

Servitization and Productization: two faces of the same coin?

Luna Leoni¹

¹“Tor Vergata” University of Rome

The ongoing convergence and integration between manufacturing and service sectors involves the firms' adoption of new strategies, namely: servitization and productization. Despite servitization having already been discussed in depth by scholars, little has been said on productization. The thematic analysis of 27 peer-reviewed journal articles lead to define productization as the process of transforming a service company offering by adding tangible products or by decomposing service components into combinable modules. Moreover, productization and servitization need to be considered as “two faces of the same coin”, which acting reversely lead to considering the existence of a new company type: the solution provider.

1. Introduction

The companies of our time compete in what has been defined as a “Customer Economy” (Seybold *et al.*, 2001). This means that society is controlled by customers, who exercise their power over all types of firms, reshaping and transforming their businesses. Therefore, *satisfying customers' needs* has become the mission and purpose of every firm.

In order to survive in this new scenario, companies – both product- and service-centred – have to reinvent themselves and their offering in a way that allows the complete fulfilment of customer needs.

The alignment between *company offer* and *customer needs* involves a profound organizational culture transformation; because for customers it no longer makes sense to distinguish between tangible and intangible goods, the same has to become true for companies. Obviously, a firm's cultural shift requires a strategic change. Evidence of this is the development and dissemination of two new strategies, namely: *servitization* and *productization*, adopted by product-centred and service-centred companies, respectively.

Despite servitization having already been discussed in depth by scholars – starting from the milestone paper written by Vandermerwe and Rada in 1988 – there has been little discussion about productization. Thus, as it is becoming increasingly difficult to ignore the ongoing convergence and integration between manufacturing and service sectors, a deeper understanding of the productization strategy seems to be necessary.

Therefore, the purpose of this paper is to address the following research questions:

RQ1: How is productization defined in the existing academic literature?

RQ2: Can productization and servitization be considered as “two faces of the same coin”?

For the sake of clarity, it is important to highlight that a literature review on productization has already been conducted by Harkonen *et al.* (2015). However, the different aims and methods adopted limit the risk of the results overlapping.

Through a thematic analysis of 27 journal articles (identified by a systematic literature review), this paper aspires to move forward the body of knowledge on productization, while at the same time contributing to the servitization field.

Following this introduction, the paper has been divided into five sections: the first explains the methodology adopted; in the second section the descriptive findings are reported; the third section is devoted to the thematic analysis; in the fourth section, discussions, conclusions, implications and future research avenues are jointly presented.

2. Methodology

Having regard to the aim of this paper, this study is founded on a systematic literature review (SLR). This method – widely used in management literature (Crossan and Apaydin, 2010; Newbert, 2007; David and Han, 2004) – differs from traditional narrative reviews (Huff, 2009; Cooper, 1998) and can be considered the most suitable research approach in order to identify, review, and synthesize – in a transparent and rigorous way – all the literature currently available (Victor, 2008) on the productization topic.

The research process has been carried out following the three steps suggested by Tranfield *et al.* (2003), namely: planning, conducting and reporting. The first step has been devoted to the scope definition and protocol development. The conducting and reporting steps are, instead, accurately described in the next paragraph. In particular, the reporting phase has been divided in two sub-stages:

1. A descriptive analysis: to provide, through the use of graphics, simple summaries of the relevant literature (Sandelowski, 2000); and
2. A thematic analysis: to identify key themes between papers, in order to provide the major findings of the systematic literature review.

2.1. Search strategy

In order to identify the relevant literature related to productization, the search strategy was developed by first choosing the online research databases: i.e., “EBSCOhost”, “Scopus”, and “Web of Science”.

During the second phase, and according to their direct association with the topic analysed, the keywords were identified. To avoid the possibility of losing significant articles, all the possible grammatical forms and spelling differences of “productization” were considered.

The selected keywords within the chosen online databases allowed the identification of 788 papers.

In the third phase specific inclusion and exclusion criteria were applied (see Table 1).

Inclusion criteria	Exclusion criteria
Articles published in peer-reviewed journals	Articles containing the keywords only in the list of references or in the biographies
Articles written in English	Articles dealing accidentally with the selected topic
Articles published until December 2014	Articles showing a poor awareness of existing literature and/or a flawed research design

Table 1. Inclusion and exclusion criteria.

Moreover, the research results have been further refined considering the “document type” and “subject area” of the papers that were found. In particular, the former limit allows considering only “articles and reviews”, while the latter limit helps to refine the results coming from the following areas: “business, management and accounting”, “decision sciences”, “social sciences”, “economics, econometrics and finance”, and “environmental science”. Through the application of these restriction criteria, 307 potentially relevant articles were identified.

In the fourth phase, after removing any duplicates, the abstracts of all the articles were reviewed to ensure their relevance to the research goal. Careful reading of the abstracts resulted in the selection of 34 articles.

In the fifth phase, the full text of all the papers selected through the previous screening was read, corroborating the articles’ relevance to the research questions and aim. In particular, for determining the articles’ substantial relevance, the fit for purpose approach of Denyer *et al.* (2008) was adopted. Indeed, the dataset includes only those articles that were directly relevant to the research inquiry; this yielded a total of 24 papers.

Finally, both reference and citation tracking (i.e., the snowballing technique) were applied. The former requires scanning and crosschecking the list of all the 24 previously identified papers, while the latter identify articles that had cited those papers (Greenhalgh and Peacock, 2005). The first approach works back in time from the article, whilst the second approach works forward in time from that article, but both are useful in order to ensure that any other possible relevant publications were also captured. This allowed for the conclusive identification of a final dataset composed of 27 relevant articles.

The review procedure is summarised in Table 2.

Phase	Description	Articles
1	Selection of databases	788
2	Identification of keywords	
3	Application of restriction criteria	307
4	Removal of duplicates and reading of abstracts	34
5	Full-text reading	24
6	Snowballing technique	3
Final Dataset		27

Table 2. The systematic literature review process.

In line with Tranfield *et al.* (2003), the 27 identified articles have been deeply analysed through descriptive and thematic analyses, discussed in the following two sections.

3. Descriptive analysis

The descriptive analysis – through the use of graphics – offers a snapshot of the subject being studied, by simply summarizing the relevant literature (Sandelowski, 2000).

In particular, the 27 articles identified through the SLR have been analysed according to the year of publication, journal distribution, geographical distribution, and authors' contribution. Each category is hereafter discussed.

Articles by year of publication

Productization literature could be considered as in a nascent stage, and the publication trend – illustrated in Figure 1 – is proof in this sense.

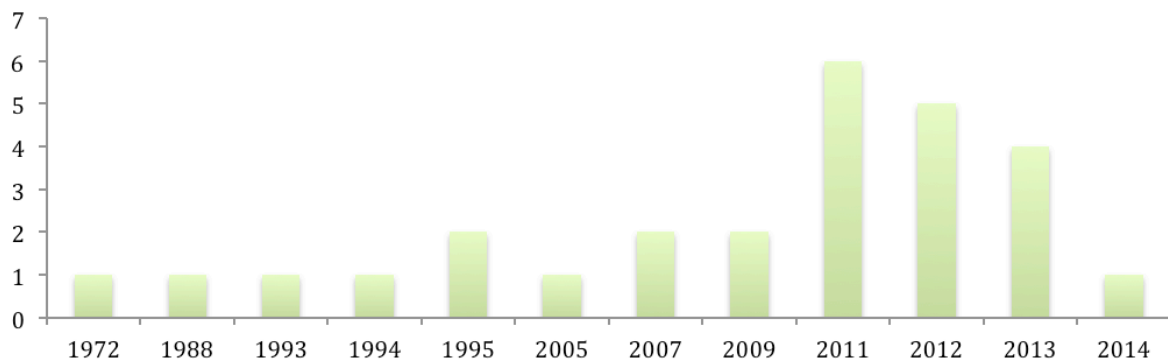


Figure 1. Time-line distribution of the papers.

In fact, starting from Levitt's paper, in 1972, it is only in 2011 that the academic interest towards productization shows any real expansion, reaching a peak of six publications in that same year. Despite this, in 2012 the trend starts to decline, until reaching only a single specific publication on the topic in 2014.

The scarcity of publications is not attributable to any specific explanation. For the sake of completeness, it is necessary to point out that there is much “grey literature” (i.e., academic literature that is not formally published, such as theses, conference proceedings, etc.) on productization (as demonstrated by the number of papers found in the first phase of the literature review process showed in Table 2). However, the rigorous methodology applied and the author's intention of ensuring the analysis is of a high quality grade, do not allow the inclusion of literature that has not been formally published.

Articles by source

Even though the productization literature is scarce, the subject is treated by scholars of different disciplines, therefore determining the involvement of 19 different journals for the 27 published articles (see Figure 2).



Figure 2. Journal distribution of the articles.

The different research fields (e.g., management, marketing, engineering, technology, etc.), in various ways are involved in the study of the phenomenon, let us therefore assume that the same will develop not only extensively but also comprehensively in the foreseeable future.

However, it is surely not a coincidence that the journal containing the highest number of publications is the *International Journal of Production Research*.

Articles by country

Not only many different journals but also a wide range of countries seem to be involved in the articles being published on productization.

Figure 3 shows a world map with the indication (given in percentages) of the number of publications from the various countries. The origins of the journal articles have been determined by the first author's affiliation.

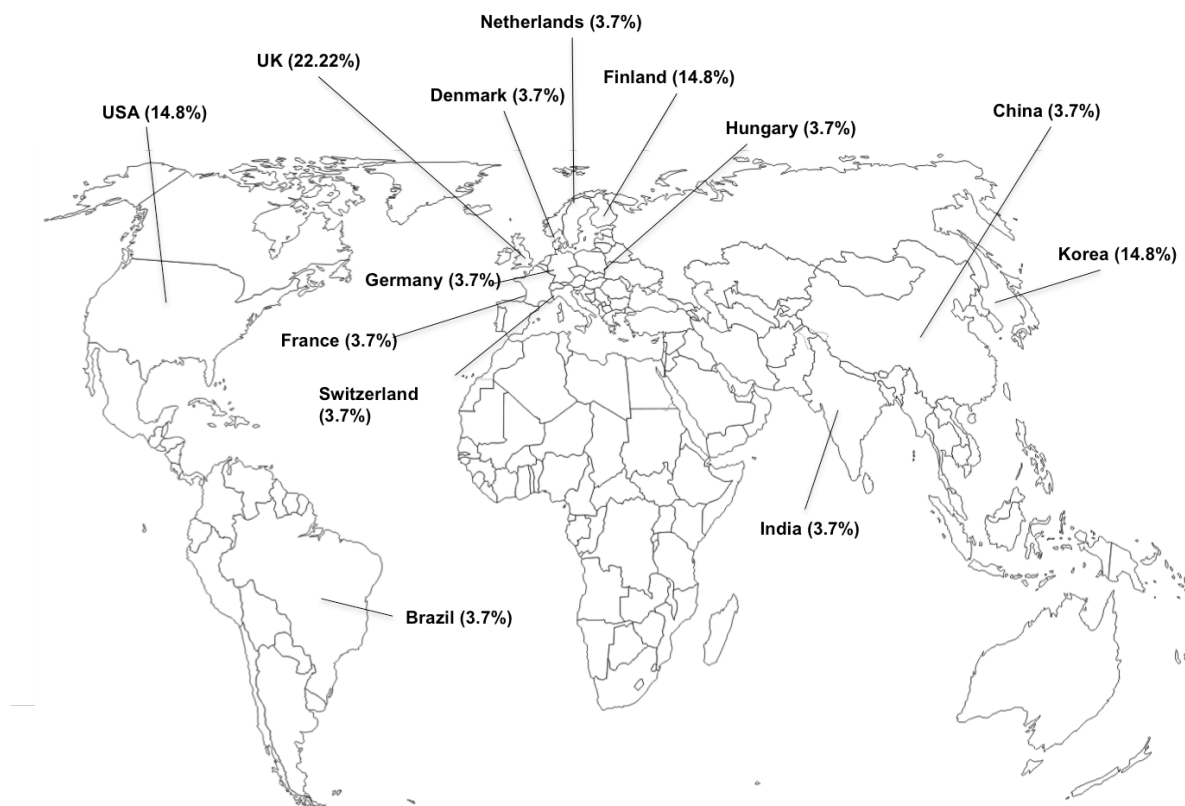


Figure 3. Country distribution of the papers.

The largest proportion of journal articles that refers to productization (almost 60%) were produced in Europe, while another 22% originates from Asia, and the remainder from America. The most involved country is the UK (more than 22% of articles) followed by Finland, Korea and the USA on a par (with almost 15% of articles).

Articles by author(s)

The last point is devoted to a descriptive analysis of the productization literature that deals with the number of authors that have contributed to the topic development.

A total of 79 different authors published articles on productization. Of these, only four authors appear in more than one contribution. They are: Durugbo, Geum, Lee S., and Park. In particular, Durugbo appears in two articles, one as sole author and one as first author. Geum, Lee S. and Park published, as co-authors, two articles (in both cases with Geum as first author). Finally, Geum and Park published together another article (in which, however, Park is the first author).

Also this last point – the absence of ‘leader author(s)’ – confirms what has been already said, namely that the productization literature is still in a nascent stage.

4. Thematic analysis

The main findings of this SLR emerge through the application of a thematic analysis approach to the dataset.

The thematic analysis approach allows an author to accurately describe a phenomenon (Daly *et al.*, 1997) and consists of the identification of common themes through “careful reading and re-reading of the data” (Rice and Ezzy, 1999, 258), “where emerging themes become the categories for analysis” (Fereday and Muir-Cochrane, 2006, 82). According to Braun and Clarke (2006), it is performed through six different phases: 1. familiarization with data, 2. generating initial codes, 3. searching for themes among codes, 4. reviewing themes, 5. defining and naming themes, and 6. producing the final report.

Due to the aim of this paper, the systematic theme’s development has been performed through the inductive (data-driven) approach (Boyatzis, 1998), according to which codes are derived bottom-up throughout the researcher’s reading of data.

Hence, through the codes that emerged, four themes have been identified and are hereafter presented and discussed. Table 3 shows the corresponding references for each theme, highlighting the contribution of each item to the subject through the use of a 3-points asterisks range (*=little contribution; **=medium contribution; ***=strong contribution).

Author(s)	Themes			
	Defining productization	Case studies	Productization features	Link(s) to servitization
Levitt (1972)	**	**	**	**
Vandermerwe and Rada (1988)	***	*		**
Reddy <i>et al.</i> (1993)	**			
Sundbo (1994)	**	*	**	**
Fincham (1995)	**			
Flamholtz (1995)	***		**	
Heusinkveld and Benders (2005)	**			
Baines <i>et al.</i> (2007)	***			**
Davies <i>et al.</i> (2007)		***		
Aurich <i>et al.</i> (2009)				***
Gallouj and Savona (2009)				**
Clayton <i>et al.</i> (2011)				***
Geum <i>et al.</i> (2011a)		**	***	**
Geum <i>et al.</i> (2011b)		**	***	
Jaakkola (2011)	**		***	
Ukko <i>et al.</i> (2011)	***			
Wang <i>et al.</i> (2011)				**
Alter (2012)		***		***
Chattopadhyay (2012)	***	***	***	*
Kim and Yoon (2012)				***
Park <i>et al.</i> (2012)	*			***
Valminen and Toivonen (2012)	***	***	**	*
Beuren <i>et al.</i> (2013)	**			**
Durugbo and Riedel (2013)				***
Nagy (2013)	***			**
Ritala <i>et al.</i> (2013)	**	**	***	
Durugbo (2014)		***		***

Table 3. Key themes identified in the productization literature.

4.1. Defining Productization

In order to understand the productization concept, the first theme has been devoted to the analysis of the different definitions given in the literature.

In the analysed literature, it is possible to find the first direct reference to the term productization in Flamholtz (1995, 42) who describes it as “the process of analyzing the needs of current and potential customers in order to design the products or services that will satisfy their needs” and it “includes not only the design of a product (defined here to include services as well), but also the ability to produce it”. This definition can be linked up to the claims by Vandermerwe and Rada (1988, 136), who – although not explicitly referring to the term productization – state that “the classic service companies [...] began to use more product to facilitate and deliver their services and take more control in the design specification of the products used to produce and deliver these services”.

After more than ten years, productization has been redefined by Baines *et al.* (2007, 4) as “the evolution of the services component to include a product or a new service component marketed as a product”. Since then different authors have also referred to it (e.g., Park *et al.*, 2012; Beuren *et al.*, 2013).

Authors such as Chattopadhyay (2012), Valminen and Taivonen (2012), and Nagy (2013) describe productization as the process of making the service offering more product-like through a systematization of its different components.

Nevertheless, there are other terms directly associated with productization. These are:

- “Technocratic thinking” (Levitt, 1972): in order to improve the services quality and efficiency, services companies must consider themselves to be manufacturers;
- “Modulization/modularization” (Sundbo, 1994; Ritala *et al.*, 2013): services are standardized through the creation of specific modules (one for each element of the services), which could be differently combined, depending on the customers’ needs;
- “Commodisation/commodification”: these terms originate from the consideration that ‘ideas’ could be marketed and consumed (Fincham, 1995; Heunsinkveld and Benders, 2005). In this vein, Ukko *et al.* (2011, 127) state that “productisation is a process in which an idea is developed into a marketable entirety that has highly standardised and well documented production phases and product elements”; and
- “Tangibilizing” (Reddy *et al.*, 1993; Jaakkola, 2011): the creation of a physical image of the service offering by adding to it some physical evidences.

Despite the different definitions and terms presented in the literature, they have different but common points that lead towards answering the first research question, and converging towards a more complete and detailed definition.

RQ1: How is productization defined in the existing academic literature?

A1: Productization is the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim of fulfilling customers' needs and improving service quality and efficiency.

4.2. Case studies

The case study methodology is widely used in the productization literature and is devoted to the analysis of different types of companies (e.g., Davies *et al.*, 2007; Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Durugbo, 2014).

Sometimes cases are not deeply explored within a paper but they are presented as successful examples of productization practices (e.g., Levitt, 1972; Vandermerwe and Rada, 1988; Sundbo, 1994). Moreover, some of the cases analysed do not mention the company name, only its business sector (e.g., Chattopadhyay, 2012; Alter, 2012; Valminen and Toivonen, 2012; Ritala *et al.*, 2013; Durugbo, 2014).

An overview of the key examples is provided in Table 4.

Company	Source	Field	Productization process
Atkins	Davies <i>et al.</i> (2007)	Consultancy	It moves into integrated solutions becoming a systems integrator of externally supplied product components.
ATM (Automated Teller Machine)	Geum <i>et al.</i> (2011a) Geum <i>et al.</i> (2011b)	Bank	The use of technology to the banking system allows its automation, which evolved until becoming a self-service offering (production and consumption do not need to be simultaneous any more).
Cable and Wireless Global Markets	Davies <i>et al.</i> (2007)	Telecommunications	In their offering there were also product components (supplied by external manufacturers) and network facilities (provided in-house).
Danish ISS	Sundbo (1994)	Cleaning	The internationalization has been possible because the 'cleaning service concept' has been made recognizable through the standardization of some components.
DHL	Vandermerwe and Rada (1988)	Logistics	In addition to core services, they offer a high quality telex and laser-printing bureau. They designed their own computer and telecom network in order to track the parcels movement.
Hilton	Sundbo (1994)	Accommodation	Internationalization has been possible because the 'hotel service concept' has been made recognizable through the standardization of some components.
McDonald's	Levitt (1972) Vandermerwe and Rada (1988) Sundbo (1994)	Food	It industrialized its processes, making them highly structured and repetitive.
McGraw Hill	Vandermerwe and Rada (1988)	Printing and publishing	Customers have the possibility to mail order diskettes because core elements of services have been standardized.
UBS (Union Bank of Switzerland)	Vandermerwe and Rada (1988)	Bank	Technology has been used in order to create the first fully automated bank.

Table 4. Companies examples of productization.

The case studies allow considering different aspects related to the productization, both in terms of theory and practice.

First of all, it is interesting to note that only one unsuccessful case is presented in the literature, i.e., Cable and Wireless Global Markets: “It was unable to force its internal regional business units to relinquish control of profitable corporate accounts and faced strong competition from major systems integrators” (Davies *et al.*, 2007, 190). This leads to two possible considerations: 1. The productization process is (almost) always a successful strategy; or 2. The literature lacks a deep analysis of the phenomenon. Considering the relatively young age and paucity of contributions related to productization, it is possible to consider as valid the second assumption.

Secondly, McDonald’s, ATM and small-KIBS (Knowledge Intensive Business Services) companies are those most considered by authors when referring to productization practices. Thus, leading practices in the adoption of productization can be found both in small and large companies. This can be considered a clear sign of how all service companies – whatever their size – recognize the need to make changes to their offering. Moreover, the fact that even small businesses are able to put in place productization strategies might suggest that this process does not require huge monetary investments. Unfortunately, the lack of quantitative studies in the literature (devoted to the measurement of costs linked to this practice) does not provide answers; although this does offer a great opportunity for future research development.

4.3. Productization features

Despite productization literature not having been extended so far, it is already possible to identify some specific features, together with their mutual relations.

The adoption of a productization strategy by a service firm implies the creation of a ‘new service offering’. According to Ritala *et al.* (2013), this involves two phases: a) service-offering visualization, and b) service-offering modelling and modularization. In order to perform these phases, Jaakkola (2011, 224) suggests “three key practices: (1) specifying and standardizing the service offering, (2) tangibilizing and concretizing the service offering and professional expertise, and (3) systemizing and standardizing processes and methods”. The adoption and implementation of these practices inevitably produce changes in ‘*the way of being and doing*’ of the company. Such changes could be facilitated by the adoption of technology. In particular, if the new service offering includes tangible products, technology can act as an interface between them – especially in the design phase (Geum *et al.*, 2011a and 2011b). Moreover, “the increased use of technology has the consequences that service production becomes more like manufacturing” (Sundbo, 1994, 253), and this occurs both with hard and soft technologies (Levitt, 1972). Once the new service offering has been developed, the efficiency and success (Valminen and Toivonen, 2012) of the productization strategy depends on the “firm’s success in defining its market segment and potential niche” (Flamholtz, 1995, 42). The correct formulation both of the new offering and the competitive positioning is reflected – with a positive effect – on firm performance. Productization benefits have been clearly stated by Chattopadhyay (2012, 198): “Service companies attempt Productisation of service for improving competitiveness and performance. Defining, systematizing and concretizing a service make its production more profitable and efficient. When the production process is well defined, the quality of the service becomes more stable. In addition, the possibilities to

accumulate knowledge systematically are improved. Productisation often intensifies the transfer of knowledge and enables the division of work. Finally, Productisation makes the pricing of the service easier". Obviously, achieving these results is positively and inevitably reflected in the customers' satisfaction and loyalty.

Each aspect encompassed in this theme, due to its importance, need to be further and deeply explored in the future.

4.4. Link(s) to servitization

In order to answer the second research question, the last themes collect all the articles in which it was possible to identify links between productization and servitization. In particular, it is interesting to point out that connections have been found in 18 journal articles (out of 27), corresponding to 67% of the literature analysed. This preliminary finding allows the author to state that productization and servitization are strictly related but the existence of the link is not sufficient to determine if productization could (or not) be regarded as the opposite approach of servitization. Thus, the 18 articles included in this last theme have been fully and deeply explored.

First of all, in the academic discussion it is possible to identify three levels of convergence; i.e., between sectors (service and manufacturing), offerings (services and products), and strategies (productization and servitization). Table 5 shows the corresponding authors for each convergence level, with related statements.

Level of convergence	Author(s)	Statement
Sectors	Levitt (1972)	"they [service companies] must think of themselves as performing manufacturing functions [...] only then will they begin to make some significant progress in improving the quality and efficiency of service" (p. 42)
	Vandermerwe and Rada (1988)	"manufacturers and service companies are thinking and behaving like one another" (p. 321)
	Sundbo (1994)	"similarities between the organizational forms of the firm in the two sectors" (p. 261)
	Wang <i>et al.</i> (2011)	"the traditional boundary between manufacturing and services is becoming increasingly blurred" (p. 6865)
Offerings	Gallouj and Savona (2009)	"the boundaries between goods and services become more blurred" (p. 162)
	Clayton <i>et al.</i> (2011)	"the consideration of the product and service as a single offering" (p. 2)
	Geum <i>et al.</i> (2011a)	"integration of products and services has been a matter of grave concern for both manufacturers and service providers" (p. 129)
	Nagy (2013)	"services will increasingly behave as physical products [...] in contrast, physical products incorporate more services than before" (p. 103)
Strategies	Aurich <i>et al.</i> (2009)	"servitization of this product [...] reverse approaches implementing productization of services" (p. 593)
	Alter (2012)	"ideally, servitizing should be treated symmetrically with productizing" (p. 27) "servitizing and productizing should be viewed as opposite strategy directions" (p. 29)
	Kim and Yoon (2012)	"many manufacturers [...] are trying to change their business model through servitization [...] similarly, service providers are also making efforts to deliver high quality of services to customers by productization" (p. 324)
	Durugbo and Riedel (2013)	"servitization closely connects and integrates services with offered products for servitized products, whereas productisation does the reverse for offered services" (p. 599)
	Durugbo (2014)	"servitization [...] and productization that does the reverse" (p. 2885)

Table 5. Levels of convergence in the academic discussion.

The link between productization and servitization has been recognized by scholars and can be regarded as the result of the existing correlation and convergence between service and manufacturing sectors, on the one hand, and services and product into a single offering, on the other.

The above-mentioned integration between services and products into a single offering entails also taking into account a part of the studies dealing with the product-service system (PSS) concept. In particular, the existence of a link between the three research communities (i.e., productization, servitization, and PSS) can be noted by examining these concepts' definitions:

- Servitization: “bundles consisting of customer-focused combinations of goods, services, support, self-service, and knowledge” (Vandermerwe and Rada, 1988, 316);
- Product-service system: “a marketable set of products and services capable of jointly fulfilling a user’s need” (Goedkoop *et al.*¹, 1999, 18);
- Productization: the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim to fulfil customers’ needs and improve service quality and efficiency.

The three definitions have two important common points: 1) creating an offering that simultaneously combines products and services; and 2) creating an offering that will satisfy customers. In this sense, the assumption of Baines *et al.* (2007) and Beuren *et al.* (2013), which considers PSS as a special case of servitization, seems not to be valid any more. The PSS concept cannot be restricted to manufacturers’ offering; it also seems usable for service companies (e.g., Clayton *et al.*, 2011; Kim and Yoon, 2012). On the other hand, it can be useful to define new terms, as Park *et al.* (2012) do. They define “integrated product-service” (IPS) as “any offering in which products and services are integrated, regardless of its type(s), objective(s), and feature(s)” (p. 529).

The verified relationship among the three research communities also reinforces the already verified lack of literature specifically dedicated to productization. In this sense, it is worth noting that of the 18 papers considered within this theme, only two are exclusively devoted to productization (i.e., Chattopadhyay, 2012 and Valminen and Toivonen, 2012).

Moreover, by analysing only the articles that jointly consider productization and servitization, it is possible to identify which kind of relationship scholars recognize between the two concepts. The adjective most used to describe this relationship is “reverse” (Aurich *et al.*, 2009; Durugbo and Riedel (2013); Durugbo, 2014). Thus, productization is seen as the exact opposite of servitization, and this answers the second research question.

¹ The article by Goedkoop *et al.* (1999) is not included in the 27 journal articles derived from the SLR. It has been cited here due to its importance to the context.

RQ2: Can productization and servitization be considered as “two faces of the same coin”?

A2: Productization and servitization can be considered as “two faces of the same coin”. In particular, positioning manufacturers and service companies at the far ends of an imaginary continuum, servitization and productization strategies acting reversely lead to the convergence of firms’ offering and sectors.

5. Discussion and Conclusion

This study set out with the aim of assessing the importance of productization practice in the modern economy.

The application of a thematic analysis to 27 journal articles – derived from a systematic review of the literature on the topic – allows us to clearly define the productization concept and its relationship with servitization.

In particular, productization has been defined as the process of transforming a service company offering by adding tangible products to core services or by decomposing service components into combinable modules, with the aim of fulfilling customers’ needs and improving service quality and efficiency. Moreover, productization and servitization can be considered as “two faces of the same coin”, which acting reversibly lead to the convergence between manufacturers and service companies.

The overall understanding and specific findings of this research have both practical and theoretical implications.

Firstly, the analysed journal articles show that the productization concept is still not well established within academic discussion, so much so that it is not possible to identify a specific research community dealing with this topic. More productization-specific studies are needed and significant work remains to be undertaken.

Even though a wide range of future research questions can be posed, there are at least three specific aspects that – more than others – need to be addressed:

- Customer role (e.g., changes to customer participation in the offering creation);
- Design issue (e.g., engineering aspects related to the practical combination of tangible and intangible goods); and
- Guidelines (tools and techniques) for managers (e.g., empirical investigations in order to provide best practices).

Secondly, the conducted research seems to suggest the existence of a new type of firm, namely the solution provider, shown graphically in Figure 4.



Figure 4. The solution provider firm.

Both manufacturing and service companies are facing important transformation processes, in order to maintain a successful competitive position. This requires the implementation of new strategies and changes in the offering provided. Practically: the application of servitization and productization processes by product- and service-based firms, respectively; and the simultaneous presence of tangible and intangible goods into a single offering. Therefore, it is possible to state that firms have to provide *solutions* (the main purpose of the new offering is to solve a consumer's problem, regardless of what it is). Servitization and productization strategies perform this task. Along the axis, each level of service/product infusion generates a new offering capable of fulfilling a specific customer requirement.

As a result, achieving a successful competitive position will be possible only through the creation of a balanced mix of products and services according to the customer expectations.

Although this study has been conducted in a rigorous manner, it contains several limitations, and – as with all research methods – is susceptible to critical observations. Limiting sources to peer-reviewed journals – even though increasing the validity of the investigated articles – does not allow for the exploration of the contribution on productization available in other publication media. Moreover, the adopted inclusion and exclusion criteria, together with the selected keywords, may also have influenced the results.

Due to the extensive search possibilities still open, the increased knowledge on productization topic gained through this study represents only the first step towards a deeper and more complete understanding of the phenomenon.

References

- Alter, S. (2012): Challenges for service science. *Journal of Information Technology Theory and Application* 13, pp. 22-38.
- Aurich, J.C.; Wolf, N.; Siener, M.; Schweitzer, E. (2009): Configuration of product-service systems. *Journal of Manufacturing Technology Management* 20, pp. 591-605.
- Baines, T.S.; Lightfoot, H.W.; Evans, S.; Neely, A.; Greenough, R.; Peppard, J.; Roy, R.; Shehab, E.; Braganza, A.; Tiwari, A.; Alcock, J.; Angus, J.; Bastl, M.; Cousens, A.; Irving, P.; Johnson, M.; Kingstone, J.; Lockett, H.; Martinz, V.; Michele, P.; Tranfield, D.; Walton, I.; Wilson, H. (2007): State-of-the-art in product-service systems. *Journal of Engineering Manufacture* 221, pp. 1543-1552.
- Beuren, F.H.; Ferreira, M.G.G.; Miguel, P.A.C. (2013): Product-service systems: a literature review on integrated products and services. *Journal of Cleaner Production* 47, pp. 222-231.
- Boyatzis, R.E. (1998): *Transforming qualitative information: Thematic analysis and code development*. Sage.
- Braun, V.; Clarke, V. (2006): Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, pp. 77-101.
- Chattopadhyay, N. (2012): Productisation of Service: A Case Study. *International Journal of Advanced Computer Science & Applications* 3, pp. 197-201.
- Clayton, R.J.; Backhouse, C.J.; Dani, S. (2011): Evaluating existing approaches to product-service system design: A comparison with industrial practice. *Journal of Manufacturing Technology Management* 23, pp. 272-298.
- Cooper, H. (1998): *Synthesizing research: A guide for literature reviews*, Beverly Hills, CA: Sage.
- Crossan, M.M.; Apaydin, M. (2010): A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of management studies* 47, pp. 1154-1191.
- Daly, J.; Kellehear, A.; Gliksman, M. (1997): *The public health researcher: A methodological approach*. Melbourne, Australia: Oxford University Press.
- David, R.J.; Han, S.K. (2004): A systematic assessment of the empirical support for transaction cost economics. *Strategic Management Journal* 25, pp. 39-58.
- Davies, A.; Brady, T.; Hobday, M. (2007): Organizing for solutions: Systems seller vs. systems integrator. *Industrial Marketing Management* 36, pp. 183-193.
- Denyer, D.; Tranfield, D.; van Aken, J.E. (2008): Developing design propositions through research synthesis. *Organization Studies* 29, pp. 393-415.

- Durugbo, C. (2014): Strategic framework for industrial product-service co-design: findings from the microsystems industry. *International Journal of Production Research* 52, pp. 2881-2900.
- Durugbo, C.; Riedel, J.C. (2013): Readiness assessment of collaborative networked organisations for integrated product and service delivery. *International Journal of Production Research* 51, pp. 598-613.
- Fereday, J.; Muir-Cochrane, E. (2006): Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International journal of qualitative methods* 5, pp. 80-92.
- Fincham, R. (1995): Business process reengineering and the commodification of managerial knowledge. *Journal of Marketing Management* 11, pp. 707-719.
- Flamholtz, E. (1995): Managing organizational transitions: implications for corporate and human resource management. *European Management Journal* 13, pp. 39-51.
- Gallouj, F.; Savona, M. (2009): Innovation in services: a review of the debate and a research agenda. *Journal of Evolutionary Economics* 19, pp. 149-172.
- Geum, Y.; Lee, S.; Kang, D.; Park, Y. (2011a): Technology roadmapping for technology-based product-service integration: A case study. *Journal of Engineering and Technology Management* 28, pp. 128-146.
- Geum, Y.; Lee, S.; Kang, D.; Park, Y. (2011b): The customisation framework for roadmapping product-service integration. *Service Business* 5, pp. 213-236.
- Goedkoop, M.; van Halen, C.; te Riele, H.; Rommens, P. (1999): Product Service Systems, Ecological and Economic Basics. Report for Dutch Ministries of Environment (VROM) and Economic Affairs (EZ).
- Greenhalgh, T.; Peacock, R. (2005): Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources. *British Medical Journal* 331, pp. 1064-1065.
- Harkonen, J.; Haapasalo, H.; Hanninen, K. (2015): Productisation: A review and research agenda. *International Journal of Production Economics* 164, pp. 65-82.
- Heusinkveld, S.; Benders, J. (2005): Contested commodification: Consultancies and their struggle with new concept development. *Human Relations* 58, pp. 283-310.
- Huff, A.S. (2009): *Designing research for publication*, Thousand Oaks, CA: Sage Publications.
- Jaakkola, E. (2011): Unraveling the practices of “productization” in professional service firms. *Scandinavian Journal of Management* 27, pp. 221-230.
- Kim, S.; Yoon, B. (2012): Developing a process of concept generation for new product-service systems: a QFD and TRIZ-based approach. *Service Business* 6, pp. 323-348.

- Levitt, T. (1972): Production-line approach to service. *Harvard Business Review* 50, pp. 41-52.
- Nagy, S. (2013): Service Pyramid Concept of Knowledge Intensive Business Services in the Small and Medium Sized Enterprises Sector. *International Journal of Advanced Computer Science and Applications* 4, pp. 103-108.
- Newbert, S.L. (2007): Empirical research on resource-based view of the firm: an assessment and suggestions for future research. *Strategic Management Journal* 28, pp. 121–46.
- Park, Y.; Geum, Y.; Lee, H. (2012): Toward integration of products and services: Taxonomy and typology. *Journal of Engineering and Technology Management* 29, pp. 528-545.
- Reddy, A.C.; Buskirk, B.D.; Kaicker, A. (1993): Tangibilizing the intangibles: some strategies for services marketing. *Journal of Services Marketing* 7, pp. 13-17.
- Rice, P.; Ezzy, D. (1999): *Qualitative research methods: A health focus*, Melbourne, Australia: Oxford University Press.
- Ritala, P.; Hyöttylä, M.; Blomqvist, K.; Kosonen, M. (2013): Key capabilities in knowledge-intensive service business. *The Service Industries Journal* 33, pp. 486-500.
- Sandelowski, M. (2000): Focus on research methods-whatever happened to qualitative description?. *Research in Nursing and Health* 23, pp. 334-340.
- Seybold, P.B.; Marshak, R.T.; Lewis, J.M. (2001): *The customer revolution*. New York, NY: Random House.
- Sundbo, J. (1994): Modulization of service production and a thesis of convergence between service and manufacturing organizations. *Scandinavian Journal of Management* 10, pp. 245-266.
- Tranfield, D.R.; Denyer, D.; Smart, P. (2003): Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management* 14, pp. 207-222.
- Ukko, J.; Pekkola, S.; Valtonen, J.; Saunila, M.; Rantanen, H. (2011): Productising expert services of performance management. *International Journal of Business Excellence* 4, pp. 125-141.
- Valminen, K.; Toivonen, M. (2012): Seeking efficiency through productisation: a case study of small KIBS participating in a productisation project. *The Service Industries Journal* 32, pp. 273-289.
- Vandermerwe, S.; Rada, J. (1988): Servitization of business: adding value by adding services. *European Management Journal* 6, pp. 314-324.
- Victor, L. (2008): Systematic reviewing. *Social Research Update* 54, pp. 1-4.
- Wang, P.P.; Ming, X.G.; Li, D.; Kong, F.B.; Wang, L.; Wu, Z.Y. (2011): Status review and research strategies on product-service systems. *International Journal of Production Research* 49, pp. 6863-6883.

Author(s):

Luna, Leoni, Research Fellow in Management
"Tor Vergata" University of Rome
Department of Studies on Business, Government, Philosophy
Via Columbia, 2 – 00133 Roma (RM) - Italy
luna.leoni@uniroma2.it