

## **Servitization in Manufacturing Firms and Business Performance: A Systematic Literature Review**

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### **Abstract**

*Broadening a firm's offer beyond manufacturing has become a prevalent way of increasing performance and staying ahead of competition. It is important to derive clarity between the servitization and related constructs. Further, the relevance in servitization and business performance related constructs are not conclusive. This paper attempt to address above gaps in the literature. Authors have conducted a systematic review of the literature in the area of servitization of manufacturing. Through the systematic review, 350 abstracts were narrowed down and 115 articles were studied in full. Out of 115 articles 40 publications central to the study was identified and findings were reported according to a thematic analysis. Servitization is the strategy of service integration into the core business in manufacturing organizations in order to enhance the business performance and competitive position of the organization. Servitization of manufacturing tend to emphasize the potential to maintain business growth, profitability, differentiation, and competitive advantage.*

**Keywords:** Services, servitization, business performance, manufacturing industry.

### **1. Introduction**

In the context of competitive markets, manufacturing firms cannot compete on the basis of cost. Manufacturers have to adopt different strategies to retain competitive and stay profitable in their businesses. Combining services with products is seen as a key strategy to industrial success in the twenty-first century (Baines & W. Lightfoot, 2013). Researchers explained the trend of manufacturers move from product dominance towards a service orientation for business benefits (Martin & Horne, 1992; Brax 2005; Neely 2008; Cohen, Agrawal & Agrawal 2006; Kohtamaki, Hakala, Partanen, Parida & Wincent, 2015).The term Servitization was introduced by Vandermerwe & Rada (1988) to report the manufacturer's effort in combining goods and services in order to add value to core product offerings. They further explained that servitization is introduced in almost all industries on a global scale; it involves a different strategic thrust, level of organizational complexity and an order where the traditional managerial recipes no longer fit. "The transformation of manufacturing firms towards servitization is more than an innovation of business model but also a worldwide transition of economic pattern" (Li, Lin, Chen & Ma, 2015, p.66). With the evolvement of servitization, authors define servitization in different manners.

It is important to understand different definitions of servitization in a systematic study and the below research question is posed.

*RQ1. How “Servitization” is defined in the literature?*

The concepts such as service infusion (Kowalkowski, Kindström, Alejandro, Brege & Biggemann, 2012), manufacturer service strategy (Raddats & Kowalkowski, 2014), integrated solutions (Davies, 2004), product service systems (Goedkoop, Van halen, Te riele, & Rommes, 1999; Mont, 2002), Servicizing (Allen, Stoughton & Feng, 1999), Productization (Baines et al., 2007) are introduced by different authors. It is necessary to understand the difference among different concepts studied in the literature.

*RQ2. How other similar concepts link with the servitization based on the definitions?*

There is a trend in manufacturing companies in North America, Western Europe, and Japan to incorporate service elements in their product offerings. (Cohen et al., 2006; Visnjic, Neely & Wiengarten, 2012). As per Neely (2008) many listed manufacturing companies in the United States (59%), Finland (53%), Singapore (49%), Malaysia (46%) and the Netherlands (40%) are servitized where as China shows the lowest servitization (1%). However Li et al. (2015) reported that more than 30% of manufacturing firms follow the servitization strategy. This reflects the growing nature of servitization adoption around the world. It is important to understand different types of services adopted by manufacturers.

*RQ3. What are the different types of services delivered by manufacturers?*

The Aberdeen Group, GM, IBM, Rolls-Royce Aero space, BP, Shell Laugh, Boeing, Xerox are frequently quoted examples which shows success through servitization. (Wise and Baumgartner, 1999; Cohen et al., 2006; Neely, 2008). It is necessary to understand the existing findings which link to the business performance through servitization.

*RQ4. What are the major themes in servitization which linked to business performance?*

## **2. Methodology**

### **2.1 Aim, Scope, and Research questions**

In management research, literature review is essential to map and assess the existing body of knowledge. Systematic literature review need to follow a clear protocol and need to record the methodology followed in order to search and evaluate the publications. “Systematic reviews differ from traditional narrative reviews by adopting a replicable, scientific, and transparent process” (Tranfield, Denyer & Smart, 2003, p.209). Systematic review is extensively used in medical sciences and application in management science is relatively new (Lightfoot, Baines & Smart, 2013).

Objectives of this research paper are to understand the definitions and the concepts related to servitization and enhance the knowledge between performance and servitization. The research questions identified in above section to address the existing gaps in knowledge are summarized in below?

RQ1. How “Servitization” is defined in the literature?

RQ2. How other similar concepts link with the servitization based on the definitions?

RQ3. What are the different types of services delivered by manufacturers?

RQ4. What is the major themes in servitization which linked to business performance?

### **2.2 Search strategy**

Servitization is relatively a wider and growing concept and search terms are first identified (Reim, Parida & Örtqvist, 2015). The following terms related with servitization are identified (listed in alphabetical order): integrated solution, product based service, product service, product service system, productization and servitization.

Prevalent publishers such as JSTOR, Emerald, Taylor & Francis, Wiley online, Science Direct, ProQuest and Springer is used to find the related articles. The search is limited to the publications in English. To avoid the publication bias following systematic process in Fig.1 was followed. Removal and addition of publications relevant to the field were considered in a systematic way. The publications were reviewed from 1988- 2015.

Further wise only the journal papers with more than 10 citations were selected. Later selectively few articles published in recognized journals with less number of citations during 2014-2015 were added. Few more articles frequently referred in the selected articles were included.

This is similar to the process followed by Halverson, Graham, Spring, Drysdale & Henrie (2014). An overview of the process used to identify the articles for the study is illustrated in Fig.1

### **2.3 Identifying Themes related to business performance.**

Thematic analysis was conducted to report the key themes in systematically selected articles. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data. A six step process mentioned below (Braun & Clarke, 2006) was followed to report on the Literature.

1. becoming familiar with the data.
2. Generating initial codes.
3. Searching for themes.
4. Reviewing themes.
5. Defining and naming themes.
6. Producing the report.

Following the thematic analysis, four key themes were identified as below in order to achieve the research objectives and findings were reported in this study.

1. Definitions and clarification of the concept.
2. Types of services offered by manufacturers.
3. Competitive advantage and differentiation through servitization.
4. Profitability, service paradox, performance and business growth with servitization.

## **3. Definitions and clarification of the concept**

### **3.1 Definitions of Servitization**

The first formal definition of servitization was provided by Vandermerwe & Rada (1988). Since then, many authors have contributed to this definition. Table 1 shows the evolution of the definitions over the period of time. Majority of definitions highlighted that servitization as an effort by manufacturers to integrate services into their offering. Authors also highlighted that servitization as a strategy (Baines, Lightfoot, Benedettini & Kay, 2009; Barnett, Parry, Saad, Newnes & Goh, 2013). Based on reviewed definitions it is possible to identify that servitization as a source of value creation activity (Vandermerwe & Rada, 1988; Baines et al., 2009; Barnett et al., 2013). Neely (2008) contributed to the definition by adding organization's capabilities and innovation to create mutual value through servitization. Visnjic et al. (2012) looked at servitization through the lens of business model innovation. Servitization definitions illustrate the business benefits such as customer satisfaction, competitive advantages, business growth, and firm performance (Baines, Lightfoot, Smart & Fletcher, 2013). Generally, the servitization interpretation indicates the manufacturer's effort of integrating the services in to the product due to competitive reasons and improves business performance. This leads to provide the following definition for servitization. Finding 1- servitization is the strategy of service integration into the core business in manufacturing organizations in order to enhance the competitive position and performance of the organization.

### **3.2 Related concepts to Servitization.**

For the conceptual clarity, it is important to understand the related concepts to servitization. Allen et al., (1999) explained the servitization "The emergence of product-based services which blur the distinction between manufacturing and traditional service sector activities". As per Baines & Lightfoot (2013), servitization is an alternative term for servitization. The Product Service Systems (PSS) were introduced by Goedkoop et al.(1999) as a marketable set of products and services capable of jointly fulfilling a user's need. Mont (2002) and Tukker (2008) extended this view by adding related benefits to its definition. The benefits highlighted are customer satisfaction, lower environmental impact, and competitiveness.

The evolution of Product-Service System concept is illustrated in Fig.2. PSS can be identified as a combination of servitization and productization. (Velamuri, Neyer & Möslein, 2011) introduced the concept of Hybrid value creation as the process of generating additional value by innovatively combining products and services. Integrated solutions, manufacturer's service strategy (Gebauer et al., 2012; Raddats & Kowalkowski, 2014), service infusion (Kowalkowski et al., 2012) and integrated solutions (Brady, Davies & Gann, 2005) are commonly used to explain the concept of combining the product and services in order to offer competitive offering to the customer. Definitions of related constructs are presented in Table 2.

Finding 2- servitization, servicization, servicizing, manufacturer's service strategy service infusion and integrated solutions are alternative terms for manufacturer's effort in adding services to their core offering. Productization refers to the concept of service organizations effort in adding products to their core offering. These two combinations can be identified as Product-Service System or Hybrid value creation.

### **3.3 Types of Services Offered by Manufacturers.**

Manufacturer's service offerings are inherit before the concept of Servitization. Hill (1977) identified basic distinction between services affecting goods and services affecting persons. Further, he subdivided these into permanent and temporary services. Table 3 shows the types of Services offered by manufacturing firms according to the servitization scholars. Even though the classifications are different it is evident that most common type of services are research and development services, product maintenance services, installation services, training services, procurement services, warehousing and transportation. Further advanced services such as consultancy services, retailing services, financial services can be identified from the literature. As per some authors manufacturers offer total solutions instead of products. Manufacturer Build-operate owner services (Dachs et al., 2013) and operating the product for customers (Bikfalvi, Lay, Maloca & Waser, 2012) are such examples. Among the type of services in the servitization literature, special services such as start-up assistance could be identified. The classification of manufactures service offering are identified differently in the Product-Service Systems (PSS) literature. Below table 4 describes the summary of the PSS classifications on how the service offerings can be combined with the product. In the PSS literature scholars commonly agreed on Product oriented PSS, Use oriented PSS and Result oriented PSS as the basic types. However, some authors extended this basic classification by adding few more types.

Finding 3- In the servitization literature different types of service offerings by manufactures are discussed. R&D services, customer training, procurement services, finance services, warehousing, and transportation, after sales services are few common ones among the list. Product-Service system literature consistently discuss about the Product oriented PSS, Use oriented PSS, Result oriented PSS and variation of those three types in the classification. The classification of services in servitization refers to the types of services that manufactures offering whereas the classifications in PSS reflect the effort in identifying the combined offering of product and services.

## **4. Themes in Servitization Which Linked To Business Performance.**

### **4.1 Competitive Advantage and Differentiation through Servitization.**

As per Vandermerwe & Rada (1988), the best companies of the future will be sustaining competitive advantage by developing services to their customers. It is clear that service addition can result in gaining a competitive advantage (Gebauer et al., 2012; Kowalkowski et al., 2012; Dachs et al., 2013; Davies, 2004). It is becoming apparent that manufacturers seek competitive advantage through service infusion approaches that are based on diverse service strategies and offerings (Raddats & Kowalkowski, 2014). It is difficult to generate competitive advantage through superior products and superior scale due to marginal product differences (Wise & Baumgartner, 1999). With the increased commoditization of the markets, competitive equality has been reached (Mathieu, 2001). Declining product margins refer to the fact that achieving product differentiation is currently in a stage of maturity hence the services addition in manufacturing to differentiate the product offering is important (Gebauer, 2008).

Emergence of outsourcing in manufacturing and ability to fund for valuable resources jointly emphasize the importance of combining the services with products to arrive sustainable competitive advantage. Davies, Brady & Hobday (2006) explained the ability to offer customized unique solutions to the customers with the combinations of product and services. Further, they explained that in future the market leaders will be those who offer integrated solutions. Through integrated solutions, organizations can develop solutions proactively and enhance the competitive position (Brady et al., 2005).

Adding services together with products will lead to a different competitive positioning (Gebauer, 2008). Services are a competitive capability for manufacturers and are in many cases of increasing strategic importance (Kowalkowski et al., 2012). Competitive advantages achieved through services are often more sustainable; being less visible and more labor dependent, services are difficult to imitate (Oliva & Kallenberg, 2003).

At the beginning, the services were used as an add-on to products. From this beginning, the services offerings have now turned into a conscious and explicit strategy with services becoming a main differentiating factor in a totally integrated products and service offering (Baines et al., 2009). An organization can use service elements to differentiate manufacturing offerings and so provide important competitive opportunities (Mathieu, 2001). Adding service components to physical products leads to strategic benefits due to the decreased imitability. This is because value adding industrial services can enable manufacturing companies to achieve product differentiation by customizing product-service offers to their customer's specific needs (Parida, Sjödin, Wincent & Kohtamäki, 2014). In mature industries, servitization is used as a differentiation tool, to extend their product's life cycle and keep business from dying off (Vandermerwe & Rada, 1988).

#### **4.2 Profitability, Business Growth, and Firm value with Servitization.**

Scholars opine that manufacturer's services are more profitable than product sales. Wise & Baumgartner (1999) explained that manufacturers should develop profitable service business to avoid the risk of thinner margins from product sales. However, Neely (2008) found that the servitized firms generate lower profit than pure manufacturing firms do. He identified the gross profit ratio and net profit ratio is higher in pure manufacturing firms and explained that working capital per employee in servitized firms are higher due to additional expenses in servitized firms. Further, he explained that employees in servitized firms are more expensive due to the higher skill level. He concluded that the extent of servitization (number of services offered) has a negative impact on net profit and small firms can get higher benefits in servitization than larger firms. Later, Neely, Benedetinni & Visnjic (2011) explained whether or not the firm had servitized has no significant relationship to profitability. Extending the findings of Neely (2008), Visnjic et al. (2012) explained that service breadth negatively affect profitability while service depth has a positive impact on the profitability. They suggest not to widen the service but to focus on selected service offerings rich with knowledge intensive service components. Visnjic et al. (2012) explained a curvy-linear relationship in profit between interaction of service completeness and product R&D investment. Further, they explained that combining knowledge intensive services with product innovation may result in an increase in profitability in the long term. Kastalli & Van Looy (2013) reported an overall positive effect of servitization on profitability. Further they summarized that low levels of servicing result in a steep increase in profitability while the scaling up of service activities results in a temporary decrease in profitability but it reemerge of positive relationship once economies of scale and learning effects are achieved. Difficulty in a firm to increase profits by adding services is called "service paradox" (Neely, 2008; Neely et al., 2011; Visnjic et al., 2012). The existing research on service offering by manufacturing organizations has provided mix results (Kohtamäki, Partanen, Parida & Wincent, 2013). In extant literature, many have provided positive and some with negative effect (Neely, 2008).

Business Growth opportunities become motivating factors for manufacturing firm to servitize (Visnjic et al., 2012; Parida et al., 2014). Manufacturing companies add services to achieve financial growth (Brax, 2005; Gebauer et al., 2012; Kohtamäki et al., 2013). The higher growth rate of service sector comparatively to manufacturing creates an opportunity for the larger market size for servitized manufacturers (Wise & Baumgartner, 1999). In recent years, industrial manufacturers around the world have deployed growing efforts in developing services in addition to their traditional core product business in order to secure long-term growth (Jacob & Ulaga, 2008). Kohtamäki et al. (2013) found the positive non liner correlation of the service offering and the sales growth. Furthermore, they found the positive moderating role of network capabilities in the above relationship.

Existing studies related to performance of industrial services consider the impact of servitization on firm's profitability (Neely, 2008; Gebauer et al., 2012), firm's market value (Fang, Palmatier & Steenkamp, 2008) and sales growth (Kohtamäki et al., 2013). Servitization has positively contributed to the firm value in slow growth industries and has negatively affected to industries with high growth as servitization may reduce the focus on products (Fang et al., 2008). Servitization profitability has mixed findings where servitization has positively contributed towards firm growth.

#### **Finding 4**

Business growth and profitability are key expectations of servitized manufactures. The reviewed literature argues that servitization is positively link with the business growth where profitability enhancement is inconclusive. Servitization can be used to generate competitive advantage and differentiate from the competitors.

## 5. Conclusion

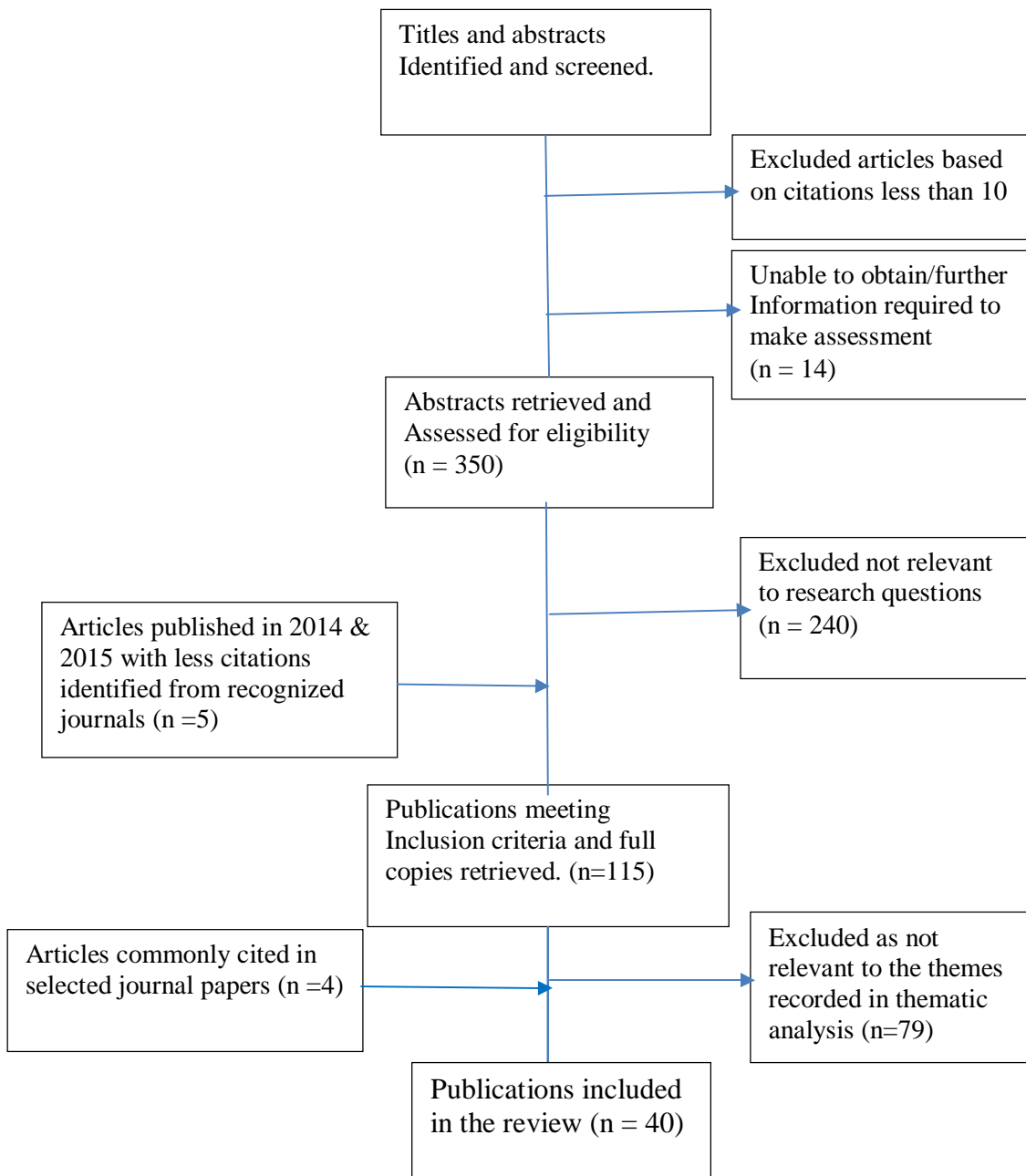
Combining services with products are seen as key to industrial success in the twenty-first century. Servitization is the strategy of service integration into the core business in manufacturing organizations in order to enhance the competitive position and improve performance of the organization. Increasing competition in the market and narrowing down in product and technological differences between manufactures have created an opportunity for servitized strategy in manufacturing to generate competitive advantage and differentiation. This paper clarifies the servitization related constructs where servitization, servicization, servicizing, manufacturer's service strategy service infusion, and integrated solutions are alternative terms for manufacturer's effort in adding services to their core offering. Productization refers to the concept of service organizations effort in adding products to their core offering. These two combinations can be identified as Product-Service System or Hybrid value creation. Business growth and profitability are key expectations of servitized manufactures. Literature argues that servitization is positively linked with the business growth where profitability enhancement is inconclusive. Servitization can be used to generate competitive advantage and differentiate the manufacturers from the competitors.

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**Fig. 1: Systematic review flow diagram**

Source: adopted from (CRD, 2009, p.26)

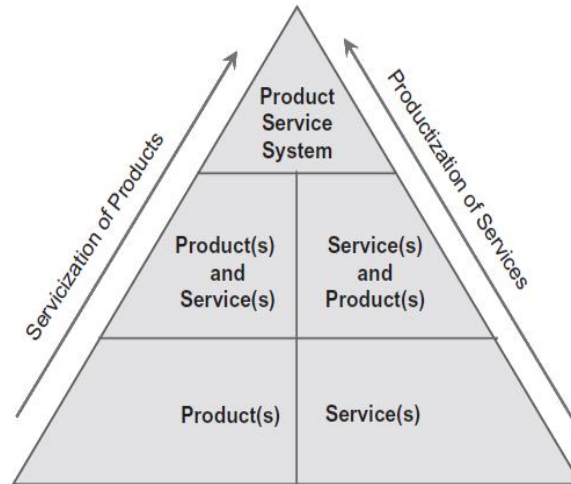


**Table 1: Definitions of Servitization**

Construct	Author (date)	Definition
Servitization	Vandermerwe and Rada (1988)	“the increased offering of fuller market packages or ‘bundles’ of customer focused combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings”
Servitization	Robinson et al, Cited in Baines et al. (2009)	“An integrated bundle of both goods and services”
Servitization	Desmet et al, Cited in Baines et al. (2009)	“A trend in which manufacturing firms adopt more and more service components in their offerings”
Servitization	Lewis et al, cited in Baines et al. (2009)	“Any strategy that seeks to change the way in which a product functionality is delivered to its markets”
Servitization	Ward and Graves, cited in Baines et al. (2009)	“Increasing the range of services offered by a manufacturer”
Servitization	Ren and Gregory, cited in Baines et al. (2009)	“A change process wherein manufacturing companies embrace service orientation and/or develop more and better services, with the aim to satisfy customer’s needs, achieve competitive advantages and enhance firm performance”
Servitization	Neely (2008)	“Servitization involves the innovation of an organization’s capabilities and processes so that it can better create mutual value through a shift from selling product to selling Product-Service Systems”
Servitization	Baines et al. (2009)	“Servitization is the innovation of an organizations capabilities and processes to better create mutual value through a shift from selling product to selling PSS”
Servitization	Baines et al. (2013)	“Manufacturers seek to build their revenues through service provision”
Servitization	Visnjic et al. (2012)	“a business model innovation where by existing product offerings are extended through related services”
Servitization	Barnett et al. (2013)	“Servitization is the move by firms to gain value from service associated with their products, which requires a strategic rather than incremental change in the provider firm”

**Table 2: Definitions of other related terms of Servitization**

Construct	Author (date)	Definition
Servicizing	Allen et al.(1999)	“The emergence of product-based services which blur the distinction between manufacturing and traditional service sector activities”
Product service systems	Goedkoop et al.(1999)	“A Product Service system (PS system) is a marketable set of products and services capable of jointly fulfilling a user’s need”
Product service systems	Mont (2002)	“PSS is a system of products, services, supporting networks and infrastructure that is designed to be: competitive, satisfy customer needs and have a lower environmental impact than traditional business models”
Product service systems	Neely (2008)	“A Product-Service System is an integrated product and service offering that delivers value in use”
Hybrid value creation	Velamuri et al. (2011)	“The process of generating additional value by innovatively combining products (tangible component) and services (intangible component)”
Productization	Baines et al. (2007)	“[T]he evolution of the services component to include a product or a new service component marketed as a product”
Integrated solution	Brady et al. (2005)	“unique combinations of products and services that address a customer’s specific business problems”



**Fig. 2: Servicization, Productization and Product service system**  
**Source: (Baines et al., 2007, p.4)**

**Table 3: Types of services offered by manufacturers**

Author	Year	Type of services
Mathieu	2001	Customer service, Product service and Service as a product
Oliva and Kallenberg	2003	Basic installed base services, Maintenance services, Professional services, Operational services
Neely	2008	Consulting services, Design and development services, Financial services, installation and implementation services, leasing services, maintenance and support services, outsourcing and operating services procurement services, retail and distribution services, systems and solutions, transportation and trucking services.
Baines et al.	2009	Protective services ( training, delivery, spares, repairs and helpdesks), Proactive services (systems integration, condition monitoring, consulting, and financing)
Chen, cited in Li et al.	2015	Goods and technical services, Consulting and training services, Leasing services, Sales services, Including distribution, Wholesaling, Retailing, Software development, Financial services, Transportation and logistics services, Result-oriented services.
Gebauer et al.	2012	Product lifecycle services, On-site maintenance services, Managed services, Consulting services/ consultancy-led solutions
Bikfalvi et al.	2012	Design and consulting services, Documentation services, Software development, Leasing and finance services, Start-up assistance, Maintenance and repair services, Operating the product for customers, Customer training.
Baines et al.	2013	Base services, Intermediate services, Advanced services
Kohtamäki et al.	2013	Maintenance services, R&D services, Customer services.
Dachs et al.	2013	Technical documentation, Design/consulting/project planning, Software development, Training, Installation, Start-up procedure, Leasing/renting/finance, Maintenance/repair, Build-operate-owner services.
Raddats and Kowalkowski	2014	Product-attached services, Operations services on own products, vendor independent operations services

**Table 4: Types of Product-Service Systems**

<b>Author</b>	<b>Year</b>	<b>Type of services</b>
Hockerts and Weaver, cited in Neely (2008)	2002	Product oriented PSS. Use oriented PSS. Result oriented PSS.
Tukker	2004	Product oriented PSS (Product related/ Advice and consultancy). Use oriented PSS (Product lease/Product renting/sharing Product pooling). Result oriented PSS (Activity management/ Pay per service unit/Functional result).
Neely	2008	Integration oriented PSS. Product oriented PSS. Service oriented PSS. Use oriented PSS. Result oriented PSS.