

Literature Review and Bibliometry: a Groundwork on Servitization

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Abstract

Typical manufacturing companies have been adding services to products to create new offers to strengthen the relationship with clients. This is a process named 'servitization'. In this context, the present study aims at investigating the literature on servitization in typical manufacturing companies in recent years. Articles published in the past 10 years, retrieved from the Web of Science, Scopus, and ScienceDirect databases resulted in 50 publications for further analysis. A bibliometric analysis identified that the articles were authored by 145 authors and co-authors from 14 countries, published in 27 journals, and present a set of 414 keywords. A preliminary content analysis shows that the transition to servitization needs attention as the challenges and barriers for organizations to overcome. The literature also points out a growth of digital servitization, which is a subject for further exploration, since the use of technology for the development of new solutions may strengthen service offerings.

Keywords

Servitization, Product-service systems, Literature review

1. Introduction

Companies often find themselves situated within highly competitive environments (Markides 2015), and are constantly challenged to rethink how they offer services (Rymaszewska et al. 2017). Service providers typically offer one or more services that are projected to meet the needs of a group of targeted clients (Kowalkowski et al. 2017). Many companies in the manufacturing sector offer services in conjunction with product portfolios, because this union provides a more holistic experience to the consumers (Gurtu 2019). Over the last few years products have become less profitable (Marilungo et al. 2017). This has led to an increased discussion on how to integrate products and services (Gurtu, 2019). One profitable opportunity may be to invest in offering services within this scenario (Baines et al. 2017). Companies that traditionally offer products have expanded quickly to offer services to clients, especially in developing countries (Baines et al. 2017; Valtakoski, 2017).

Providing services allows companies to increase their profit margins, aggregate value to the products and goods they manufacture, and allow companies to differentiate them from their competitors, without needing to reduce operational costs to remain competitive (Baines et al. 2017). This movement towards offering services and solutions in conjunction with products is called 'servitization' (Vandermerwe and Rada 1988). Baines et al. (2017) define 'servitization' as an innovation of capabilities, and organizational processes that move away from a model based on negotiating "the sale of products" towards "the sale of products and services together that aggregates value in an integrated way". A business model translates strategies, like position and strategic objectives, explicitly stating how the business is planned and operated (Osterwalder et al. 2005).

1.1 Objectives

There are many challenges surrounding transitions to servitization that traditional manufacturing companies face. In this sense, this study seeks to investigate the topic of servitization through a literature review by using bibliometric analysis and content analysis. This paper is then divided into four sections, in addition to the introduction. Section 2 addresses the theoretical basis for the study, seeking to provide a conceptual base for the themes addressed here.

Section 3 describes the research methodological procedures used in the study. Section 4 presents the results and, lastly, section 5 presents the main concluding points and opportunities for further studies.

2. Theoretical Basis

2.1 Servitization Concept

Servitization is a process by which manufacturing companies offer services in conjunction with their products (Baines and Lightfoot 2014). As a result of this change in strategy, organizations that were exclusively manufacturing organizations need to incorporate services in order to obtain competitive advantages (Ren and Gregory 2009), thus creating value by incorporating services into products (Baines et al. 2017), with a focus on sustainability, since sustainability relates to extending the life cycle of a product (Rabetino et al. 2018). This process can change industrial biases, formerly based on mass consumption, towards personalized needs based on demand (Cui et al. 2019).

Manufacturing companies need to transform their organizations to develop and provide services based on demand (Baines et al. 2017). The role of organizational culture is essential for a well-executed transformation (Bigdeli et al. 2018). Studies often focus on servitization as resulting from a process of change, and not as its own change process (CUI et al., 2019), although some studies do state that servitization is the final result (Rabetino et al. 2018). Servitization, which has been the focus of many academic studies over the last decade, is related to a movement where companies amplify their supply using integrated product, service, and support packages, and automated self-help and information systems, to aggregate value to the main business activities and quickly improve the essential capacities of the company (Baines et al. 2017).

This rationale is based on a predominantly service-based logic, where services are at the core of a company's mission and values, and can only be created with the involvement of consumers in co-creation processes (Vargo and Lusch 2004). Sayar and Er (2017) state that consumer involvement in understanding his/her/their own needs increases the value of the experience, and that this interaction can occur in three ways (i) interaction with the service provider, (ii) interaction together, and (iii) interaction with the consumer. However, companies must confront great challenges and risks during the transition process towards servitization (Bigdeli et al. 2018). This occurs specifically at the moment of transition, and especially in the stages that follow, when strategic, organizational, and operational risks might arise (Beneditini et al. 2015).

2.2 Transition to Servitization in Manufacturing Companies

According to Baines et al. (2017), the transition process towards servitization can be expressed by various approaches, with the most popular being related to extending the life cycles of products. An example provided by the authors listed above, is that a product-centered company can compete without developing and delivering any services related to this product and accepting that market share may decrease as the product's life cycle matures and the supply of competitors starts to be more attractive to customers. The previous cited authors add that the transition to servitization provides a wide spectrum of possibilities for providing services. However, it makes management more complex, and in some cases it is necessary to redesign strategic, organizational, and operational systems, and to reorganize resources and capacities to adjust to a new business model (Visnjic et al. 2018). Companies should efficiently mobilize internal resources and or collaborate with other companies within the ecosystem of the manufacturing company in order to overcome these challenges and to seek out opportunities for transitions to Servitization (Goduscheit and Faullant 2018).

Organizational strategy should also be updated to strengthen cultural changes within the company via changes to mission statements and fundamental characteristics of governance, e.g., the way that departments are structured and distributed within the company (Saebi et al. 2017). It is important to create or rethink the structure of innovation processes, and develop processes for services evaluations and relations with consumers that may require new business principles (Bigdeli et al. 2018). Thus, the traditional product-centric business structure should be reworked into a service-oriented structure (Cui et al., 2019).

Creating a strategy oriented towards providing services is a complex task, since it encompasses a wide spectrum of new actions (Baines et al. 2017). According to Karlsson (2007), organizations should radically change their mindset, since a series of interdisciplinary processes should be established, specifically affecting product development, logistical structure, and service operations (that may already exist). These processes should encompass changes in

mentality i.e., marketing, sales and consumers, timeframes, i.e., long-term risks and exposure, as well as business models for supply e.g., understanding what clients value, and develop a service culture, and skills for projecting and supplying services (Neely, 2009).

3. Research Design

This is a descriptive theoretical in nature, since it deals with a literature review. Literature reviews are rigorous syntheses of all research conducted on a specific subject. These reviews seek to analyze studies and to justifying the selection of certain studies by using explicit inclusion and exclusion criteria, as well as a quality assessment methodology (Yin, 2010). The study aims to investigate existing literature on servitization for typical manufacturing companies by consulting studies mainly published in international journals.

As can be seen in Table 1, the search was conducted by combining keywords to find publications that contained these words in the abstract, title, or keywords. This was done in the following databases: the Web of Science, Scopus, and ScienceDirect. The time frame was limited to 2009 to 2019, enabling to observe the growth over the last 10 years.

Table 1. Key-words choice

Key-words	Additional terms
(“*service*”) AND (“*servit*”)	<i>Service Ecosystem, Service Maturation, Services Strategies, Service Implementation, Service Infusion, Service Innovation, Advanced Services, Product-Service System, Servitization and Deservitization</i>

3.1 Research Methods

Bibliometric analysis was carried out in conjunction with quantitative descriptions of the publications in order to identify and select the main outlets that were relevant to the subject contained in the databases. This description took into account: the year of publication, authors, country of origin of the authors, journals, keywords, and the collaborative networks among authors.

The search strategy started by defining the research subject (‘transition to servitization’), the keywords (Table 1), and the databases (Web of Science, Scopus, and ScienceDirect). The filtering process considered articles published in journals from all areas. The bibliographic portfolio was defined according to the following criteria (i) identifying repeated articles (exclusion criteria), (ii) articles published in English, (iii) titles aligned with the research subject, (iv) an abstract aligned with the research subject, (v) articles available from the databases (exclusion criteria), and (vi) text aligned to the research subject (full read).

After selecting the studies that would comprise our bibliographic portfolio, the contents of the publications were analyzed to identify the main topics addressed. To manage, organize, and treat the collected data, the following software was used: EndNote® X5, MS Excel™, and VosViewer™. EndNote® X5 is software used to manage references integrated in the database, allowing to register, organize, and analyze the articles. VosViewer™ was used to conduct the co-authorship analysis. It is a software that allows researchers to construct networks based on data downloaded from databanks. The main words contained in the publication were retrieved to aid in the thematic analysis of the articles, along with the key words used in the articles, i.e., both considering the frequency of repetition. A visual representation of this analysis was elaborated using the website wordclouds.com. The next section presents the main results.

5. Results and Discussion

The search and filtering phases resulted in 1,151 articles from the selected databases. Using the criteria defined in Section 3, 50 publications aligned with the subject consisted of the bibliographic portfolio. Figure 1 shows the number of articles resulting from the search, and the triage steps applied to the articles.

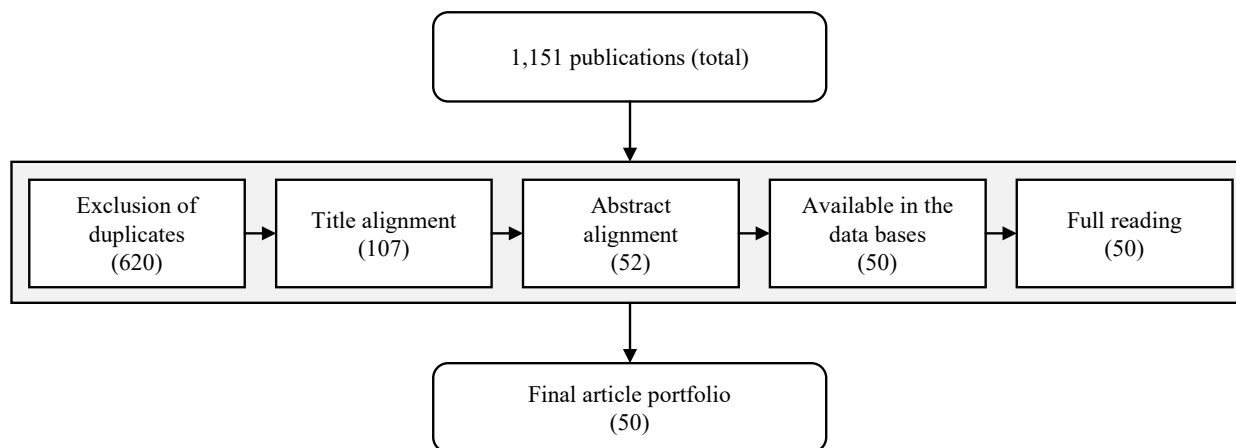


Figure 1. Number of articles in each step

Of the 50 articles that comprised the bibliographic portfolio, 30 were classified as theoretical, and 20 as empirical (19 studies with predominant qualitative data and 1 quantitative study). The classification adapted from Filippini (1997) was adopted to categorize the research methodological approach, namely: modeling, simulation, survey, case study, field study, action research, and theoretical conceptual approaches.

From the empirical studies, 19 used the case study method and one adopted action research. With respect to the theoretical articles, 25 were literature reviews, 14 of which focused on servitization, while the other 7 articles were theoretical literature reviews focused on product-service systems (PSS), 2 focused on deservitization, 1 on digital servitization, and 5 focused on creating a framework for PSS, and 2 a framework for servitization.

Figure 2 shows the chronological distribution of the articles by year. It is worth noting that the number of publications related to the subject of interest started to increase after 2014, and the greatest concentration of these articles were from 2017 to 2019, with 10 publications for each year.

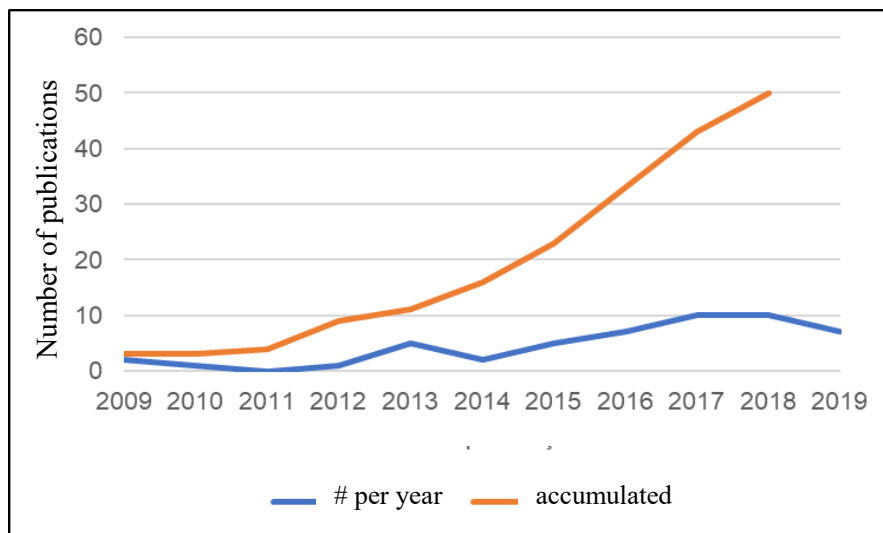


Figure 2. Temporal distribution of publications

Table 2 presents the main journals where the articles were published (4 or more articles).

Table 2. Main journals

Number of publications	Journal
17	<i>Industrial Marketing Management</i>
11	<i>Procedia CIRP - The International Academy for Production Engineering</i>
4	<i>Journal of Manufacturing Technology Management</i>

The CIRP publishes its proceedings in the *CIRP Procedia - The International Academy for Production Engineering* by the Elsevier/ScienceDirect platform. The rationale of considering the *CIRP Procedia* was due to a large number of publications, and the fact that is peer-reviewed.

The 50 articles were written by 145 authors and co-authors, published in 27 journals from 2009 to 2019 in 14 countries. The countries with the most publications were the United Kingdom, with nine publications, followed by the United States, with seven publications, then Italy and Germany with six publications each. After analyzing the most relevant authors of the bibliographic portfolio using the software program VosViewer, we found that 132 authors and co-authors formed 4 cluster sets with 50 links. The clusters represent the authors that worked in conjunction, and the links correspond to connections related to co-authorship, which is shown in Figure 3.

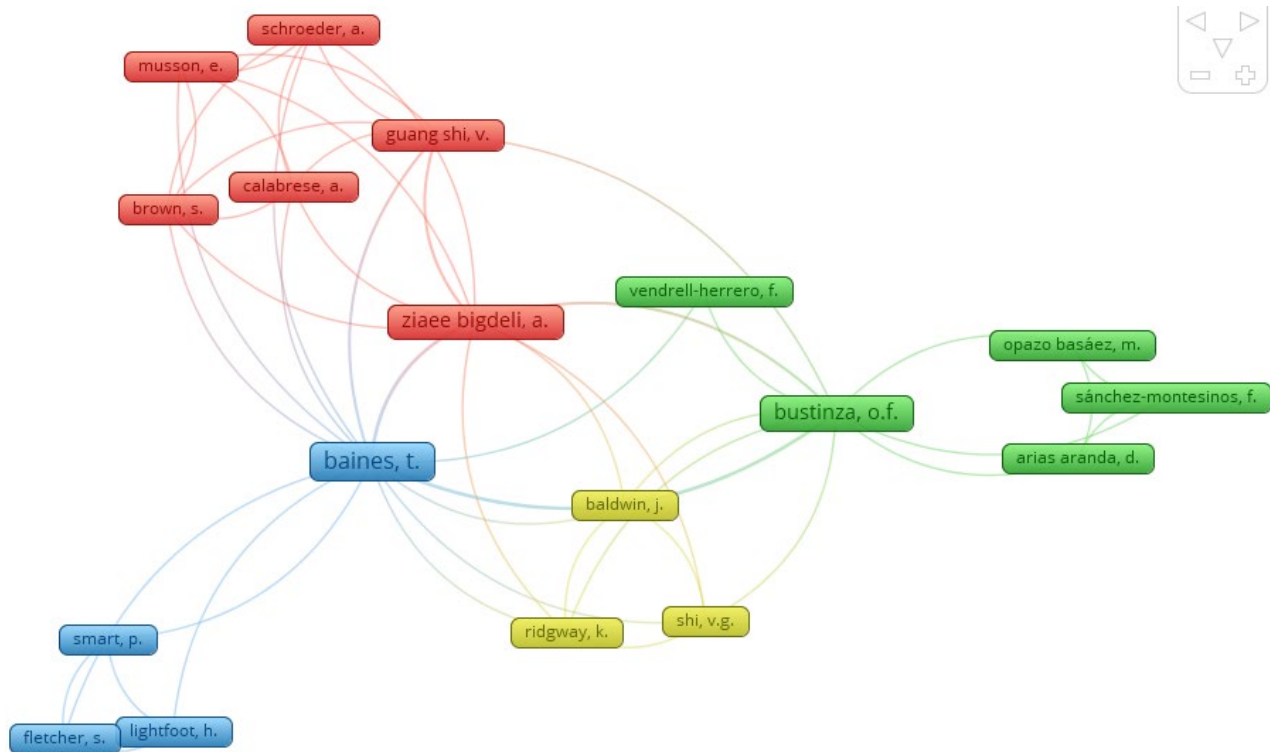


Figure 3. Author network

As was expected, in general, the authors and co-authors dealt with the same central theme of ‘servitization’ in its diverse applications, addressing product service systems, co-creation values, and digital servitization, to name but a few. The largest clusters are in red, green, blue, and yellow, and are comprised of four to six authors (Figure 3). The clusters containing the most authors and co-authors are outlined in Table 3.

topic for future research, given advances in technology that can create new opportunities for developing new solutions directed towards ensuring that transition processes are successful. Finally, this study may serve as a base for other studies that seek to expand upon the topic of transitions towards servitization for traditional manufacturing companies. Next phase is to perform a contents analysis in order to achieve more robust literature outcomes.

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Biography

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