifically at processes and systems through which the service offering is carried out by manufacturers. This body of knowledge is a hybrid one, because the focal point is still internal, in the sense that the purpose is to identify organizational competences and capabilities that have to be

practiced in order to deliver services, but in addition, it links the internal activities with the external factors involved in the process of servitization (e.g. customers and partners). Notable examples are: Davies et al. (2006, 2007), Shepherd and Ahmed (2000), Mathieu (2001b), Brady et al. (2005), de Brentani (1989, 1991, 1995), Gebauer et al. (2007), Spring and Araujo, 2009).

The third consistent research stream it is defined as relational dimension of servitization because it draws his basis on the relational paradigm's concept (Håkansson and Snehota, 1989). Here, the lens of the analysis is focused more on the external activities and more precisely understanding how and why manufacturers interact with its constellation of network actors when delivering services and solutions. We have grouped the articles within this research stream into two subcategories: 1) the first group are based on supplier-focused articles, while 2) the second group is composed by primarily customer-focuses articles. In the former Scholars have addressed servitization by investigating the firms' supplier networks (above all Nordin, 2005; Windhal and Lakemond, 2006; Tuli et al., 2007), considering the relationship between manufacturers, partners and resources from a relational point of view. The latter is closely related to Vargo and Lusch's conclusions (2004, 2006), according to which customers are considered as active actors able to (co) create value in the servitization process. Eminent examples of this field of research are Grönroos (1994; 1998; 2006; 2008), Mathieu (2001), Matthing et al. (2004), Cova and Salle (2007), Tuli et al. (2007), Payne et al. (2008), Ford (2011), Smith and Reynolds (2001).

Hence, the literature has constantly used different but dedicated lenses of analysis devoted to focus just one or few aspects of the whole picture. However, only a limited number of papers (i.e. Vladimirova et al., 2011, Brax and Jonsson, 2005) have focused on the servitization process by looking at the phenomenon with a broader lens of analysis. For instance, it has been suggested by Brax and Jonsson (2005) that a holistic view could be more relevant to better understand the servitization practice, because of its complexity. They claimed that a more comprehensive perspective would benefit the analysis as the solution development is not a "straight-forward implementation process". Further, we argue that for practicing managers, it would be more useful to take a holistic perspective because it can better reflect the complexity of servitization in practice, including several aspects of strategic and operational management.

Thus, to contribute to this gap, this paper's purpose is as follow: 1) to provide a general overview of the servitization by formulating a set of propositions that can summarize the most critical aspects; 2) to evaluate the reliability of the body of knowledge as such in an in-depth single case study.

The paper is organized as follow: the first part will review the literature on the servitization in three main conceptual dimensions, according to the research streams introduced above: a) the

organizational dimension (internal); b) the procedural dimension (hybrid); c) the relational dimension (external). For each conceptual dimension, a set of propositions will be advanced. Afterwards, based on the propositions formulated, a conceptual framework will be proposed, to depict a synthetic, but at the same time exhaustive overall picture of the phenomenon. The second part of the paper will present the methodology and the empirical case study chosen. Finally, theoretical and practical implications for managers will be discussed, as well as future possible researches.

1. Literature review and research propositions

To start with, it is important to state what we mean by servitization. In the literature there are many different definitions on servitization (cfr. Baines et al., 2008). However, as this paper intentionally aims to depict a broader picture of the phenomenon, we intentionally chose to follow the Vandermerwe and Rada's (1988, p. 314) definition that states how *"modern corporations are increasingly offering fuller market packages or 'bundles' of customer-focussed combinations of goods, services, support, self-service and knowledge"*. The main reasons are twofold: firstly because the two authors define servitization as a business process through which "corporations blend services into the overall strategies of the company". This basically implies that the concept of servitization is not a static dimension of the business, rather a dynamic and improving activity that organizations tend to apply within their product antecedents. Secondly, because the involvement of "goods, services, support, self-services and knowledge" refers to a wider range of notions that allow us to include in the analysis the concepts of solution as well as product-services. Thus, this conceptualization permits an evaluation of a broader range of articles in the literature in order to touch many different aspects of the phenomenon and to choose between the critical elements in the manufacturing service development. By doing so, we are sufficient confident to have analysed the servitization as a holist phenomenon, as we intended to do.

The following literature review aims to develop a conceptual framework of six propositions structured as follows: P.1.A and P.1.B are propositions related to the organizational dimension of the servitization; P.2.A and P.2.B propose two keys criticalities regarding the development of the servitization from a procedural dimension; the last two critical aspects rely on the relational dimension as P.3.A relates to the relationship between manufacturers and their suppliers to deliver solutions, while P.3.B focuses on the interactions between customers and the manufacturing firms.

1.1 The organizational dimension of servitization: internal perspective.

The literature is unanimous in stating that manufacturers need to switch from their product-centric organization to embrace a more customer-centric orientation “to create an organization that can package and deliver the solutions” (Galbraith, 2002, p. 194).

Oliva and Kallenberg (2003) pointed out that the shifting from product-centric to customer-centric organization it is not accomplished until the unit who masters the product and the unit who provides services are strictly separated. Further, according to the two Authors, the service unit should act as an independent subject, not only in terms of processes and systems, but also in terms of financial attitude and managerial responsibility. The reason is that manufacturers, in order to take entire responsibility of the end user’s operations, need to “establish itself firmly in the maintenance and professional services market.” (Oliva and Kallenberg, 2003, p. 170)

To draw this debate into even more practical terms, Gebauer et al. (2006) argue that the separation of the service organization from the product unit enables a higher rate of service revenues in manufacturing companies, because it helps employees to achieve their own goals and thus to contribute to the overall corporate goal. However, it is here important to underline that the separation between service and product units does not automatically correspond to success (Brax, 2005; Turunen and Toivonen, 2011). For example Brax (2005) argues that the implementation of a steadily strategy of servitization could be hazardous due to the presence of some important challenges (i.e. in marketing department, in the production line and design, in communicating the new value-proposition).

In conclusion, these arguments suggest the following proposition:

P.1.A: In the organizational dimension of the servitization of manufacturing, it is critical to separate the product unit from the service units to enhance the service’s delivery and the business profitability

The organizational dimension does not only address the issue of how to organize and manage different companies’ assets. It further concerns on which kind of values and beliefs must govern the employees’ daily operations, and more generally, which are the key values that a manufacturer needs to possess to become a service provider. The “service shifting mindset” (Neely, 2008) or the “embedded product-service culture” (Martinez et al., 2010) are business behaviours positively related to company’s overall performance (Homburg et al., 2003; Mathieu, 2001b; Gebauer et al., 2006). Grönroos (1990) explains that the service management is a business activity that requires a

“change of focus of management in service firms as well as in manufacturing firms” (Grönroos, 1990, p. 7). That means attaching constant attention to the business routines instead of providing a stand-alone performance, because services are delivered over time, while goods are sold just once. However, scholars have broadly claimed that gaining a service culture is sometimes rather problematic. Gebauer et al. (2006, p. 382), for instance, argue that “a service culture in manufacturing companies must be nurtured continuously and grows over several years on the basis of an appropriate service awareness”. In addition, scholars (e.g. de Brentani, 2001; Gebauer, 2007) claim that for an established product-oriented manufacturer the process of becoming a service company could be challenging due to presence of the antecedents of the product culture. Particularly, according to the Vladimirova et al.’s (2011) Transformation Model for Servitization the culture and value factors act as barriers instead of enablers of the service strategy. The major change is in the shift of the organizational culture: “from technology-led to service oriented and from features-lead to value-based”. In other words, the product legacy if on the one hand provides a valuable heritage to be exploited in the market; on the other hand it inhibits the required service orientation to business.

In conclusion, these arguments suggest the following proposition:

P.1.B: In the organizational dimension of the servitization of manufacturing, it is critical to shift the manufacturer mind-set in terms of culture and values from product to service, to enable the process of servitization.

1.2 The procedural dimension of servitization: hybrid perspective.

Many Scholars claim that it is quite problematic to engineer the development of a service due to the characteristic of perishability, according to which it is impossible to clearly separate the production phase from the consumption: both events occur at the same time. As a consequence, planning and supporting professional services become rather critical (above all: Zeithaml et al., 1985, de Brentani, 1989, 1995; de Brentani and Ragot, 1996; Shepherd and Ahmed, 2000; Windhal and Lakemond, 2006). E.g. Gebauer et al. (2008) argue how often the development of a new service innovation is not based on formal procedure or standard development frameworks: “it simply happens”. However, Bitner et al. (2008, p. 4) claim that successful services are often based on planned activities and processes that span “from the establishment of clear objectives, to idea generation, to concept development, service design, prototyping, service launch, and customer feedback”. Thus, it is important to specify within a detailed framework those processes and procedures according to which services are developed. The same opinion is shared by de Brentani and Ragot (1996) who further investigate in which factors impact the performance when developing new business-to-business

professional services. According to the empirical data collected, the authors highlighted a positive correlation between those firms who have a formal approach that guides the New Service Development (henceforth NSD) and higher rates of successful services. The authors conclude that, although in the literature it is claimed that the development of new services could be a haphazard approach, the data demonstrate the opposite: successful services were those previously planned according to formal process and procedures (i.e. Marketing activities). On the contrary, when companies do not apply with proficiency a detailed and a very well planned NSD framework this constitutes a key in their failure (de Brentani, 1999; de Brentani and Ragot, 1996).

Concluding, these arguments suggest the following proposition:

P.2.A: In the procedural dimension of the servitization of manufacturing, it is critical to apply formal processes and procedures (i.e. NSD framework) to enhance the success of service delivery.

Shepherd and Ahmed (2000) underline that becoming a solution provider is more than simply supplying the exact solution that customers require. Thus, when manufacturing firms adopt the strategy to add services to their core products offering, this implies the development of new capabilities simply because, on the one hand the shifting process from product-centric to customer-centric organization requires a new range of activities to be developed (namely technical competences, customer partnering competences, integration competences, market/business knowledge competences); on the other hand becoming service-oriented means that firms have to integrate the customer's systems into their own processes by developing business activities and by taking risks that belong formerly to their customers (i.e. Baines et al., 2009; Brax and Jonsson, 2009).

We can group the different ranges of new capabilities discussed in the literature in two main categories: organizational capabilities and operational capabilities.

In the first group Davies et al. (2006) and Brady et al. (2005) indicate that successful examples of customer-centric organizations (i.e. IBM, GE, Nokia, Ericsson) are those capable to refocus their former organizational structure around customer's requirements by implementing a "three part organizational structure", which consists of three different type of units: 1) a front-end (Customer Facing Unit) that aims to gain fully access to the customer and understanding the specific customer's needs; 2) a back-end unit, that provides the front ends with a wide range of solution-ready products and services; 3) a strong strategic centre which role is central in linking front with back ends to "enable a speedy and rich of knowledge and information." (Davies et al., 2007, pp. 43-44)

With operational skills we meant those new capabilities required to develop and deliver services. Brady et al. (2005) individuated four broad operational capabilities: Systems integration, Operational service, Business consulting and Financing. In addition they highlighted seven more detailed “skills” in terms of Key account management, Risk analysis and management, financial acumen, Legal skills, Information management, Innovation management, Portfolio management. In addition, Vladimirova et al. (2011) claim that Risk Analysis and Management is one of the main important skills that manufacturers need to develop as moving into services business can expose a traditional manufacturing firm to certain risks (i.e. losing revenue from its product sales). Another critical capability often discussed by Scholars is the management of 1) innovation and 2) information (Frambach et al., 1997; di Benedetto, 1999; Möller and Rajala, 1999; Brady et al., 2005). The purpose is basically to develop and maintain relevant knowledge about technology. That is, understanding when some equipment is obsolete and determine how and when to substitute them with radical innovation or rather pull out the more from the assets in use.

Concluding these argumentations suggest the following proposition:

P.2.B: In the procedural dimension of the servitization of manufacturing, it is critical to develop new competences in terms of organizational and operational capabilities to address customer’s needs

1.3 The relational dimension of servitization: external approach.

A central debate on the servitization discourse is about business networks (i.e. Kothandaraman and Wilson, 2000; Shepherd and Ahmed, 2000; Nordin et al., 2010; Windhal and Lakemond, 2006; Brax and Jonson, 2009).

The logic that stands behind business-to-business relationships is that often the companies involved in the alliance can quickly acquire knowledge and skills from each other without having to invest in internal resources. (Nordin et al. 2010). Shepherd and Ahmed (2000, p. 103) fostered the partner’s critical dimension by emphasizing the importance in “partnering with key suppliers who can provide a world class products and services to address [customer’s] needs.” Thus, the firm’s network can represents a sort of shortcut in acquiring specific and dedicated resources that customer cares. Further, the acquisition of new and more competences through strategic partnerships can even improve the firm positioning (Penttinen and Palmer, 2007). In addition, Windhal and Lakemond (2006, p. 817) identified six main successful factors related to the business network relationships, which are: “(a) the strength of the relationships between the different actors involved in the project,

(b) the firm's position in the network, (c) the firm's network horizon, (d) the solution's impact on existing internal activities, (e) its impact on the customers' core processes, and (f) external determinants". However, often the relationship with manufacturer's partners can be problematic in many ways, especially when it comes to the service supply relationship. Particularly, writing agreements for service exchanges, defining the service process, outsourcing the delivery of the service and controlling the relationship with the end-user avoiding opportunistic behaviour are potential key challenges (Åhlström and Nordin, 2006).

Concluding, these arguments suggest the following proposition:

P.3.A: In the relational dimension of the servitization of manufacturing, it is critical to develop strategic partnerships with suppliers to acquire new competences and to deliver superior value for customers.

During the last decade, a rich body of knowledge in the servitization aiming to disclose the relationship between manufacturer and customer has emerged (e.g. Mathieu, 2001; Grönroos, 2008; Ballantyne and Varey, 2006; Tuli et al., 2007; Cova and Salle, 2007; Payne et al., 2008). This literature it is consistent with the Service dominant logic paradigm, according to which "a service centred dominant logic implies that the value [of the solution] is defined by and co-created with customer, rather than embedded in output" (Vargo and Lusch, 2004, p. 6). Therefore, the shift in the perspective (from internal to external) suggests two main implication highlighted by Brax and Jonsson (2009): on the one hand, the way manufacturers used to pack, price and communicate the solution need to be re-adjusted in terms of performance instead of transactions. On the other hand, the value that firms need to focus on is not the effectiveness of their product *per se*, rather the applicability and interconnectivity of the product into the customer's systems and processes.

As a result, manufacturers need to constantly relate to customers to understand customer's dimensions and at the same time, customers need to be able to recognize and decode the value of the solution offered (Tuli et al., 2007). According to Mathieu (2001) two factors become rather critical: 1) the ability to build up "favourable interactions" to exactly correspond what customer requires; 2) the capacity to develop communication strategy devoted to "describe the value proposition to customers". Therefore, the main challenge is to create a "shared understanding" both internally and externally toward the customer.

If the co-creating value is based on developing mutual interactions, what is then the critical aspect in the management of the co-creating process? According to the academia learning is the central aspect (e.g. Ballantyne and Varey, 2006; Cova and Salle, 2008; Payne et al., 2008)

Particularly, Payne et al. (2008, p. 87) claim that “the relationship experience leads to customer learning”. The customer learning, in turns has a positive impact on the customer satisfaction and involvement. Eventually, an involved customer tends to actively participate in the co-creation process by i.e. repeating purchase or helping the supplier improving the service encounters toward its own requirement. As a result, it is critical for the supplier supporting the customer learning process by understanding the customer’s cognition, emotion and behaviour (Edvardson 2005).

Thus, constant learning interactions and relational exchanges between customers and suppliers are required in order to enhance the customer’s value that can potentially lead to long-term business relationships.

Concluding, these arguments suggest the following proposition:

P.3.B: In the relational dimension of the servitization of manufacturing, it is critical to engage with customer through learning interactions, to enhance the customer’s value.

1.4. The conceptual framework for the servitization process.

<i>P.1.A In the organizational dimension of the servitization of manufacturing, it is critical to separate the product unit from the service units to enhance the service’s delivery and the business profitability.</i>
<i>P.1.B In the organizational dimension of the servitization of manufacturing, it is critical to shift the manufacturer mind-set in terms of culture and values from product to service, to enable the process of servitization.</i>
<i>P.2.A. In the procedural dimension of the servitization of manufactuinrg, it is critical to apply formal processes and procedures (i.e. NSD framework) to enhance the success of service delivery.</i>
<i>P.2.B In the procedural dimension of the servitization of manufactuinrg, it is critical to develop new competences in terms of organizational and operational capabilities to address customer’s needs.</i>
<i>P.3.A In the relational dimension of the servitization of manufacturing, it is critical to develop strategic partnerships with suppliers to acquire new competences and to deliver superior value for customers.</i>
<i>P.3.B In the relational dimension of the servitization of manufacturing, it is critical to engage with customer through learning interactions, to enhance the customer’s value..</i>

Tab 1: taxonomy of the propositions formulated

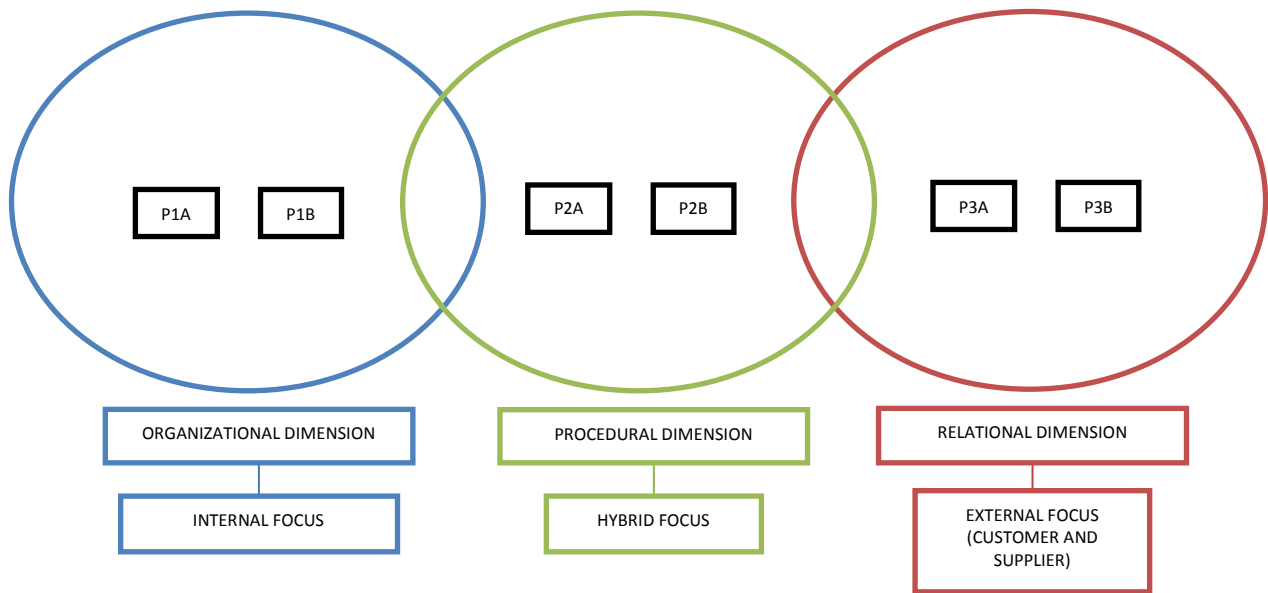


Fig.1: The three conceptual dimensions of servitization and the positioning of the 6 propositions.

Figure 1 proposes a framework composed by the three main overlapping conceptual dimensions that reflect the three main research streams in the servitization reviewed and discussed in the previous section: 1) the *organizational dimension* which aims to analyse the servitization of manufacturing from an internal company’s perspective; 2) the *procedural dimension* that aims to both analyse the internal practices and the external dynamics; 3) the *relational dimension*, which poses the focus of the lens of analysis toward the external dynamics (partners and customers). Accordingly, each propositions formulated are mapped within the related conceptual dimensions: P.1.A and P.1.B reside in the organizational dimension due to their internal characters, P.2.A and P.2.B belong to the procedural dimension, because they arise from activities that are both internal to the company (e.g. the strategic service business development) and external (i.e. the customer care activities); P.3.A and P.3.B belong to the relational dimension and the perspective is external, because the focus of the analysis goes beyond the organization boundaries (i.e. the manufacturer’s supply chain and the customers).

The framework is twofold useful: on the one hand it aims to capture a snapshot of the entire figure of the solution offering (holistic perspective), on the other hand it helps to position within the servitization space, where the main criticalities lay.

2. Case design and Methodology

Case study methods are required to provide detailed descriptions of a phenomenon, to test the reliability of a theory and for theory generation (Eisenhardt, 1989; Perry, 1998; Yin, 2009). Accordingly, to evaluate the reliability of the propositions formulated in the previous section, a single

case study has been conducted. Lee (1989) claims that the advantage for using a single case study is related to a higher degree of rigorous method in examining a phenomenon that exists in a real world. Furthermore, in contrast to multiple-case studies, the advantage of using single case studies is that they can offer a better empirical ground for a deeper understanding of a phenomenon that need to be studied in depth (Yin, 2009).

However, it has been argued (e.g. Yin, 2009; Eisenhardt, 1989; Hillebrand et al., 2001) that case studies may suffer of two weaknesses: 1) the lack of rigor both in collecting data and in interpreting the outcomes; 2) the impossibility to generalize the findings to a large extent (external validity)

To solve the first issue, as suggested by Yin (2009) a case study protocol has been developed in order to increase the reliability of the research and to lead the collection of the data for all the duration of the study. Yet, as argued by Voss et al. (2002) the case study protocol is more than a “research instruments”, because it should contain the explanation of the research sources (i.e. interviewees) and it clarifies why and how those sources are used. Furthermore, the case study protocol is a desirable methodology that helps researcher in avoiding misinterpretation biases (Weick, 1979 cited in Dubois and Gadde, 2002, p. 555).

Regarding the issue of the theory generalization in case studies, we follow Yin (2009) arguing how the attribute of the generalization is acceptable even though not relevant in statistical point of view. Particularly, the theory testing is a design research that implies a deeper understanding of a certain phenomenon and that focuses more on the theoretical generalization, rather than statistical. The same argumentation has been confirmed by Hillbrand et al. (2001) by arguing that when a researcher is able to formulate logical argumentation in support of causal relationships, it may be concluded that these causal relationships also hold for cases that are structurally similar.

2.1 The case

The study was conducted within the ABB Robotics, a multinational company producing industrial products, which are maintained through technological services. ABB Robotics is an ABB AB’s Business Unit that has installed more than 200.000 robots worldwide, whose head office is located in Västerås. It designs, produces and delivers robots for two main categories of customers: the Automotive Industry (cars) and the General Industries (i.e. food, packaging, nuclear plants). Since years, ABB Robotics has adopted a different approach in supporting its clients, by implementing an advanced and innovative product-related service so named the Remote Service Assistance (hence forth Remote Service).

The Remote Service represents an innovative installed based service that allows the Company to monitor their Robots world-wide installed, applying the wireless technology. The purposes of this innovative service are twofold: from the customer point of view is to prevent costly maintenance, to reduce the break-down and to increase the performance of the Robots. From the ABB perspective, the Remote system can put focus on reduction of cost of poor quality, it delivers constant revenues, it improves the relationship with customers, it takes away reasons to select local competition and it takes out spare part price discussions.

Hence, the ABB's product service represents an interesting and pertinent case study to be researched, because it matches three important requisites: 1) ABB is a big-size industrial company that can comprehensively represent the complexity of the theoretical framework; 2) ABB is delivering an installed based product service; 5) the Robot Market represents a new empirical ground for product services, that it has not been yet investigated by scholars.

2.2 Data Collection and Analysis.

The case study is mainly based on in-depth semi-structured interviews, that were conducted at ABB headquarter located in Västerås. This choice was suggested by the need to investigate not only about the fact of matters, but further to ask respondents about their opinion about events (Yin, 2009). The interviews were firstly recorded and integrated with personal reflections noted in a case study journal. Consequently, the materials were immediately transcribed to better crystallize and assimilate the answers given. After conducting the interviews, the researchers were involved in direct observations (such as meetings attendance and workshops) and informal conversations with the after sales ABB employees.

It is pertinent to underline that interviews have been valuable and useful in the evaluation of the propositions formulated. While the other sources of evidence (i.e. observations) have been helpful in the general understanding of the case study and especially in the perception of the internal and external dynamics of the organization.

Primarily, the respondents have been categorized into two main types: the key informant and the specific informants. This preliminary mapping was pertinent and useful in order to better follow the conceptual framework and to develop different questionnaires in relation to the informants' working background.

Particularly, one questionnaire has been developed for those interviewees that operate in the organization back-end. The purpose was to investigate on the propositions P.1.A and P.1.B regarding

the main criticalities in the organizational dimension. The second type of questionnaire has been designed for those interviewees that interact with both the internal and external organizational dimensions (i.e. front-ends employees): the propositions involved in the second questionnaire were P.2.A, P.2.B. Finally, a third and a fourth questionnaire has been specifically developed to investigate the relational dimension of servitization and respectively the proposition P.3.A regarding the ABB's partners and the proposition P.3.B related to the ABB's customers.

To achieve higher a degree of accurateness and convincement other sources of evidences were collected such as corporate documentations, participant observations and meeting attendance.

The data has been analyzed and "triangulated" (Yin, 2009) by using the technique of "pattern matching". The logic of the pattern matching is to evaluate and contrast (where required) the empirical material with the propositions previously formulated, to reach a certain degree of internal validity (Yin, 2009). However, one of the main risks in the "pattern matching" technique is the tendency to move away from the original topic due to the complexity of the data gathered. Therefore, the idea has been to strictly follow the conceptual framework depict in Fig. 1, by structuring the analysis according to the propositions formulated. Consequently, the empirical data has been compared with the body of knowledge by matching each proposition (from P.1.A to P.3.B) with the evidences that have shared the same pattern. Although this strategy did not completely avoid unfocused biases, on the other hand it helped to narrow down the analysis on a track that was reasonably clear and determinate *a priori*.

3. Findings and Discussion

This section reports and discusses whether or not and to which extent, the evidences emerged from the case study support the propositions previously formulated.

With the exception of the proposition P.2.A and partially for the proposition P.3.A, overall all the propositions were supported by the empirical data. In addition, the evidences allowed a deeper understanding of the servitization of manufacturing and permitted a better appreciation of the complex dynamics and interactions that govern this process in the three dimensions depicted by the conceptual framework (i.e. organizational, procedural and relational).

Particularly, the empirical data collected for the evaluation of the propositions P.1.A and P.1.B suggests that the separation between product unit and service unit is perpetuated only to a certain extent. E.g. formally the ABB Robotics has already achieved a certain degree of separation between service and product units. This is inferred from the physical separation between the buildings where the product and the service operations are carried out. Further, it is also proved by the Business

cards of each employee that state the objective of their work task both in terms of service or product activities. However, in practice this dedication to product or to service does not really exist in a more operational level. As a manager put it: *"In the Robot family, we don't develop in the way that the Remote Service changes the way we are working. (...) it is more in the product perspective instead of the service perspective (...) we are better for testing the product side instead of the services one (...)"* (ABB, R&D Manager). When it comes to the values and beliefs that the service organization need to possess in order to enable the process of servitization, this aspect seems to be quite problematic as the "shifting mind-set" suggested by Scholars is far to be acknowledged. By asking what type of values drive the company, the Business Development Manager clearly answer: *"This is a technology driven company, made by engineers for engineers"*. Therefore, the case study discloses a different degree of separation between product and service dimension: only to a certain extent it is actuated, and more precisely, at the formal strategic level, but in the daily operational level this division is less pronounced or at least not completely implemented.

Proposition P.2.A (applying formal process and procedures devoted to the service development) gained weak support by the evidences. The manager of the Research and Development department explains that the service activities are planned according to the model employed for the development of the new products. Thus, the back ends activities are carried out on the basis of the product orientation rather than service. However, the R&D manager admits that a sort of adaptation in the daily routines is required, due to the different characteristics between product and service: *"In my opinion testing product and services should be done in different ways. One thing is to test the box [the remote service device] and another is to test how you deliver the service (...) we need to maintain the daily operations, that's the challenge with the service, because with the product when it is launched it is done."* As a result, the case study do not clearly confirm the proposition as it has formulated, because the product antecedents in the back end activities (i.e. the product development model) characterized the processes and procedures implemented in the front line, even though the evidences shows a sort of flexibility in the execution phase, due to the peculiar characteristic of the service.

The acquisition of new competences (P.2.B) finds wide support by the evidences of the case study. *"Yes we did [develop new capabilities] in terms of telematics (...), but it is even more about the service. In the sense that it [the Remote service] is a service also not only a product, which means that you need to continuously deliver it. With the product, once it's launch it's done. Here you need to constantly develop. For example, the software."* (R&D Manager). However, the study produced a deeper understanding on the dynamics through which new capabilities are acquired in terms of decision making. To this regards the Robocare project is a pertinent example, because in order to

quickly acquire new competences, the company decided to implement internal resources instead of outsourcing as suggested by the proposition P.3.A. The R&D Manager explained that the services software operations have been developed within the ABB's Indian Unit, because that branch already had a solid know-how in software and because *"of course it has been cheaper to go there"*. This point is twofold interesting: on the one hand it corroborates the scholar's view about the necessity to quickly learn new knowledge; on the other hand it sheds lights on how to do it rapidly and at a lower cost.

The interviews conducted with the ABB's partners offered another interesting evaluation of the proposition P.3.A. The case study reports many evidences on the problematic relationships between the manufacturer and its business partners, simply because the real field is often characterized by a non-fluid context, where partners are allies and enemies at the same time. For instance, if in certain markets, ABB collaborates with its partners (i.e. system integrators), at the same time they are competitors in others. As a consequence, there is an initial distrustfulness that must be overcome on both sides. An ABB's partner made it very clear in the following sentence: *"(...) ABB still have their own system integrator department. Sometimes we are in competition (...) so we decided at the beginning to go to ABB Göteborg because we didn't know if they talked to our customers"*. This distrustfulness was recognised also by the ABB's sales employees: *"the system integrators were suspicious. Because ABB has directly access to their customers"*. Thus, the evaluation of the proposition P.3.A brought up two interesting findings: firstly, the partners were not involved in developing new competences, due to costs constraints. Secondly, the management of the relationships was problematic due to the presence of business conflicts that hindered the sharing of critical information related to the Remote Service.

The last proposition P.3.B explores the supplier-customer relationship. Particularly, the process of value co-creation requires constant learning interactions to enhance the customer's value perceived. The Remote Service is a service that requires constant interaction between the provider and the final user, because the initiation of the service needs to be activated by the customer, which is also involved in the process of the robots data collection. Therefore, the dynamics of the service management tends to consider the customers as active actors in the value creation process and not just as the object of the delivery.

However, the most critical aspect in the co-creation process was the initial need of learning. Both the actors involved in the Remote Service (i.e. the ABB's sales agents, the front-line employees and the customers) declare a high demand of training programs and communication materials at an early stage: *"The customers were not involved. The business concept was not clarified"* (a Sales Manager);

“It is a great service and useful, but it is something that I am not very aware of. We were not trained for. We are doing it nowadays” (an ABB customer). Therefore, there was a critical aspect in the co-creation process that has been underestimated by the literature: it regards the role played by the learning interactions in the early phase of the relationship. Accordingly, manufacturers need to work on two important tasks: 1) they need to engage with the customers involved in the service from the beginning of the service plan and not only at the end of the process, when the service is released to market; 2) they need to feed the relationship with customers with constant learning programs (i.e. training) to enhance the customer’s value perceived.

<i>Propositions to be evaluated</i>	<i>Findings</i>
<i>P.1.A In the organizational dimension of the servitization of manufacturing, it is critical to separate the product unit from the service units to enhance the service’s delivery and the business profitability.</i>	<i>The separation is actuated at a formal/strategic level, but it is less actuated at the operational level.</i>
<i>P.1.B In the organizational dimension of the servitization of manufacturing, it is critical to shift the manufacturer mind-set in terms of culture and values from product to service, to enable the process of servitization.</i>	<i>The antecedents in terms of product-centric culture act as a barrier that obstacle the acquisition of a new service-centric cultural mind-set.</i>
<i>P.2.A In the procedural dimension of the servitization of manufactuinrg, it is critical to apply formal processes and procedures (i.e. NSD framework) to enhance the success of service delivery.</i>	<i>Partially confirmed. The case study’s evidences do not support the strategic view of the NSD framework. The planning phase in the back-end is carried out according to the former product development model, but the daily service activities (i.e. front-end operations) are adapted to the requirements of the service characteristics.</i>
<i>P.2.B. In the procedural dimension of the servitization of manufactuinrg, it is critical to develop new competences in terms of organizational and operational capabilities to address customer’s needs.</i>	<i>The case study sheds light on how the new competences are acquired. Particularly, manufacturers when possible and appropriate tend to internally develop new skills because it is cost and time favourable.</i>
<i>P.3.A In the relational dimension of the servitization of manufacturing, it is critical to develop strategic partnerships with suppliers to acquire new competences and to deliver superior value for customers.</i>	<i>Partially confirmed. The case study brought up two additional interesting findings: 1) due to costs constrains, partners are not involved for the development of new capabilities; 2) due to the presence of business conflicts (i.e. market competition) manufacturers and partners avoid to share critical information related to new business development.</i>
<i>P.3.B In the relational dimension of the servitization of manufacturing, it is critical to engage with customer through learning interactions, to enhance the customer’s value..</i>	<i>Learning is a critical aspect in the value co-creation process. Two addition findings. Manufacturers need 1) to satisfy a higher demand of learning at the early stage of the project from all the actors involved; 2) to feed the relationship with customers with constant learning programs (i.e. training) to enhance the customer’s value perceived</i>

Tab. 2: summary of the findings related to the propositions formulated.

4. Theoretical implications and further researches

The framework depicted in Fig. 1 portrays the positioning the propositions drawn by the literature in a theoretical space composed by three dimensions. This conceptual representation of the main critical aspects in the servitization process, on the one hand allow us to visualize a synthetic, but at the same time overall overview of the phenomenon observed in the case study; on the other hand, it helps us in disclosing how the proposed criticalities affect each other. As such, the findings suggest an interesting theoretical implication based on the correlation between the propositions P.1.A (the organizational separation), P.1.B (the organizational values and beliefs) and P.2.A (the planning of the service processes and procedures).

Scholars largely agree on the separation between product and service unit to enhance the service's performance and to increase the profitability of the service business of the manufacturing firms (P.1.A). Further, a successful transition from product-centric organization to service-centric organization requires a shift in the employees mind-set, from product oriented to service oriented (P.1.B). Yet, it is suggested that the development of the service activities should be planned and carried out according to a devoted framework (i.e. the NSD). Therefore, the literature portrays a linear pattern in the servitization process, according to which the disjunction between the unit that develops the product and the unit that delivers the service, enables the acquisition of the required (service) cultural attitude, that eventually leads to the implementation of the service activities developed by specific processes and procedures. However, the data gathered in the case study undermine this coherent view of the servitization of manufacturing by suggesting a more fragmented interpretation of the same phenomenon.

Particularly, the evidences collected highlight a controversy picture of the servitization of manufacturing due to the presence of the product antecedents (i.e. product development model). As discussed in the previous section, the organizational separation between product and service is actuated only at a formal level (finding P.1.A); while at the operational dimension and thus at a more practical level (mainly in the back end) employees carry out the services activities according to an established product development framework (finding P.2.A). However, some adaptations are required due to the service characteristics that strongly differ from products. Hence, as suggested by the case study, the process of servitization is enabled and at the same time hindered by the manufacturer assets in the sense that in a practical scenario, different degrees of service culture co-exist with the product antecedents depending on whether it is moving from the strategic level toward a more operational level.

This consideration reminds us the Service Paradox (Brax, 2005) discussed in the proposition P.1.A. Brax claims that a “shift” from product-centric to customer-centric organizations, intended as a continuum or as a transition, could be more hazardous in comparison with a “break” strategy, where the product antecedents are zeroed to advance a total new service business entity. Further, Brax claims that it is not largely demonstrated that this process of slight transformation automatically lead to a certain degree of profitability. Therefore, the author challenges the view of the servitization process as a continuum, questioning if a total switching strategy (meaning, a radical change in the company’s assets) would instead be more appropriate, even though more dramatic, for the success of the servitization.

Although we do not completely agree with Brax, we understand the provocation of her paradox, within the servitization discourse. We affirm that there is a need of further researches to evaluate which are the main practical implications of the “shifting strategy”, and the impact of the product antecedents into the service processes and procedures. The case study did not allow us to track down a linear pattern in the ABB servitization process. On the contrary, the data collected depict a process corresponding more to a “strategic flexibility” (Brozovic and Nordin, 2011) or to a “hybrid offering” (Ulaga and Reinartz, 2011), where manufacturing firms respond to various internal and external circumstances executing different business strategies aiming to becoming service-oriented. As a result, the creation of a service culture resembles to a learning-by-doing process, rather than a clear service implementation strategy.

In conclusion, we suggest that the debate around the servitization process need to be further enriched by studies aiming to gain an increasing understanding of the interplays between a) the critical aspects in the organizational transition from product-centric to service-centric, and b) the implementation of the service transition strategies from a formal to a more practical level. In other words, what is less clear is how and why the critical aspects in the organizational dimension affect the procedural aspects of the servitization. Or better: is the structural separation between products and services a fundamental prerequisite for the development of the service activities or the development of the service-specific field activities is mandatory for the success of the service transition? In addition, related to the role played by the product antecedents in the servitization process, what it needs to addressed is: how a firm can successfully combine the existing manufacturing assets with the development of new service offering? Which are the critical product (antecedent) resources that can be re-employed for enabling the servitization of manufacturing in practice?

4.1 Managerial implications

The holistic perspective of this study provides a more comprehensive understanding of the servitization, because by contextualizing the critical aspects in a wider spectrum of analysis, it permits to appreciate its multi-disciplinary nature. However, despite the complexity of the picture portrayed by the case study, there is a sort of 'cross-dimensional' critical aspect that interplays with the three conceptual dimensions of the servitization (i.e. organizational, procedural and relational): the management of the communication process, both internal and external to the organization.

E.g. the employees at different levels (back and front end) declared a lack of clarity in the business model developed for the Remote Service, as well as the customers were unable to access the value proposition communicated by the sales force. Furthermore, the partners demonstrated a fatal attitude toward the adoption of the Remote Service programme due to an initial mistrust, caused by low involvement and lack of communication from the manufacturer. In more practical terms, the communication issue has been translated in a high demand of learning that was only partially satisfied by the organization through training programs. As a result, the incompleteness of the information flows generated a lower degree of involvement around the service project, inside as well as outside the organization.

Therefore, the management of the communication can be a key activity that can actively contribute for the success of the implementation of this business model. Particularly, 1) the planning of training programs and 2) the systematic engagement, since at an early stage (not only within the organization but also external to the organization such as customers and partners) of all the stakeholders involved in the servitization, seems to correspond to vital aspects to be addressed. In addition, the data collected demonstrated that communication is an important ingredient that feeds the relationship between supplier and customers and that enables the process of co-creation.

References

- Baines, T., Lightfoot, H., Peppard, J., Johnson, M., Tiwari, A., Shehab, E., Swink, M., (2009) "Towards an operations strategy for product-centric servitization", *International Journal of Operations & Production Management*, Vol. 29 No. 5, pp.494 – 519
- Baines, T., Lightfoot, H.W., Benedettini, O., Kay, J.M., (2009) "The servitization of manufacturing: A review of literature and reflection on future challenges", *Journal of Manufacturing Technology Management*, Vol. 20 No. 5, pp.547 – 567
- Ballantyne, D., Varey, R. J., (2006) "Creating value-in-use through marketing interaction: the exchange logic of relating, communicating and knowing", *Marketing Theory* vol. 6, No. 3, pp. 335-348
- Bitner, M. J., Ostrom, A. L., Morgan, F. N., (2008), "Service Blueprinting: a practical technique for service innovation", *California Management Review*, Vol. 50, No. 3, pp. 66-94.
- Brady, T., Davies, A., Gann, D. M., (2005), "Creating value by delivering integrated solutions", *International Journal of Project Management*, Vol. 23, No. 5, pp. 360–365.
- Brax, S. (2005) "A manufacturer becoming service provider – challenges and a paradox", *Managing Service Quality*, Vol. 15, No. 2, pp.142 – 155
- Brax, S. A., Jonsson, K. (2009), "Developing integrated solution offerings for remote diagnostics. A comparative case study of two Manufacturers", *International Journal of Operations & Production Management*, Vol. 29, No. 5, pp. 539-560.
- Brozović, D., Nordin, F., (2011) "Servitization as Strategic Flexibility: Insights from an Exploratory Study", Paper Presented at Nordic Academy of Management, 2011, Stockholm, Sweden
- Cova, B., Salle, R., (2007) "Marketing solutions in accordance with the S-D logic: Co-creating value with customer network actors", *Industrial Marketing Management*, Vol. 37, Issue 3, pp. 270–277.
- Davies, A., (2004), "Moving base into high-value integrated solutions: a value stream approach", *Industrial and Corporate Change*, Vol. 13, No. 5, pp. 727-756.
- Davies, A., Brady, T. and Hobday, M. (2006), "Charting a path toward integrated solutions", *Sloan Management Review*, Vol. 47 No. 3, pp. 39-48.
- Davies, A., Brady, T. and Hobday, M. (2007), "Organizing for solutions: systems seller vs. systems integrator", *Industrial Marketing Management*, Vol. 36 No. 2, pp. 183-93.
- de Brentani, U., (1989) "Success and failure in new industrial services", *Journal of Product Innovation Management*, Vol. 6, Issue 4, pp. 239-258
- de Brentani, U., (1991), "Success Factors in Developing New Business Services", *European Journal of Marketing*, Vol. 25, No. 2, pp. 33-59.
- de Brentani, U., (1995), "New Industrial Service Development: Scenarios for Success and Failure", *Journal of Business Research*, Vol. 32, Issue 2, pp. 93-103.
- De brentani 2001),
- de Brentani, U., Ragot, E., (1996), "Developing new business-to-business professional services: What factors impact performance?", *Industrial Marketing Management*, Vol. 25, Issue 6, pp. 517-530
- di Benedetto, A. C., (1999), "Identifying the Key Success Factors in New Product Launch", *Journal of Product Innovation Management*, Vol. 16, Issue 6, pp. 530–544.
- Dubois, A., Gadde L. E., (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55, Issue 7, pp. 553– 560.
- Edvardsson, B., (2005), "Service quality: beyond cognitive Assessment", *Managing Service Quality*, Vol. 15, No. 2, pp. 127-131.
- Eisenhardt, K. M., (1989), "Building Theories from Case Study Research", *The Academy of Management Review*, Vol. 14, No. 4, pp. 532-550.
- Ford, D., (2011), "IMP and service-dominant logic: Divergence, convergence and development", *Industrial Marketing Management*, Vol. 40, Issue 2, pp. 231–239.

- Frambach, R.T., Wels-Lips, I. and Gündlach, A. (1997), "Proactive product service strategies: an application in the European health market", *Industrial Marketing Management*, Vol. 26, No. 4, pp. 341-52.
- Galbraith, J.R. (2002), "Organizing to deliver solutions", *Organizational Dynamics*, Vol. 31 No. 2, pp. 194-207.
- Gebauer, H. (2007), "An Investigation of Antecedents for the Development of Customer Support Services in Manufacturing Companies", *Journal of Business-to-Business Marketing*, Vol. 14, No. 3, pp. 59-96
- Gebauer, H., (2008) "Identifying service strategies in product manufacturing companies by exploring environment-strategy configurations" *Industrial Marketing Management*, Vol., 37, No. 3, pp. 278-291
- Gebauer, H., Bravo-Sanchez, C., Fleisch, E. (2007) "Service strategies in product manufacturing companies", *Business Strategy Series*, Vol. 9, No. 1, pp.12 – 20
- Gebauer, H., Friedli, T., Fleisch, E., (2006) "Success factors for achieving high service revenues in manufacturing companies", *Benchmarking: An International Journal*, Vol. 13, No. 3, pp.374 – 386
- Gebauer, H., Krempf, R., Fleisch, E., Friedli, T., (2008) "Innovation of product-related services", *Managing Service Quality*, Vol. 18, No. 4, pp.387 – 404
- Gebauer, H., Edvardsson, B., Bjurko, M., (2010) "The impact of service orientation in corporate culture on business performance in manufacturing companies", *Journal of Service Management*, Vol. 21, N. 2, pp. 237 - 259
- Grönroos, C., (1990), "Service Management: A management focus for service competition", *International Journal of Service Industry Management*, Vol. 1 Iss: 1, pp.6 - 14
- Grönroos, C., (1994) "From Marketing Mix to Relationship Marketing: Towards a Paradigm Shift in Marketing", *Management Decision*, Vol. 32 Iss: 2, pp.4 - 20
- Grönroos, C., (1998) "Marketing services: the case of a missing product", *Journal of Business & Industrial Marketing*, Vol. 13, Issue 4/5, pp.322-338.
- Grönroos, C. (2006), "Adopting a service logic for marketing", *Marketing Theory*, Vol. 6 No. 3, pp. 317-33.
- Grönroos, C. (2008), "Service-dominant logic revisited: who creates value? And who co-creates?", *European Business Review*, Vol. 20 No. 4, pp. 298-314.
- Hillebrand, B., Kok, R. A. W., Biemans, W. G., (2001), "Theory-Testing using case studies", *Industrial Marketing Management* Vol. 30, Issue, 8, pp. 651–657.
- Homburg, C., Fassnacht, M., & Guenther, C. (2003). The role of soft factors in implementing a service-oriented strategy in industrial marketing companies. *Journal of Business-to-Business Marketing*, Vol. 10, No. 2, pp. 23– 51.
- Håkansson, H., Snehota, I., (1989), "No business is an island: The network concept of business strategy", *Scandinavian Journal of Management*, Vol. 5, Issue 3, pp. 187–200.
- Kothandaraman, P., Wilson, D. T., (2000), "Implementing Relationship Strategy", *Industrial Marketing Management*, Vol. 29, Issue 4, pp. 339–349.
- Lee, A. S., (1989) "A Scientific Methodology for MIS Case Studies", *Management Information Systems Quarterly*, Vol. 13, No. 1, pp. 33-50
- Martinez, V., Bastl, M., Kingston, J., Evans, S., (2010) "Challenges in transforming manufacturing organisations into product-service providers", *Journal of Manufacturing Technology Management*, Vol. 21 No. 4, pp. 449 – 469
- Mathieu, V., (2001a), "Product services: from a service supporting the product to a service supporting the client", *Journal of Business&Industrial Marketing*, Vol. 16, No. 1, pp. 39-58.
- Mathieu, V., (2001b) "Service strategies within the manufacturing sector: benefits, costs and partnership", *International Journal of Service Industry Management*, Vol. 12, No. 5, pp.451 – 475
- Matthing, J., Sandén, B., Edvardsson, B., (2004) "New service development: learning from and with customers", *International Journal of Service Industry Management*, Vol. 15, No. 5, pp.479 – 498
- Möller, K., Rajala, A., (1999), "Organizing Marketing in Industrial High-Tech Firms. The Role of Internal Marketing Relationships", *Industrial Marketing Management*, Vol. 28, Issue 5, pp. 521–535.

- Nordin, F., (2005), "Searching for the optimum product service distribution channel. Examining the actions of five industrial firms", *International Journal of Physical Distribution & Logistics Management* Vol. 35, No. 8, pp. 576-594.
- Nordin, F., Öberg, C., Kollberg, B., Nord, T. (2010), "Building a new supply chain position: An exploratory study of companies in the timber-housing industry", *Construction Management and Economics*, Vol. 28, No. 10, pp. 1071-83
- Neu, W.A., Brown, S.W., (2005) "Forming Successful Business-to-Business Services in Goods-Dominant Firms", *Journal of Service Research*, Vol. 8, No. 1, pp. 3-17
- Neely, A. (2008), "Exploring the financial consequences of the servitization of manufacturing", *Journal Operations Management Research*, Vol. 1, No.2, pp. 103-118.
- Oliva, R., Kallenberg, R., (2003), "Managing the transition from products to services" *International Journal of Service Industry Management*, Vol. 14, No. 2, pp. 160-172
- Penttinen, E., Palmer, J., (2007), "Improving firm positioning through enhanced offerings and buyer-seller relationships", *Industrial Marketing Management*, Vol. 36, Issue 5, pp. 552 – 564.
- Payne, A., Storbacka, K., Frow, P. (2008) "Managing the co-creation of value", *Journal of the Academy of Marketing Science*, Vol. 36, No. 1, pp. 83-96
- Perry, C. (1998), "Processes of a case study methodology for postgraduate research in marketing", *European Journal of Marketing*, Vol. 32, No. 9/10, pp. 785-802
- Shepherd, C., Ahmed, P. K., (2000), "From product innovation to solutions innovation: a new paradigm for competitive advantage", *European Journal of Innovation Management*, Vol. 3, No. 2, pp. 100-106
- Smith, A. M., Reynolds, N. L., (2001), "Measuring cross-cultural service quality: A framework for assessment", *International Marketing Review*, Vol. 19 Issue 5, pp.450-481.
- Spring, M., Araujo, L., (2009) "Service, services and products: rethinking operations strategy", *International Journal of Operations & Production Management*, Vol. 29, No. 5, pp. 444 – 467
- Tuli, K. R., Kohli, A. K., Bharadwaj, S. G., (2007), "Rethinking Customer Solutions: From Product Bundles to Relational Processes", *Journal of Marketing*, Vol. 71, No. 3, pp. 1-17.
- Turunen, T.T., Toivonen, M., (2011), "Organizing customer-oriented service business in manufacturing", *Operation Management Research*, Vol. 4, No. 1-2, pp. 74–84
- Uлага, W., Reinartz, W.J., (2011), "Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully", *Journal of Marketing*, Vol. 75, No. 6, pp. 5-23
- Vandermerwe S., Rada J., (1988), "Servitization of business: adding value by adding services", *European Management Journal*, Vol. 6, No. 4, pp. 314–324
- Vargo, S. L., Lusch, R. F., (2004), "Evolving to a new dominant logic for Marketing", *Journal of Marketing*, Vol. 68, Issue 1, pp. 1-17
- Vargo, S. L., Lusch, R. F., (2006), "Service-dominant logic: reactions, reflections and refinements", *Marketing Theory*, Vol. 6, No. 3, pp. 281-288.
- Vladimirova, D., Evans, S., Martinez, V., Kingston, J., (2011), "Elements of Change in the Transformation towards Product Service Systems", *Functional Thinking for Value Creation*, Springer Berlin Heidelberg
- Voss, C., Tsiriktsis, N., Frohlich, M., (2002), "Case research in operations management", *International Journal of Operations and Production Management*, Vol. 22, No. 2., pp. 195-219.
- Windahl, C., Lakemond, N., (2006), "Developing integrated solutions: the importance of relationships within the network", *Industrial Marketing Management*, Vol. 35, No. 7, pp. 806-818.
- Wise, R., Baumgartner, P., (1999), "Go downstream: the new profit imperative in manufacturing", *Harvard Business Review*, Vol. 77, No. 5, pp. 133-41.
- Yin, R.K., (2009), *Case Study Research: Design and Methods*, Fourth Edition, Sage Inc., California.
- Zeithaml, V. A., Parasuraman, A., Berry L. L., (1985), "Problems and Strategies in Services Marketing", *The Journal of Marketing*, Vol. 49, No. 2, pp. 33-46.

Åhlström, P., Nordin, F. (2006), "Problems of establishing service supply relationships: evidence from a high-tech manufacturing company", *Journal of Purchasing and Supply Management*, Vol. 12, No. 2, pp. 75-89.