

Servitization as a Strategic Complement to Production and/or Servuccion Systems: A Systematic Review

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Abstract

Both production systems and servant systems today face increasingly dynamic and changing scenarios as a result of the greater number of competitors entering the markets, the wide variety of goods and/or services offered, the marked scarcity of resources (raw materials), the increasingly high associated costs, etc. Industry 4.0, 5.0 and the same dynamism of customer needs, generating great telluric movements in the way of doing business, and that companies belonging to these contexts eagerly seek schemes that allow them to operate as open systems, that is, to be in contact with customers to the greatest extent possible, to listen to their voice and encourage them to feel served as they deserve and more. Based on the proposed precepts, schemes that allow this objective are described and it is thus that Servitization is seen as a competitive opportunity, which is the main focus of attention of this work, with which it is intended to establish through a systematic review supported by the Gavilan model the way in which it is being used worldwide to mark competitive advantages in the aforementioned productive contexts in a related time window with the last 10 years (2014 – 2023) and thus be able to generate a roadmap that allows the strengthening of the companies that make up these contexts in the city of Cartagena de Indias, Colombia.

Keywords

Servitization, Servuccion, Production, Operations Strategy, Gavilan Model.

1. Introduction

Business organizations, both in production (also known as manufacturing (manufacturing, transforming and/or assembling goods), and in service (manufacturing services), are currently facing many challenges given the dynamic and unstable context in which they operate, this instability translated into permanent telluric movements and/or shaking as a result of the permanent interaction between two important actors in the social and economic context. These are the customers (users and/or consumers), which express their needs or demands in a particular way and in a language very different from the language of organizations and on the other hand the companies that every day that passes there are more and more of them and likewise they produce a greater volume of goods and/or services, the same, similar (**Esteban Tovar, 2016**) and/or substitutes (Arboleda Arango, Duque Roa, & Escobar Saa, 2015) which generates, on the one hand, a high degree of competition and, on the other hand, a high level of competitiveness, which has a significant impact on the survival and sustainability of companies in the market (Gómez Ortiz & Duran, 2023) and in turn in the life cycle of the products. As a consequence, in order to remain in the market and maintain high levels of market participation, companies need to implement strategies that lead to generating differences (Franco-Yoza, Macías-Pillasagua, & Lucas-Pincay, 2022) and consequently customer loyalty (José Ignacio López Espinosa & Ratto Schol, 2022), which to a large extent is achieved when the expectations of the market are known and translated into the organizational language and products (goods and/or services) aligned with these expectations are first designed and then processes are designed and implemented to guarantee the manufacture of these products in accordance with the design characteristics and the established operational budgets. In order to guarantee customers meaningful and high value-added experiences for which they are willing to pay, they generate positive perceptions (Silva-Treviño, Macías-Hernández, Tello-Leal, & Delgado-Rivas, 2021).

Based on the above and in order to motivate research, the following problematic questions are proposed:

- a. Is Servitization a strategy that guarantees the survival and sustainability of production and/or Servuccion systems?
- b. Does Servitization contribute from a strategic approach to improving the productivity, quality and profitability of Servuccion systems?

1.1 Objectives

- To establish, through a systematic review supported by the Gavilan model, the way in which Servitization is being used worldwide to mark competitive advantages in the productive contexts of production and/or Servuccion in a time window of the last 10 years (2014 – 2023).
- Propose a roadmap that allows the strengthening of the companies that make up the productive contexts of production and/or Servuccion in the city of Cartagena de Indias, Colombia.

2. Literature Review

2.1 Servitization

It is a competitive strategy traditionally used in the manufacturing industry more nowadays and that consists of not limiting itself to offering a good and delivering it to the customer or user so that he or she can use it or make a consumption action in exchange for a payment, but it involves agglutinating and making a link between several of the current trends. such as the digital agenda, innovation in business models and the co-creation of value (especially between manufacturers and users of their products, machines, components, technologies, etc.) (Kamp, 2016). In other words, it is a matter of establishing mechanisms that make it possible to make the customer the most important, permanently and continuously, which means that the relationship will allow the user or consumers to be served throughout the operation of the value chain, even until they finally have the acquired good, which is generating real transformations and growth in the business (Minaya, Avella, & Tres Palacios, 2023). Servitization can be defined as a process of change that manufacturing companies face and need in which they must develop competencies to manufacture services and thus guarantee their continuous and permanent relationship with the customer, user or consumer, which implies a change or transition in the way of doing business in which by tradition there is a focus on the product and with the introduction of this new concept businesses Focus on service (Viladas, 2020).

2.2 Servuccion

Also known as the logistics behind the service, which guarantees an optimal customer experience through the timely and accessible interaction that is generated between the basic and vital elements of any service system, such as: the

contact staff, the physical agent and the customer (Guerrero Bejarano, Solís Vera, & Silva Siu, 2017). On the other hand, service can also be defined as the process of creation of the service through which the different stages that lead to the concept of the new service are deployed, in which the expectations proposed by the clients based on their needs are translated into experiences through the definition of a physical agent framed in processes of attention and services themselves and that generate as an effect A perception of the manufactured service (Parra Ferié, Rhea González, & Gómez Román, 2019). When talking about service, we describe those highly complex systems in which services are manufactured as a result of customer demands and/or requirements, which are remedied through processes capable of translating those requirements into value-added experiences, which in turn generates perceptions in these customers that guarantee loyalty. this generating the repurchase of the service offered (Garzón Saenz & Redchuk, 2021).

2.3 Production

The process by which a manufacturing organization manufactures goods tailored to customers (Project Production Systems); In variety, diversity according to the requirements of the target market (Pothole and/or Batch Production Systems) and mass, with high levels of standardization and automation (Continuous Production Systems) (Moreno, 2017). Production can also be defined as the set of processes that interact in a systemic way and through which the activities necessary to produce, manufacture and/or assemble goods are planned, programmed and controlled, including here the manufacture of services according to a level of influence of the customer on the design of the final product (Chapman, 2006). Likewise, production is understood as the set of processes through which input resources, generally called raw materials, are transformed into finished products in a variety, quantity, cost and quality that in turn generates satisfaction of the requirements of an objective market and itself economic and sustainability interest of a group of investors and associated with a previous design of the product to be offered (Alba, 2017).

2.4 Operations Strategy

When we talk about business strategy, this concept focuses on the need that companies have to mark competitive differences within the context where they operate, that is how business strategy is and has become the core of the present and future of any modern organization. This entails identifying and developing new management techniques and practices that allow analyzing market conditions, competitive conditions, advantages and disadvantages of introducing new products, new materials, among others, and thus being able to make the best decisions to remain current in the market. From an operational point of view, strategy represents a challenge in which companies can understand that according to how products are designed, how they are shipped, delivery times and changes in the way things are done represent substantial differences in the competitive position (GÓMEZ GÓMEZ , y otros, 2020). The trading strategy should define and establish how it is intended to create and sustain value for investors. By including sustainability to the concept, the requirement to meet current needs without compromising the ability of future generations to meet their own needs is raised, so it must not only focus on the economic viability of its shareholders, but must also consider the environment and the social impact on stakeholders, so an adequate operations strategy establishes policies and general plans to use the company's resources defining criteria in the social, economic and environmental spheres (JACOBS & CHASE, 2014). From a general approach, the operations strategy allows both manufacturing companies and service companies to adapt in an efficient, effective and effective way to the telluric movements that are generated in the market as a result of the permanent interaction between the needs (customer demands) highly volatile and susceptible and the great variety and typologies of companies available in the economic and social context that are permanently Offering a great diversity of products, whether goods or services, it is therefore the duty of companies to guarantee the full satisfaction of these needs and this is where the strategy comes in, which is responsible for generating that route of action to be able to achieve the fundamental objectives of organizations, which are to produce goods and/or services according to the demands of the market. with high quality standards and a price-cost that contributes to the profitability of the organization, including becoming sustainable (Pineda Zapata & García Delgado, 2020).

2.5 Gavilan Model

When it comes to solving information problems, a number of strategies and/or mechanisms are established that allow for an efficient, effective and effective solution to this problem, since the sources of information described in the databases are increasing every day. Thus, validated methodologies emerge, such as the Gavilan model, which allows in a structured and systemic way to provide solutions to information problems based on the development of 4 fundamental stages and that allows it to be adapted to any condition to respond to one or more information problems (Cánchica de Medina, 2016). On the other hand, it is established as a fundamental objective of the Gavilan model in the academic environment as a methodology that allows the development and strengthening of information

management and administration competencies, which undoubtedly represents a competitive advantage for today's professionals who face a number of challenges with the development of information technologies, among them the high volume of information and knowledge available on the web or the large number of databases available for consultation, as well as physical material in libraries (Jaramillo & Bedón , 2017).

3.Methods

The development of this work was carried out under an exploratory and descriptive research approach, since, in order to establish the strategic opportunities that Servitization has for productive contexts of production and/or service, a systemic review of the literature was carried out in the period between 2014 – 2023, in the Scopus database based on the Gavilan model, which is executed from (4) four stages as they are (See Figure 1):

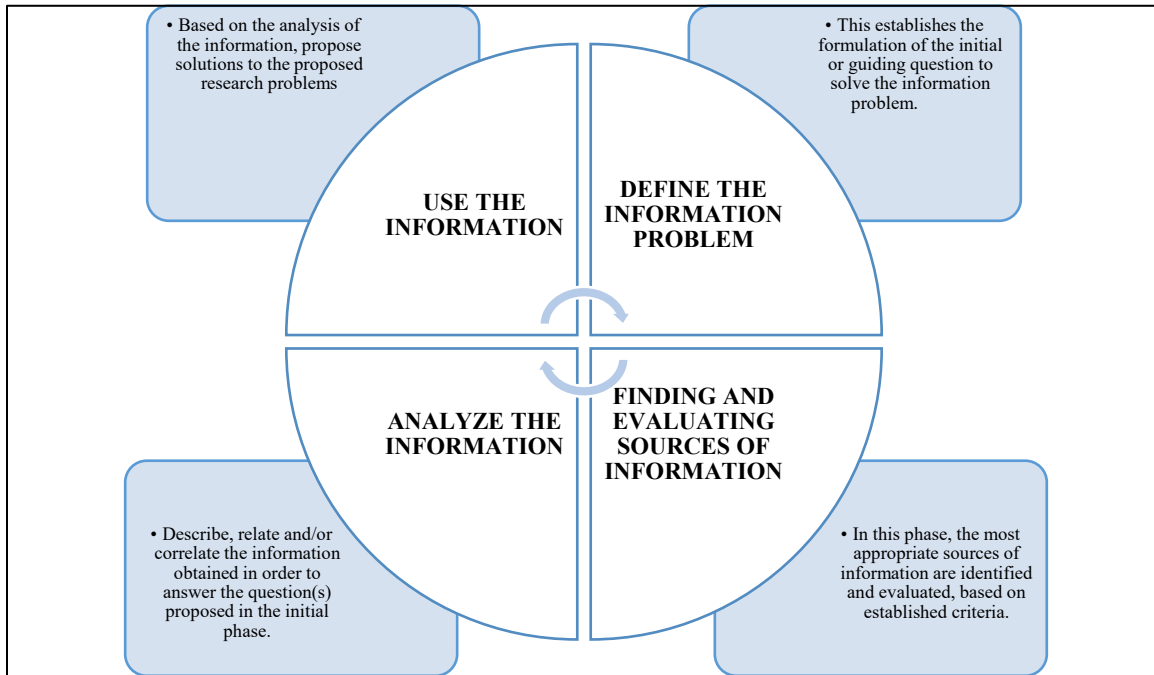


Figure 1. Gavilan Model

Finally, and in order to take advantage of the information obtained, statistical tools were used to describe, relate and correlate the research approaches around Servitization and its strategic contribution in the consolidation of production and/or Servuccion systems and from these to establish a roadmap that contributes to the strengthening of these systems in the city of Cartagena de Indias, Colombia.

5. Results and Discussion

5.1. Define the Information Problem

In order to optimize the research and in order not to lose sight and to develop the Gavilan model in a structured and systemic way, two main research questions and some sub-questions were posed that allowed to guide and organize the search in the databases selected for the study (See Figures 2 and 3):

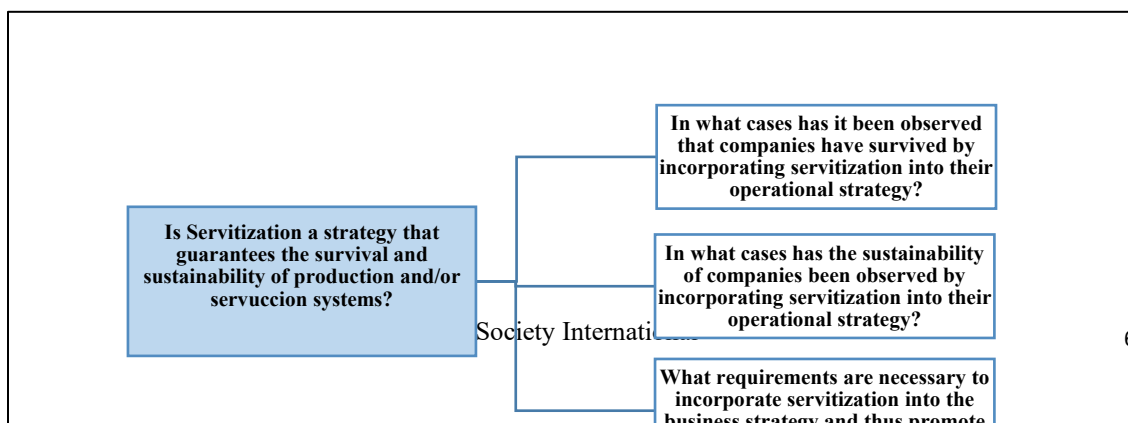


Figure 2. Problem Question 1 and Sub questions

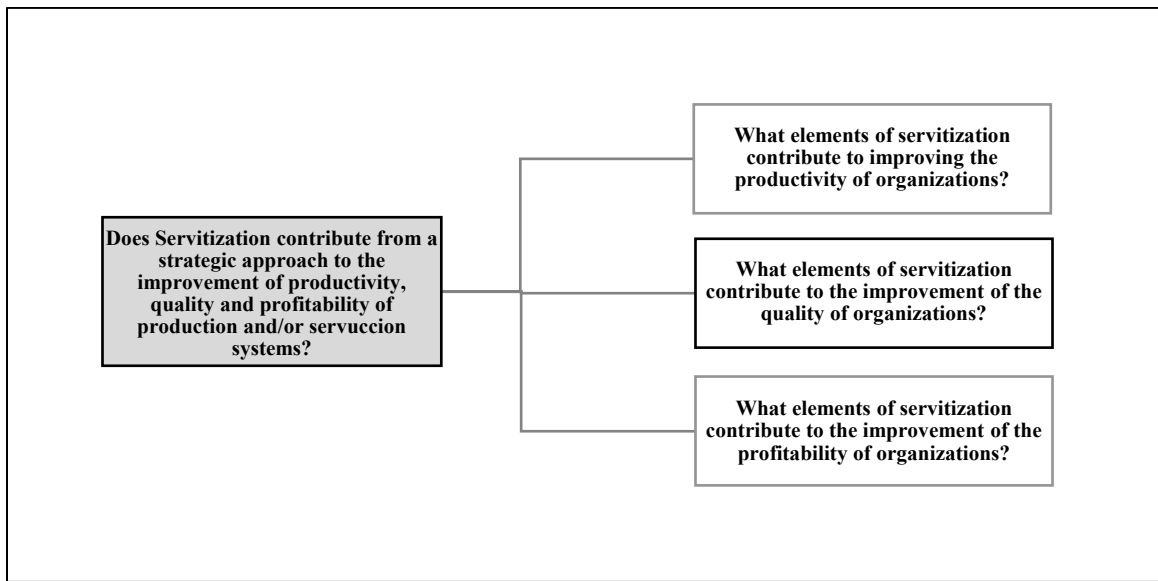


Figure 3. Problem Question 2 and Sub-Questions

5.2 Search and Evaluate Sources of Information

Given the central theme defined, the temporality of the information, the context under study and the target audience, it is necessary to establish as a search engine the database that would deliver updated information and relevance to the scientific context, among these sources for the development of this work, the Scopus database was chosen. Given that it is easily accessible and displays a wide range of texts of different types and natures, and on the other hand, and given its relevance in the scientific field, the database was chosen.

Based on the above, the search temporality was defined, in which the period between 2014 – 2023 was established as the time horizon object for the study; In addition, Spanish and English were established as the search languages, as they are the most widely practiced languages globally. Thus, 18 documents were identified in Scopus for the Spanish language and 2114 for the English language, for a grand total of 2132 documents whose main keyword was Servitization (See Table 1).

Table 1. Consolidated Documents for Systemic Review

Consolidated Documents For Review		
Database	Language	Number of Documents
Scopus	English	2114
	Spanish	18
Total Documents Identified		2132

5.3. Analyze Information

To continue with our work, we proceeded to carry out an analysis of the information generated through the valid databases, finding the following from a descriptive approach:

For documents in Spanish:

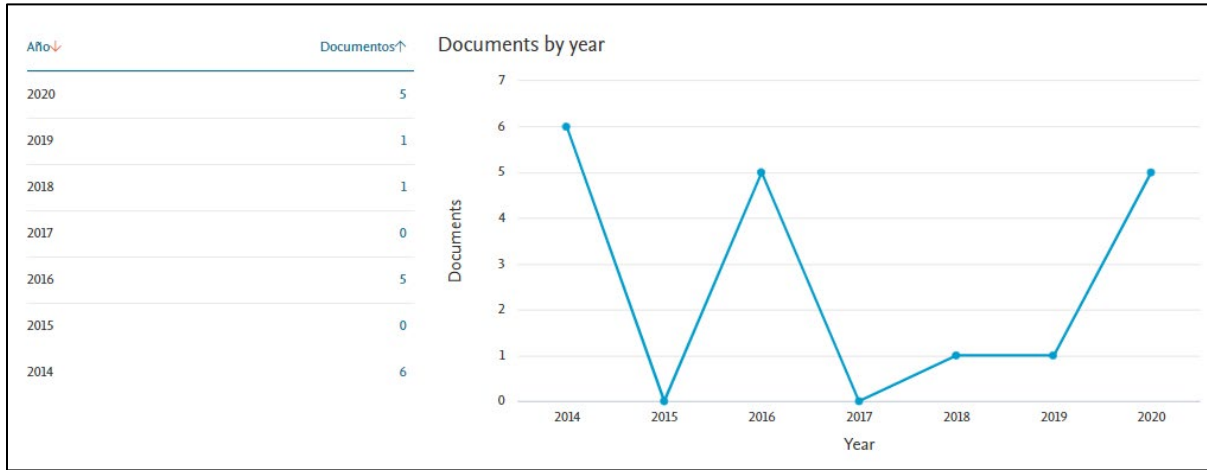


Figure 4. Documents in Spanish language per year

As described in Figure 4, the year with the highest production of documents related to the term Servitization was 2014 with 6 documents, followed by 2016 and 2020 with 5 documents each and in 2018 and 2019 1 document is identified in each of them, in 2015 and 2017 no documents related to the subject are identified.

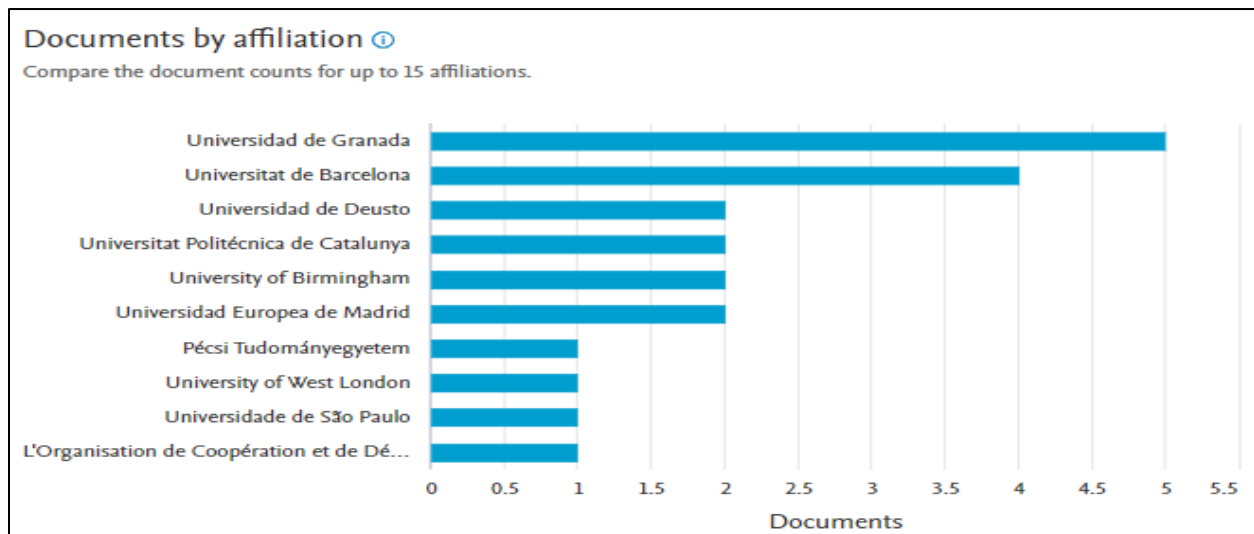


Figure 5. Documents in Spanish by affiliation of authors

Figure 5 describes the documents by affiliation of the authors, where it is described that the institution that has generated the most documents related to the word Servitization has been the University of Granada with 5 documents, the University of Barcelona with 4 documents, the University of Deusto, the University of Catalonia, the University of Birmingham, and the European University of Madrid with 2 documents respectively, of the rest are described universities such as the University of Sao Paula, the Organization for Economic Cooperation and Development, King Juan Carlos University, University of the West of England, University of the Studies of the Reggio of Calabria, University of the Basque Country, Federal University of Minas Gerais, International University of Catalonia,

Mondragon University, Instituto Tecnológico de Costa Rica, TBS Business School, Bristol Business School, Aston Business School, and the Faculty of Economics and Business at the University of Pécs, with one filiation each.

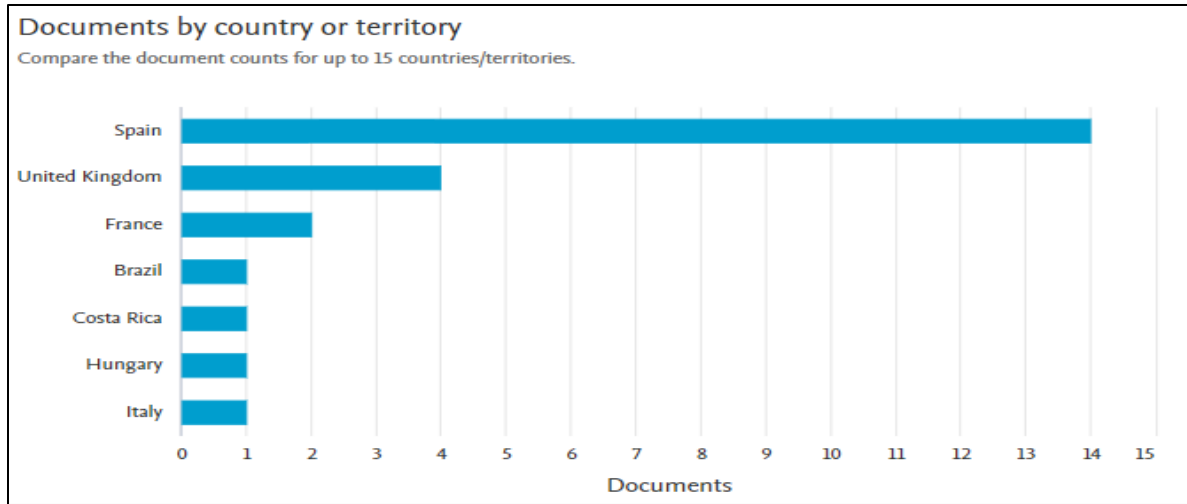


Figure 6. Documents by country or territory

Figure 6 describes the documents by territory, in which it is described that the country that has carried out the most work on Servitization is Spain with 14 documents, followed by the United Kingdom with 4 documents, France with 2 documents and Brazil, Costa Rica, Hungary and Italy with 1 document each.

For English-Language documents:

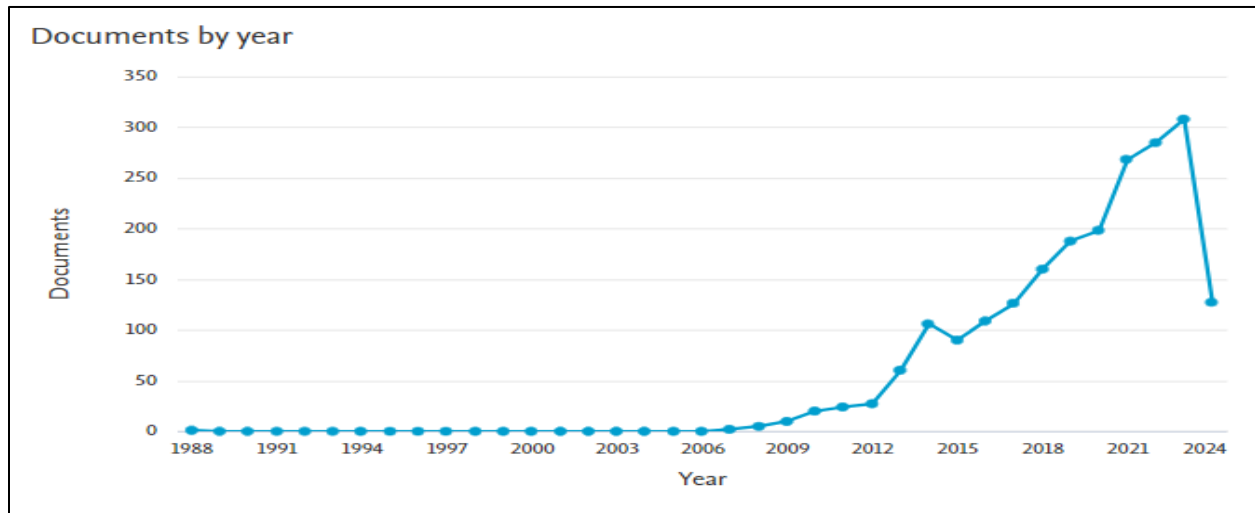


Figure 7. Documents in English language per year

It is described in Figure 7, referring to documents in English language by year related to Servitization that since 1988 when it was first written on the subject did not show interest on the part of the scientific community, but since 2009 there is clearly an increasing trend in publications related to the subject and in the English language. Its most significant growth has been since 2015 in which 90 documents are identified, 2016, 109 documents are described, 2017 with 126 documents, 2018 with 160 documents, 2019 with 188 documents, 2020 with 198 documents, 2021 with 268 documents, 2022 with 285 documents, 2023 with 308 and so far in 2024 127 documents have already been identified.

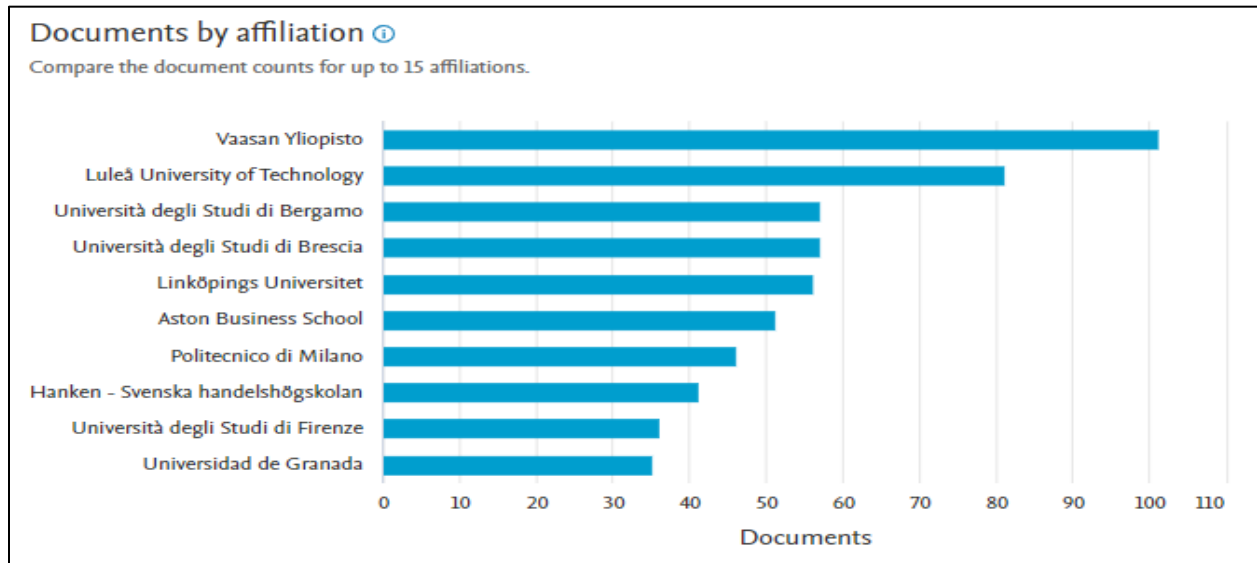


Figure 8. Documents in English by affiliation of authors

Figure 8 shows that the main institution according to affiliation of authors is Vaasan Yliopisto with 101 documents, followed by the Luleå University of Technology with 81 documents, the University of Bergamo Studies and the University of Brescia with 57 documents, the University of Linköpings with 56 documents, the Aston Business School with 51 documents, the Politecnico di Milano with 46 documents, the Hanken - Svenska handelshögskolan with 41 documents, the University of the Studi di Firenze with 36 documents and the University of Granada with 35 documents, among which stand out the most for their production related to the subject under study.

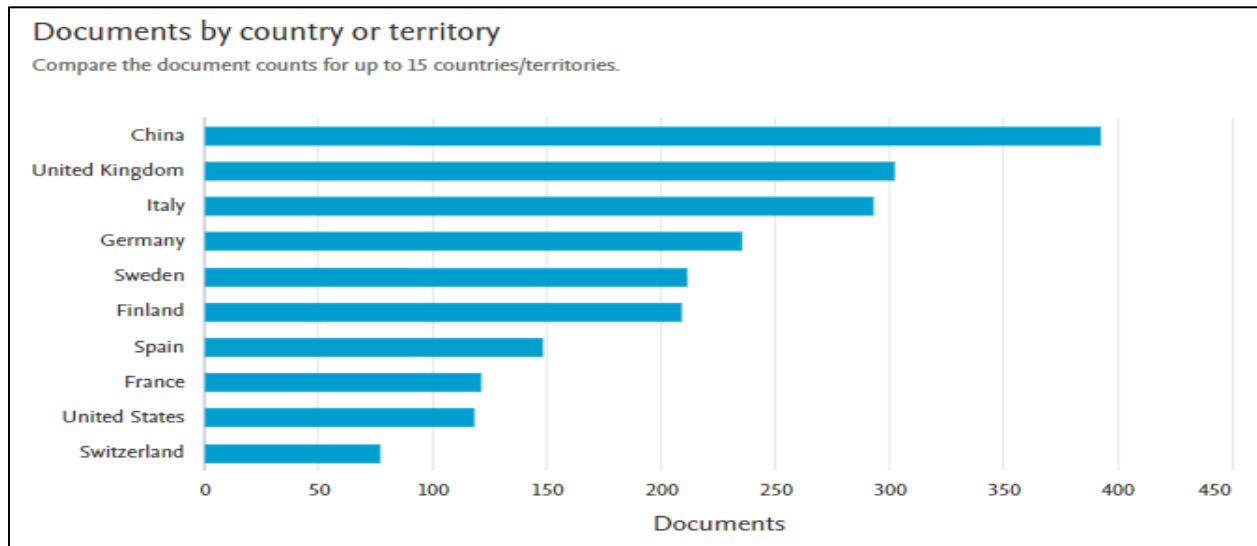


Figure 9. Documents by country or territory

Figure 9 shows that the country that produces the most documents on this topic is China with 392 documents, followed by the United Kingdom with 302 documents, Italy with 293 documents, Germany with 235 documents, Sweden with 211 documents, Finland with 209 documents, Spain with 148 documents, France with 121 documents, the United States with 118 documents and Switzerland with 77 documents as the most prominent countries in the field.

5.4 Use of Information

Developing a more exhaustive analysis of the selected topic and within the framework of the problematic questions and guiding sub-questions, it can be observed that Servitization has traditionally been widely used and correlated with manufacturing systems as a strategic complement to them, which in their work fulfill their purpose once the customer (user or consumer) acquires the good offered. leaving the acquired good to free use until its final disposal, thus generating negative impacts in terms of costs and in terms of sustainability.

It should be noted that from a Servitization approach, the business function of production systems and/or Servuccion does not end with the product sold, but once the customer acquires the product, a new opportunity to complement the offer begins, serving the customer in the way he expects, which means defining a continuous service structure that will extend the cycle of the customer experience, thus generating loyalty and greater buyback of the products offered, which will translate into greater cash flow for those organizations that make efficient, effective and effective use of this new business model.

Based on this and in order to answer the main questions and sub-questions, the following roadmap is proposed, framed in the opportunity that Servitization represents for both production and servuccion systems, as follows in Table 2 and Table 3:

Table 2. Servitization Roadmap with a Focus on Survival and Business Sustainability

Is Servitization a strategy that guarantees the survival and sustainability of production and/or service systems in the city of Cartagena de Indias, Colombia?	
Aspect	Action
Business Survival	This topic represents the need for both production and service systems to make use of technology such as Artificial Intelligence, to establish schemes that learn and correlate the behavior of their customers vs. the behavior of the competition.
Business Sustainability	This topic leads production systems to open opportunities for the use and application of new technologies such as reverse logistics within the framework of the circular economy with the aim of reducing the use of virgin raw materials or reducing the use of resources such as energy, water, among others that will lead to a significant minimization of costs. Preservation of the environment and natural resources.
Business Strategy	From a strategic approach, Servitization will allow permanent communication with current and/or potential customers, which opens up the possibility of designing new products (goods and/or services) tailored to customers, in addition to consolidating a culture of service which goes beyond selling a product and the customer consuming it.

Table 3. Servitization Roadmap with Operations Strategy Approach

Does Servitization contribute from a strategic approach to the improvement of productivity, quality and profitability of production and/or Servuccion systems?	
Aspect	Action
Productivity	This topic represents that, based on continuous and permanent communication with customers, the availability, quantity, and conditions of the resources required to manufacture a good or service are defined in a more optimal way.
Quality	It represents the need to use permanent and continuous communication as feedback, which will translate into the development of a culture of continuous improvement or advanced optimization, guaranteeing zero failures.
Profitability	It represents the need to adjust the costing mechanisms or systems of organizations, define more detailed and accurate operating budgets, since permanent communication with customers will help to make better decisions

6. Conclusion

From the development of this work, it can be inferred that:

- There is a marked trend worldwide and especially in highly developed countries, for the issue of Servitization, since there is an awareness and the imperative need for companies not only to sell products, but also to survive, sustain and remain current in a highly competitive market such as the current one.
- Servitization becomes a significant opportunity from an operations strategy approach not only for production systems, but also for servuccion systems since the business mission goes beyond selling a product, the fundamental business mission is to serve its customers as they expect it.
- The success of Servitization as a business strategy to survive, be sustainable, and significantly improve productivity, quality and profitability of the organization lies largely in the methods and measures to communicate with its customers, as well as the ability to learn from that communication and permanent interrelationship both with customers and with the context where they develop.
- Based on this work, the possibility of new research is opened to establish the measurement of the service culture in both production and service systems, since this becomes an essential requirement to implement Servitization both with a focus on survival and sustainability and with a focus on operations strategy.

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José Manuel Solana Garzón. is an Industrial Engineer. Specialist in Production and Quality Management and PhD student in Engineering mention in Industrial Engineering with experience in administration and process improvement in the industrial and service sector. He has excelled in the standardization of processes with a view to the automation of business systems through ERP-type applications. He also has experience in the organization of processes with a view to compliance with international norms and standards in Quality Management Systems and Physical Safety. He has developed chairs focused on Operations Research and Quantitative Methods for Higher Education. The research it is carrying out is focused on Operations Management and Operations Research in productive and service contexts. He currently serves as Director of the Industrial Engineering and Technology in Industrial Production programs at the Fundacion Universitaria Tecnologico Comfenalco Cartagena, where he has participated in the redesign of the Industrial Engineering program and in the Process of Accreditation and Reaccreditation in High Quality of the Technology in Industrial Production program.