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Servitization strategies from customers' perspective: the moderating role of co-creation

Ruiz-Alba, J.¹; Soares, A.²; Rodríguez-Molina, M.³; Frías-Jamilena, D.³.

¹ University of Westminster (London, UK)

² Plymouth University (Plymouth, UK)

³ University of Granada (Granada, Spain)

ABSTRACT

Purpose:

This research aims at investigating the moderating role of co-creation in the implementation of servitization strategies in the pharmaceutical industry in a B-to-B context. More specifically, this investigation explores the impact of different levels of services (base, intermediate and advanced) on servitization and on performance, using co-creation as a moderating factor.

Design/methodology/approach:

A research framework was developed and empirically tested in the pharmaceutical sector. Data collection was conducted through the online distribution of questionnaires. The final sample included 219 pharmacy stores and the data was analysed using structural equation modelling.

Findings:

Main findings suggest that when the level of co-creation of the design of services is high there are significant effects of servitization on firm performance. The moderating effect of co-creation is illustrated in regards to intermediate and advanced services, but results referring to the impact of intermediate services on servitization appear non-significant with a low degree of co-creation. No significant effects could be found for the impact of base services on performance and servitization for both high and low degrees of co-creation. Findings show an impact of advanced services on performance through the mediating effect of servitization when the degree of co-creation is high.

Originality/value:

Most research concerning servitization has been done from the perspective of manufacturers and service providers. This study adds value to the literature because it was designed from a customer's perspective. Moreover, it contributes towards the conceptualization of the servitization research strategy and business models, in a B-to-B context. This is accomplished through the investigation of the moderating effect of co-creation on (1) the impact of the different levels of services on servitization and (2) on performance.

KEYWORDS: Business-to-business (B-to-B) marketing; Servitization; Co-creation; Service design; Performance.

Article Classification: Research Paper

1. Introduction

The application of solutions-based strategies and business models is a growing trend as companies increasingly count on services to protract their profitability (Baines et al., 2013; Suarez et al., 2013). This movement from selling products to selling solutions is portrayed by the concept of servitization (Gebauer, Paiola and Saccani, 2013), emphasizing the holistic nature of the service function (Kowalkowski, 2011). Nonetheless, scholars have yet not agreed on a common definition of what a servitization strategy actually is which in turn hinders the operationalization and measurement of the concept. In fact there is a lack of

empirical quantitative research about servitization (Kowalkowski et al. 2017), as most papers are based on case studies. This is an important research gap and focus should be on clarifying why firms decide to make significant changes in the way they approach businesses and expand the product lifecycle. In particular, the research community has not yet deeply studied the topic of organisation transformation in servitization, particularly using co-creation as the enabler (Bustinza, Vendrell-Herrero and Baines, 2017).

In line with Kowalkowski et al. (2012), this paper argues that servitization strategies can be particularly successful if companies engage in the co-creation of design and delivery of services. When selling “solutions” instead of products (Nordin and Kowalkowski, 2010; Baines et al., 2013; Neely, 20013; Suarez et al., 2013), a trend shared across other industries besides pharmaceutical, these solutions will only make sense if they are in fact adjusted to the customer. This premise will be true for any industry considered which has moved or claims to have moved from selling just physical goods. Therefore, the main findings of the present research are related to the pharmaceutical industry in a B-to-B context, but can also be applicable to other industries.

Unlike previous studies that investigated the impact of servitization on a B-to-C context (Bustinza, Parry, Vendrell-Herrero, 2013; Vendrell-Herrero et al., 2017), the present research looks into customers in a B-to-B context, instead of final consumers in a B-to-C context. This is an important distinction because whatever value is created for final consumers is undoubtedly different from the value that is created for customers within a B-to-B approach. Servitization and the various service levels are therefore expected to produce a different impact on customers and consumers given that each level of the supply/value chain will naturally exhibit differentiated perspectives on value (Gummesson and Polese, 2009).

Nonetheless, most studies have failed to demonstrate the difference in these levels and have mostly considered servitization in a unilateral manner where the manufacturer plays a key role. This somehow contradicts what was indicated earlier regarding what the role of co-creation should be and what research has taught us about the importance of integration (Matthyssens and Johnston, 2006). In this sense, Charterina, Basterretxea and Landeta (2016) suggest that it would be advisable for companies to dedicate more time, effort and resources to sharing information and gaining knowledge in the industrial customer–supplier relationship. In line with this, the present study looks into the clients of the pharmaceutical distributors/manufacturers to address this gap and understand the actual role of co-creation in the design of services as a crucial element of any servitization strategy.

As a result, this research aims to contribute to the literature and discussions regarding servitization strategies and the role of co-creation of value in leveraging organizational transformation in the implementation of advanced services (Bustinza, Vendrell-Herrero and Baines, 2017). In particular, the goal of this study is to understand the effect of the different levels of service offered by pharmaceutical companies on the servitization strategies and their impact on financial performance. Moreover, the moderator role of co-creation on these relationships is also analysed.

In order to achieve this, the remainder of this paper briefly addresses the literature on servitization, co-creation and performance explaining how the research framework and hypotheses were elaborated. After this, methodological approaches are explained, followed by main findings and discussion of results. The paper ends with concluding remarks focusing on contributions, industry practical implications and suggestions for future research with the intention of contributing to the debate in B-to-B marketing, buyer/seller relationships and channel relationships, which are currently considered some of the most important trends in JBIM (Valenzuela et al., 2017).

2. Literature Review

2.1. Pharmaceutical sector

The pharmaceutical industry has moved across countries from “selling sickness” (Moynihan et al., 2002) to selling “health solutions” (Marceau and Martinez, 2002; Neely, 2013) which has resulted in a

change in business models and strategies within this industry. This move is not only relevant to servitization research but it is also vital for the future of the European economy.

The pharmaceutical industry is a key asset to the European economy that represents 2% of EU GDP, € 220 billion EU (retail prices) and a major contributor to employment - 700.000 employees in 2013 and 100.000 R&D related jobs (European Commission, 2014; Efpia, 2014).

The pharmaceutical distribution sector in Spain commenced its development between the 1930 and the 1960s when 24 new distributors were established. Since then a process of concentration has taken place and currently only two players are in control of 50% of the pharmaceutical distribution in Spain (Ruizalba, 2016). Thus, the Spanish market size was €10,034 Million euros (Fedifar, 2012) and the main peculiarity of the Spanish pharmaceutical sector is characterised by the power of pharmacy stores and distributors in contrast with the power of laboratories (main brand manufacturers) in other countries.

The Spanish pharmaceutical sector cannot be fully understood without reflecting on the major role of pharmaceutical cooperatives as distributors. Pharmacy owners were the driving force behind the creation of these cooperatives that have been leading the pharmaceutical distribution (Ruizalba, 2016). In the current configuration of the pharmaceutical sector in Spain, pharmacists take ownership and sell/provide medication to consumers. This structure facilitates an extensive territorial presence with a subsequent benefit for consumers that will have easier access to medicines, but also for the whole national health system. The cooperative Bidafarma (that integrates Farmanova, Cecofar and Cofarcir) represents more than 9.000 pharmacy stores with an annual turnover of more than 2.500 Million euros. Bidafarma delivers one out of four medicines distributed in Spain.

Based on previous research by Ruizalba et al. (2016) that have focused on the Spanish and Portuguese pharmaceutical distributors, it could be said that some of the players of the pharmaceutical distribution in these countries have been, to some extent, “flying blind” for the past thirty years in the design and delivery of services. This is due to the fact that, not only did they focus more on base services, but also when launching new intermediate and advanced services they did not always have their customers on board as service co-creators. As a result, during all these years, the distributors’ strategy of launching services was not clearly defined and guided by customer needs. This is the main reason that justifies the need to investigate the co-creation of the design of services in order to avoid this lack of connection with the needs of the customer in a B-to-B context. This has happened in the past in this sector even though it has been involved in a long process of implementation of a differentiation strategy based mainly on the development of new services. Moreover, the servitization trend can be one of the biggest opportunities so far available for the pharmaceutical distribution to face these challenges. The portfolio of services offered by cooperatives is broad and with high quality but this is not sufficient. The services that they offer, in order to be efficient, need to comply with two conditions: 1) they have to be designed jointly by cooperatives and pharmacies with a co-creation process and 2) cooperatives have to ensure that the advanced services are contributing to the development of the capabilities of pharmacists and to the improvement of their business processes. Otherwise, it would not make sense for pharmacy stores to invest in those services.

Another important aspect that needs to be addressed refers to the reasons why this study focuses on customers (pharmacy stores) and not final consumers (patients). The B-to-B context was chosen in order to investigate the reasons why those firms (pharmacies) adopt (or not) various types or levels of services (base, intermediate or advanced) based on a categorization of services offered in the pharmaceutical industry (Ruizalba et al., 2016) inspired by the work of Baines et al. (2013). The same categories of services as Baines et al. (2013) were used, but the definition of services for each of these categories (base, intermediate and advanced) was classified based on the service descriptions and on pharmaceutical industry experts and academics. These pharmacies cannot be considered as the final consumers of the product nor the final consumers of this supply chain (as highlighted in Figure 1) as they are intermediaries. The focus is on the reasons why retailers would or not adopt the services offered by manufacturers.

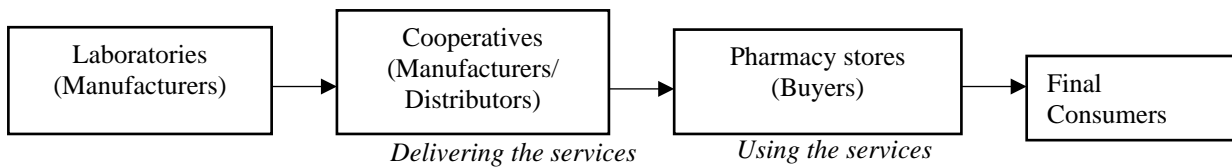


Figure 1: The Spanish Pharmaceutical industry supply chain and the servitization movement (based on Ruizalba et al., 2016).

As purely defined, the concept of servitization has been framed mainly in a pure manufacturing context and the transition towards the provision of services (e.g., Baines et al., 2009). Nonetheless, the reality is that these manufacturing companies do not survive or act in isolation (Gummesson and Polese, 2009). Bustinza et al. (2017) also supported this idea in their latest publication, highlighting the importance of strategic partnerships.

There are obvious differences between B-to-B and B-to-C including the type of service encounters, the service offering and the type of relationships (communication and levels of trust) developed, to name just a few (Coviello and Brodie, 2001; Hooks and Higgs, 2002; Narayandas, 2005; Jayawardhena et al., 2007). Still, Palmatier et al., (2006) and Ramaseshan, Rabbanee and Hui (2013) argue that research focusing on the returns from specific B-to-B investments in relationship marketing programs and/or research explaining how to leverage these investments for specific customers is scarce.

According to Gummesson and Polese (2009, p.343), value co-creation is interdependent in B-to-B, B2C, C2B and C2C suggesting the symbolic formula B2B2C2B2C2C. This not only represents the ingrained nature of servitization in a supply chain, but also emphasizes the importance of a network approach when looking at servitized organizations.

The context of this study is the pharmaceutical industry supply chain given that, if manufacturers decide to adopt servitization strategies (no matter which ones they are or how they are categorized), they need to consider their immediate customers. If they do not, they will not be able to sell those services (whether they are base, intermediate or advanced). If no value is recognized by their customers (the pharmacy stores), why should the manufacturers (pharmaceutical laboratories and cooperatives) invest money in developing and advertising the services? This was the main challenge identified by our contacts in the pharmaceutical industry that collaborated in this study. This research question has underlined the whole research project developed and presented in this paper.

Customer focus seems almost an obvious conclusion and one that is not new in any of the fields that have looked into value creation. However, besides the fact that this has been addressed in a limited manner by the servitization literature in a B-to-B context, this also seems to be the case for the Spanish pharmaceutical industry. There is not only a lack of research but also a clear lack of application of this in the pharmaceutical industry, hence the pertinence of this investigation to highlight common practice fallacies. It is precisely this type of proactive attitude in the sector and interest in the servitization phenomenon that will enable the maintenance and development of sustainable competitive advantage.

2.2. Servitization

Servitization has been attributed various definitions stemming from the marketing, organisational studies and operations management literature (Lightfoot, Baines and Smart, 2013). Most popular definitions include the seminal work of Vandermerwe and Rada (1988) as well as more recent definitions by Ren and Gregory (2007), Baines et al. (2009) and Kowalkowski et al. (2012). Vandermerwe and Rada (1988) stated that servitization referred to “Market packages or ‘bundles’ of customer-focused combinations of goods, services, support, self-service and knowledge”. Ren and Gregory (2007) defined servitization as “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". According to 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 product-service systems (PSS)." In addition, Baines and Lightfoot (2013) suggested three levels of service implementation in organisations including: a) base b) intermediate and c) advanced services. Finally, for Kowalkowski et al., (2012) servitization implies a "value co-creation" process. This highlights that firms cannot create value individually since value is continually co-created in collaboration with customers and partners (Lusch, Vargo, and Tanniru, 2010). Thus, Macintyre, Parry and Angelis (2011) Bustinza et al (2015) and Sanchez et al., (2015) argued that the establishment of links with customers was fundamental for the process of understanding the needs for value creation subjacent to servitization. Accordingly, Carbonell and Rodriguez-Escudero (2014) explored the antecedents and consequences of using the information provided by customers involved in new service development (NSD). Confirming the importance of customer involvement for NSD in a business context, their results showed that the use of the information collected from customers involved in NSD can lead to higher service advantage and service newness and in turn to higher market and service performance. Tunisini and Sebastiani (2015) investigate servitization and procurement development processes with a case study emphasizing the role of integration of activities. They observed that as the company's business strategy becomes focused on client value, its success strongly depends on the development of a customer-driven procurement. The evolution of the role of procurement is accompanied by the growing integration between the company's procurement and sales functions, as well as by the growing interconnection and interaction between the procurement function and the company's clients. Furthermore, in a B-to-B setting, this process is further influenced by the perceptions of industrial goods as suggested by Elsässer and Wirtz (2017). These authors studied the success factors of B-to-B branding and evaluated their performance impact on customer satisfaction and brand loyalty. Results show that rational brand quality consists of the three dimensions product quality, service quality, and distribution quality while consistent advertising style, brand image, country-of-manufacture image and salesperson's personality are dimensions of emotional brand associations. All dimensions positively influence customer satisfaction and brand loyalty.

Following the above definitions, servitization is therefore understood in this paper as a strategy that contributes towards the development of the customers' processes and capabilities (Baines et al., 2009) in a B-to-B context, through close collaboration in the design of services that are jointly co-created to generate mutual value for both parts. Moreover, adopting Baines et al. (2009) definition of servitization in which the development of processes and capabilities is considered, a natural expected outcome of a servitization strategy would therefore consist of the level or contribution towards the development of processes and capabilities of servitised firms from a customers' perspective (used in this research to measure servitization).

Casadesus-Masanell and Ricart (2010) understand strategy as the selection of a business model (that is a reflection of the firm's realized strategy). Accordingly, Kindström and Kowalkowski (2014) investigated the nature and characteristics of business model elements required for successful service innovation. They identified ten fundamental business model elements: strategy, structure, offering, revenue mechanism, development process, sales process, delivery process, customer relationships, value network, and culture. Thus, they examined which unique resources and capabilities product-centric firms should develop and deploy to pursue service innovation.

As a result, a *sine qua non* condition for the implementation of a servitization business model is the co-creation of design and delivery of the product-service combinations. Moreover, the implementation of this servitization business model implies a fundamental behavioural change in which customers play a central role in the communication of their needs for the design of new services. As such, services are not seen as add-ons to an existing product (Gebauer et al., 2005), but as truly differentiating value-adding properties of a product-service combination jointly designed to fulfil mutual needs and create mutual value. Accordingly, if co-creation is indeed a vital element of the servitization strategy, then a whole new service culture is needed in the manufacturing sector throughout different industries.

Following this, co-creation of service design is analysed in this research as a moderating factor in order to understand its impact on the implementation of servitization business models, specifically on the different service levels (Baines and Lightfoot, 2013) and their impact on servitization and performance.

Therefore, here it is proposed that servitization strategies refer to the election of a particular business model that implies the willingness to act in a consistent manner in the co-creation of solutions through the joint design, delivery and provision of product-service combinations in a B-to-B context. Based on Ruizalba et al. (2016), it is argued that this servitization business model should consider the following elements:

- (1) improvement of processes and capabilities;
- (2) competition through the development of product-service systems instead of products only;
- (3) creation of mutual value (bi-directionality);
- (4) development of consistent intra and inter-firm channels of communication;
- (5) co-creation;
- (6) mutual learning and collaboration in the design and delivery of services;
- (7) generation of new sources of revenue and higher performance;
- (8) long term relationships (frequently contractual) and
- (9) sustainable competitive advantage.

Taking into consideration servitization as aforementioned, it is expected that the perception about the servitization strategies adopted by firms is affected by the levels of services offered to their customers. In order to consider this effect, the levels of service proposed by Baines and Lightfoot (2013) has been taken as a reference. Therefore, the following hypothesis are proposed:

- H1: Base services have a positive impact on performance
- H2: Base services have no relationship with servitization
- H3: Intermediate services have a positive impact on performance
- H4: Intermediate services have no relationship with servitization
- H5: Advanced services have a positive impact on performance
- H6: Advanced services have a positive impact on servitization

2.3. Effect of servitization on performance

The effect of servitization on manufacturers' performance has been widely discussed (Wise and Baumgartner, 1999; Antioco et al., 2008; Fang et al., 2008; Neely, 2008; Hultén, 2012; Partanen et al., 2017). Research has also supported product servitization performance and creation of customer value (e.g., Kim et al., 2007; Kim et al., 2010; Visnjic and Van Looy, 2013), as well as the generation of improved profitability (Van Looy, Gemmel and Van Dierdonck, 2003). Nonetheless, the literature has provided conflicting results, demanding further investigation on the effects of servitization and further clarification on what is understood as servitization performance outcomes (e.g., Gebauer et al, 2005; Fang et al, 2008; Neely, 2008; Neely, Benedetinni and Visnjic, 2011; Visnjic and Van Looy, 2013; Visnjic, Van Looy and Neely, 2013).

Although it is accepted that the nature of performance is quite an encompassing one, most studies regarding performance still favour financial performance indicators (e.g., inventory turnover and overall profitability) (Akyuz and Erkan, 2010; Neely, 2007; Neely, Gregory and Platts, 2005). Still, many authors have also chosen to incorporate other indicators, supporting the trends in the field to adopt a balanced approach (acknowledging the contributions of Kaplan and Norton, 2005). For example, Gunday, et al., (2011) used market performance measures (customer satisfaction, total sales and market share) and financial performance measures (including return on sales (profit/total sales), return on assets (ROA) (profit/total assets), general profitability of the firm and cash flow excluding investments). Qrunfleh and Tarafdar (2014) measured firm performance by asking participants to position themselves against competitors in terms of market share, return on investment, growth of market share, growth in return on investment, profit margin on sales and overall competitive position.

In terms of servitization and performance research, Wise and Baumgartner (1999) analysed different companies with a case study approach and supported the impact of servitization, suggesting four downstream servitization business models. Tukker (2004) discussed the impact of PSS on sustainability. He found eight different types of PSS that resulted in marginal environmental improvements. In turn, Gebauer et al., (2005) mentioned the servitization paradox which results in lower performance outcomes due to implementation difficulties, such as lack of top management commitment, deficiencies in organisational design and information technology, insufficient service management capabilities, the lack of servitization culture with additional cultural and cognitive biases (Oliva and Kallenberg, 2003; Visnjic and Van Looy, 2013). Antioco et al., (2008) focused on the perception of performance against competitors in terms of relative product sales and service volume revenue. They demonstrated that the impact of services in support of the client's action leveraged relative product sales. Fang et al., (2008) determined that the impact of servitization on performance (considering multiple dimensions of performance – sales, profits, cash flow, and earnings volatility) seems to be highly dependent on the industry, nature and size of the service portfolio. Neely (2008) supported this by demonstrating that servitization has a positive impact on profitability (measured through typical financial indicators such as net profit, total revenues, etc.), but the extent of servitization has a negative effect on profitability.

Accordingly, Hultén (2012) analysed customers' perceptions of the value of upgraded product offerings. Findings indicated that communication of the value of upgraded product offerings and usage situations are positively associated with the customer-perceived operative value drivers. Visnjic and Van Looy (2013) also analysed the servitization paradox and found a positive yet non-linear relationship between the scale of service activities and profitability. Kowalkowski, Kindström and Gebauer (2013) contributed to theory on service strategies by researching the enabling role of ICT for new services. They distinguished between two types of service-oriented differentiation: services in support of the product (SSP) and services in support of the client's actions (SSC). Results indicated that SSC had the largest positive impact on firms' service business orientation. In turn, using data from data from 91 Finnish manufacturing firms, Kohtamäki et al. (2013) analysed the impact of the industrial service offering on sales growth and the moderating role of network capabilities. They were able to demonstrate a non-linear effect of the service offering on sales growth and also highlight the role of organizational capabilities (such as network capabilities) to improve performance. Suarez et al., (2013) examined the role of services in firms' financial performance in the pre-packaged software products and argued that organisations show a tendency to rely on service revenues as part of their business models. Nonetheless, they also found a non-linear relationship between service implementation and financial performance.

Unlike previous findings, Benedettini, Neely and Swink (2015) found that the presence of a service business leads to a greater number of bankruptcy risks for the supplying firm due to greater internal risks. They identified two types of service offerings (demand chain and product support services) and concluded that when firms offered demand chain services they were exposed to greater environmental risks. More recently, Bustinza et al. (2017) focused on the relationship between product–service innovation (servitisation) and performance. They argued that manufacturing firms implementing services benefit from strategic partnerships with Knowledge-Intensive Business Service (KIBS) firms, which provides opportunities for downsizing, externalising risks and sharing knowledge. Their survey results (with 370 executives from large manufacturers) emphasizes the importance of concentric strategic partnerships to successful product–service innovation in high R&D industries. Vendrell-Herrero and Wilson (2017) argued that servitization has a direct effect on firm performance and territorial competitiveness. Thus, they showed that these effects are industry specific. Finally, it is important to mention that Partanen et al. (2017) developed and validated a new multi-dimensional scale for operationalizing the scope (i.e. breadth and depth) of industrial service offering. Although unavailable at time of data collection for the present paper, this should definitely be taken into consideration in future projects. These authors also identified a new typology of service offerings including pre-sales services, product support services, product life-cycle services, R&D services and operational services.

To sum up, the research available suggests that the impact of servitization on performance is still ambiguous with some studies identifying non-linear relationships between servitization and performance (e.g., Kohtamäki et al., 2013), providing different moderating variables (e.g. Bustinza et al., 2017), and some

even suggesting negative outcomes (bankruptcy – e.g., Benedettini, Neely and Swink, 2015). From previous studies, it is expected that servitization has effects on firm performance. In this sense, the following hypothesis is proposed:

H7: Servitization has a positive impact on performance.

2.4. Moderating effect of co-creation

Co-creation has been defined in many fields and associated to many activities, for example co-creation of value, co-creation of experience, co-creation of products, and co-creation of knowledge, amongst others. Broadly speaking, co-creation refers to the act of joint creativeness (Sanders and Stappers, 2008) and it is commonly assumed that customers are co-creators of value at all times (Vargo and Lusch, 2008).

Recent years have seen a surge in research in the field of service-dominant (S-D) logic. A key concept within this field is that of value co-creation, the idea that value is not solely being created for the customer by the provider of a service but for and by both parties throughout the time of their interaction. The concept of value co-creation is ambiguous and authors have made consistent efforts to reach a consensus regarding its definition and core elements. However, one of the most followed orientations is the one suggested by Vargo and Lusch (2004, 2008) which considered all customers to be value co-creators. This view has been recently refined by Grönroos (2012), who distinguishes between customer value creation – which relies on the activities of customers as economic actors – and value co-creation – which requires the interaction of two or more economic actors (customers and providers). Grönroos (2012:6) conceptualizes value co-creation as “joint collaborative activities by parties involved in direct interactions, aiming to contribute to the value that emerges for one or both parties”.

Most research studies on value co-creation argue for the intensification of cooperation between firms and customers as a means of increasing firm productivity, efficiency, and intensifying customer involvement in firm processes (Normann and Ramirez, 1994; Wikström, 1996). These studies argue that co-creation is a means of creating more value for both customers and firms in a synchronic interactive manner (Ramirez, 1999; Vargo and Lusch, 2004, 2008), through resource integration (Grönroos and Voima, 2013; Hilton et al., 2012). They also assume this happens during direct interactions (Grönroos, 2012; Grönroos and Voima, 2013) and that this extends beyond the purchase act in itself towards including the entire product or service life cycle (Grönroos and Voima, 2013; Lusch and Vargo, 2006; Prahalad and Ramaswamy, 2000, 2004).

Looking into co-creation from an operations management perspective, Sampson and Froehle (2006) proposed the use of a “Unified Services Theory” (UST) focusing on the role of the customer in production. According to this theory, the service production process relies on customer inputs and they act as main suppliers for all service processes. These authors go further by distinguishing between two types of inputs that include customer self-inputs (i.e., the direct involvement of customers in the process of developing services) and customer provided information (i.e., the provision of information by the customer fundamental for service delivery).

In a nutshell, the idea behind these approaches (from marketing and operations) is that customers will participate in the design of something that they will later consume, hence Xie et al. (2008) refers to them as “prosumers” (as they are both producers and consumers). For the purpose of this paper, co-creation is defined in the context of service design given that some degree of joint development of services is expected in a servitization context. When used in the context of service design, co-creation refers to the creative cooperation during design processes (also known as co-design) and during service delivery and usage (Steen et al., 2011). This understanding of co-creation in service design processes implies that both providers (with product expertise) and customers (the ‘experience experts’ – Visser et al, 2005) come together to creatively design services. Ramirez and Mannervik (2008) emphasized the importance of co-creation in service design, as organisations increasingly need to involve users and customers to excel in the new service economy.

In this context, previous studies highlight the effect of co-creation on business performance. Grisseman and Stokburger-Sauer (2012) developed a scale to measure the degree of co-creation and argued that companies can achieve both efficiency (in operational activities) and effectiveness (in the creation of service offerings) through co-creation. Santos-Vijande, González-Mieres and López-Sánchez (2013) found that organizations with a greater disposition to new service co-creation achieve higher innovation rates, which lead to sustained performance. Biggemann, Williams and Kro (2014) found that value co-creation (participation of suppliers, manufacturers, retailers and others, working together and living up to the values promised by their products and services) was the foundation for sustainability.

The literature overview also unveiled previous studies showing the impact of co-creation on the productive process of firms. Oinonen and Jalkala (2015) research suggests that suppliers have a broader reaching perception of the co-development process because they wish to sell the resulting product, while the customer and expert partner tend to focus solely on the stages that support their own goals to improve the efficiency of the process or to develop new technology. In their study of the building blocks of value co-creation (which include for these authors dialogue, access, risk assessment and transparency), Taghizadeh et al., (2016) used data from 249 managers of telecommunication companies in Malaysia and found that implementing value co-creation process facilitates companies in formulating an innovation strategy that enhances market performance significantly.

In B-to-B, superior value is jointly co-created by networks (Ulaga, 2001; Ryssel, Ritter and Gemünden, 2004; Schertzer, Schertzer and Dwyer, 2013). Accordingly, looking at the preconditions of inter-organizational value-creation, Walter and Ritter (2003) used a database of over 200 customer-supplier relationships and identified adaptation, trust and commitment as key drivers for value creation. Parry, Bustinza, Vendrell-Herrero (2012) tested the relationship between consumer groups and their purchasing preference in the music industry in relation to tangible products and intangible 'service' purchases. Main findings suggest that all consumers view positively pay per unit and suggestions are made towards inclusion of monthly subscription services, highlighting the coproduction of value that is co-creation through this service. Additionally, Gebauer, Paiola and Saccani (2013) and Ylimäki and Vesalainen (2015) highlighted the need to focus on service networks and to consider the intentional links established between providers of product-service offerings. Song et al. (2016) investigated value creation in a B-to-B context in a service supply chain from a relationship marketing perspective. They distinguished between product-based and integrated managerial services as co-creating value strategies and they explained the different mechanisms underlying their relationships with strategic interaction between service supplier and customer. To be precise, their investigation suggests that although strategic interaction may produce superior relationship value, the size of the customers will determine what kind of co-creating strategies would be favoured. That is, the mediating effect of product-based service is more significant for large-size customers, whereas the mediating effect of integrated managerial service is more significant for medium- and small-size customers. Vedel (2016) examined four closed vertical supply chain triads in a case study. He found that distributors are not dis-intermediated in spite of their limited contribution to activities in the triads. Hence, perceived connectedness of relationships operates as a triad value function, which captures the structural value potential of the triad for a focal actor. Kohtamäki and Rajala (2016) distinguish between co-creation and coproduction. In their review of these concepts considering management, marketing, strategy, and operations journals, these authors demonstrate that research of value co-creation and the coproduction of value proposition covers a myriad of viewpoints to the economic and social exchange among actors in multi-actor service ecosystems. They argue that value co-creation is centred on enhancing the customer experience in the context of use and call for further research on the field.

Nonetheless, not all co-creation activities result in the highest potential benefits (Ng et al., 2010) and the majority of the work on co-creation has been developed within a company-consumer context, instead of a B-to-B context (Akaka et al. 2014). A gap also remains in the literature regarding empirical evidence of the process of value co-creation in a service context (Nudurupati, et al., 2015). Moreover, the new service-dominant logic (S-D logic) in marketing currently focuses on interaction and customer participation in creating value (Vargo and Lusch 2008), in which a "customer participate[s] as co-producer" to co-create customized offerings (Grönroos, 2008, p.307), and customers play an active role in managing the relationships. Therefore, it is important to consider consumer participation to reflect a state of involvement

(Cermak, File, and Prince, 1994). According to Vargo and Lusch (2004), consumers should be acknowledged as co-creators of value. These authors suggest that firms can only propose or facilitate customer value through customer participation in such creation. Therefore, the degree of participation or involvement and the way customers participate may vary (Holbrook, 1999; Pine and Gilmore, 1999). This suggests that the degree of participation is a core moderator between levels of service and servitization as well as between servitization and performance.

Adopting both S-D logic and the UST perspectives, this paper argues that customers always have to collaborate with providers in the implementation of servitization strategies. In the same manner, a high level of involvement is required not only in the implementation of services, but also in the crucial stage of the design of services facilitating the co-design. Consequently, we argue here that the degree to which companies engage in the co-creation of service design will ultimately influence their performance outcomes. Therefore, the following hypotheses are proposed:

H8: Co-creation moderates the impact of service types on servitization.

In particular, it is expected that the influence of base, intermediate and advanced services on servitization will be higher when the degree of co-creation increases.

H9: Co-creation moderates the impact of service types on performance.

In particular, it is expected that the influence of base, intermediate and advanced services on performance will be higher when the degree of co-creation increases.

H10: Co-creation moderates the impact of servitization on performance.

In particular, it is expected that the influence of servitization on performance will be higher when the degree of co-creation increases.

Following the review of the literature, the suggested research framework proposes that the impact of the different levels of services (base, intermediate and advanced) is moderated by co-creation. Figure 2 shows each of the main expected effects and also the hypotheses related to the moderating effect of co-creation.

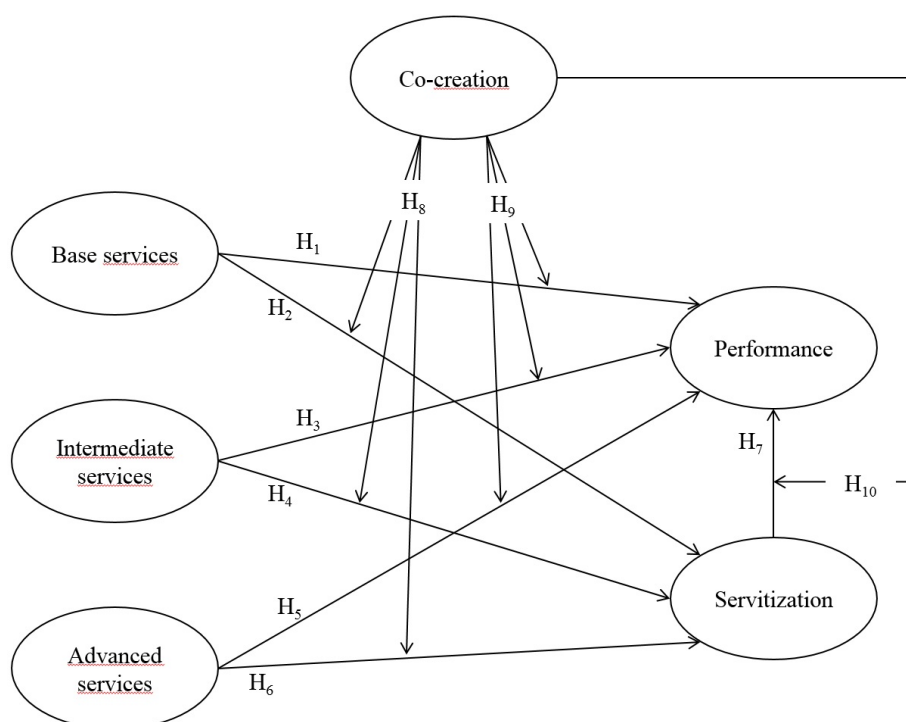


Figure 2: Research Framework and proposed hypotheses

3. Methodology

The present study followed a quantitative research approach to investigate the proposed research framework and hypotheses. To achieve this, a questionnaire was developed with Likert scales to measure the level of implementation of services, co-creation, servitization and performance.

At the time of the planning of this study and of data collection, there were no empirically validated scales available to measure servitization (such as the recently published Bustinza et al., 2017 or Partanen et al., 2017), therefore the authors attempted to create indicators based on previously used items and definitions (already discussed in the literature). As a result, servitization was measured based on Baines et al. (2009) definition including items regarding development of processes and capabilities as per their definition.

The different level of services (base, intermediate and advanced) were measured following Baines and Lightfoot (2013) categorization that was applied to the Spanish pharmaceutical industry by Ruizalba et al., (2016). This classification of services included the same broad categories as defined by Baines and Lightfoot (2013). Nonetheless, it was based on the classifications of industry experts regarding what Baines and Lightfoot (2013) have defined as base, intermediate and advanced and not on the type of services these authors have originally used as examples. As such, the group of experts (managers and academics) from the pharmaceutical industry agreed on which of the services could be classified as base, intermediate and advanced within the context of this industry. Since co-creation is defined here as co-creation of design in services and not co-production, it was important for the authors to find a measure that reflected this, therefore, co-creation measures/items were based on Grisseman and Stokburger-Sauer (2012).

Finally, to consider the various indicators usually deemed relevant when looking into performance measures as discussed in the literature, this construct was operationalized using items adapted from Gunday, et al. (2011), Hultén (2012), and Qrunfleh and Tarafdar (2014).

Data collection was conducted through online distribution of self-completion questionnaires including questions about companies and their suppliers/partners. These questionnaires were distributed to pharmacy store firms within the context of the Spanish pharmaceutical industry (see figure 1 above). To develop this research, we had the collaboration of Farmanova, one of the main pharmaceutical distributors in Spain with a 25% market share. Farmanova represents 9.000 pharmacy stores mainly in the region of Andalusia with a population of 9 million inhabitants. With the contribution of Farmanova the questionnaire was sent to a sample of 900 pharmacies. The final number of valid questionnaires was 219 pharmacy store responses. This represents a response rate of 24.3%.

The scales were validated using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA was used to test if services used by pharmacy stores were grouped in a consistent manner according to the classification proposed by Baines and Lightfoot (2013) and Ruizalba et al. (2016). Results showed the presence of three factors with eigenvalues higher than one that explain 58% of the variance. The analysis of factor loadings allows the interpretation of those factors as base, intermediate and advanced services. After this analysis, a CFA was performed to know the psychometric properties (validity and reliability) of the scales used in this research. Robust Maximum Likelihood was used as a method of estimation as the sample was not following multivariate normal distribution ($b1p = 172.62$; $Z = 25.54$; $p = 0.00$; $b2p = 898.05$; $Z = 12.61$; $p = 0.00$; omnibus = 811.44; $p = 0.00$) (see Bollen, 1989; 415-424). The proposed model shows adequate global fit indicators ($\chi^2_{SB} = 429.12$; $df = 307$ p -value = 0.00; GFI = 0.96; AGFI = 0.95; CFI = 0.95; NNFI = 0.95; TLI = 0.95; RMSEA = 0.04). Composite reliability showed values over 0.70 and average extracted variance (AVE) was above 0.50 in all cases. From the previous information, it can be concluded that the constructs have convergent validity (see Table 1). In order to test discriminant validity the heterotrait-monotrait ratio of correlations (HTMT) was used (see Henseler, Ringle and Sarstedt,

2015). As shown in Table 2, the HTMT had a value inferior to 0.90, so it can be concluded that all constructs have discriminant validity.

- TABLE 1 ABOUT HERE -

- TABLE 2 ABOUT HERE -

4. Results

In order to test H1 to H7, the model represented in Figure 2 was estimated without including the moderating effect of co-creation using Robust Maximum Likelihood as estimation method. Results show that global fit indicators of the model are within the values recommended by the literature ($\chi^2_{SB} = 354.05$; $df = 240$ p -value = 0.00; GFI = 0.96; AGFI = 0.95; CFI = 0.95; NNFI = 0.95; TLI = 0.95; RMSEA = 0.05). The base services do not have a significant effect neither on performance ($\beta = -0.05$; $p = 0.28$), nor on servitization ($\beta = 0.06$; $p = 0.29$). So H1 must be rejected, but H2 receives empirical support. The results are also showing a significant effect of intermediate services on performance ($\beta = 0.34$; $p = 0.00$), but the effect is not significant on servitization ($\beta = 0.11$; $p = 0.09$), for this reason H3 and H4 receive empirical support. Advanced services reveal a non-significant impact on performance ($\beta = 0.15$; $p = 0.09$), but the effect on servitization is different from zero ($\beta = 0.64$; $p = 0.00$). Therefore, H5 must be rejected, but H6 receives empirical support. Finally, servitization has a positive significant effect on performance ($\beta = 0.22$; $p = 0.02$). Therefore, H7 receives empirical support (see Table 3).

In order to test H8, H9 and H10 a multigroup structural equation modeling was designed according to the degree of co-creation. For this purpose, the sample was divided into two groups according to the statistical median, representing in both cases a high or low degree of co-creation respectively. No association can be observed between the created groups and some characteristics such as number of employees ($\chi^2 = 1.29$; $p = 0.73$), number of customers that are visiting daily ($\chi^2 = 3.48$; $p = 0.18$) or the condition of member/not member of the cooperative when accessing to sample subjects ($\chi^2 = 0.05$; $p = 0.83$). All of these indicate that the sample is homogeneous among the considered groups and that differences are due to the degree of co-creation with their service providers in the design and creation of services.

The measurement scales were fixed in both groups assuring that scales used in both cases were invariants (metric invariance). The fit of the model was adequate as the global fit indicators are within the values recommended by the literature ($\chi^2_{SB} = 639.14$; $df = 499$ p -value = 0.00; GFI = 0.95; AGFI = 0.93; CFI = 0.95; NNFI = 0.94; TLI = 0.94; RMSEA = 0.05). The fit of the model for each of the sub groups show adequate values. It is worth mentioning that, the fit is slightly higher for the group with high degree of co-creation (Low degree of co-creation: $\chi^2_{SB} = 353.40$, $df = 240$, p -value = 0.00, GFI = 0.95, AGFI = 0.94, CFI = 0.90, NNFI = 0.89, TLI = 0.89, RMSEA = 0.07; High degree of co-creation: $\chi^2_{SB} = 281.46$, $df = 240$, p -value = 0.00, GFI = 0.94, AGFI = 0.92, CFI = 0.97, NNFI = 0.97, TLI = 0.97, RMSEA = 0.04). In addition to this, the scales of both groups have convergent validity as all unstandardized coefficients are significant, and the composite reliability and AVE reach values higher than a 0.70 and 0.50, respectively. The analysis of results shows that the degree of co-creation does not seem to moderate the effect of base ($\beta_{LDc} = -0.16$ vs $\beta_{HDc} = -0.01$; $p = 0.27$), intermediate ($\beta_{LDc} = 0.31$ vs $\beta_{HDc} = 0.38$; $p = 0.55$) and advanced services ($\beta_{LDc} = 0.18$ vs $\beta_{HDc} = 0.19$; $p = 0.93$) on performance. In a similar way, the degree of co-creation does not moderate the relationships between base ($\beta_{LDc} = -0.10$ vs $\beta_{HDc} = 0.14$; $p = 0.19$) and advanced services ($\beta_{LDc} = 0.59$ vs $\beta_{HDc} = 0.67$; $p = 0.54$) on servitization. However, the degree of co-creation moderates the relationship between servitization and performance ($\beta_{LDc} = 0.12$; $p = 0.27$ vs $\beta_{HDc} = 0.23$; $p = 0.03$) as illustrated in figure 3 and 4.

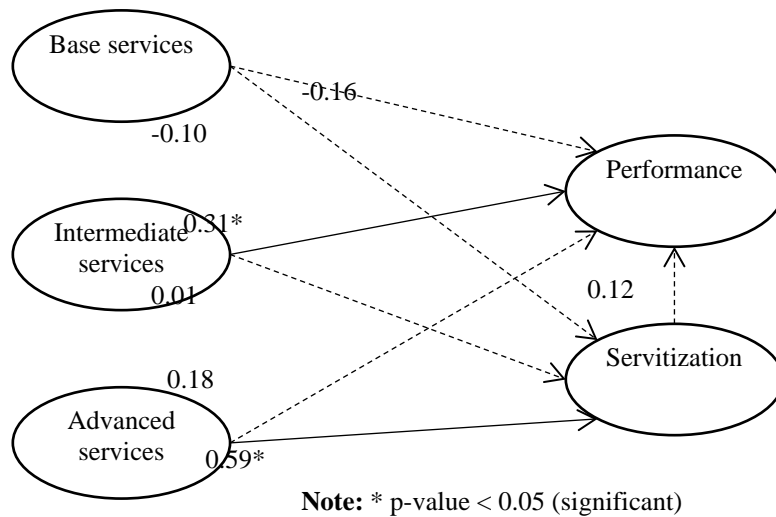


Figure 3: Low degree of co-creation (unstandardized coefficients)

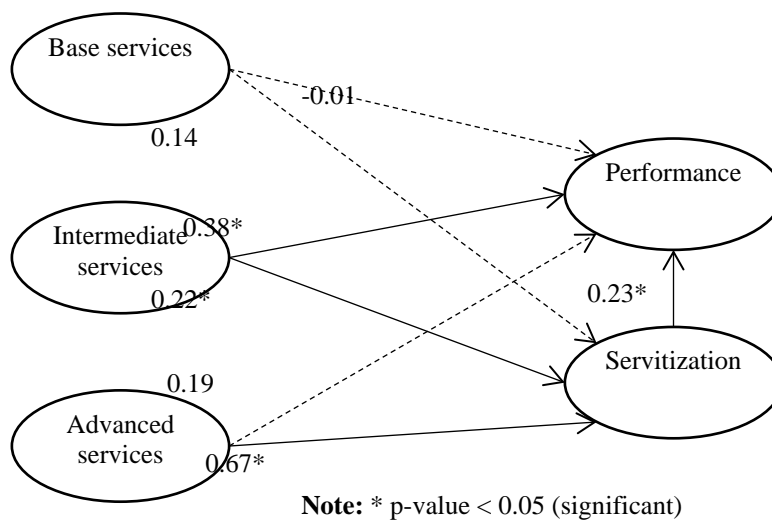


Figure 4: High degree of co-creation (unstandardized coefficients)

Specifically, when the degree of co-creation is high, servitization has a significant influence on performance. However, when the degree of co-creation is low, servitization does not have a significant effect on performance. In turn, the degree of co-creation moderates the effect of intermediate services and servitization ($\beta_{LDc} = 0.01$; $p = 0.96$ vs $\beta_{HDc} = 0.22$; $p = 0.04$). When the degree of co-creation is high, the intermediate services have a significant impact on servitization. However, when the degree of co-creation is low, the intermediate services show no significant effect on servitization. Results from the analysed firms show that the comparisons between the groups of high and low co-creation were not significant. From the previous results, it can be concluded that H8 only receives partial support, whilst H9 should be rejected. Conversely, H10 receives empirical support. Table 3 below summarizes these findings.

- TABLE 3 ABOUT HERE -

5. Discussion and Research implications

The review of the literature shows a clear need to understand the actual benefits of co-creation of services and set realistic expectations of servitization strategies, processes and business models (Steen et al., 2011). This paper makes an important contribution to the servitization literature, highlighting the role of co-creation in the design of services concerning the impact of different levels of services on performance. In doing so, we can identify theoretical and managerial implications.

This paper adds particularly to the theoretical debate by providing a conceptualization of servitization that sees the servitization strategy as the adoption of a specific business model that clarifies the role of co-creation and its impact on performance from a customer's perspective. This is important because servitization has been looked at mostly from the perspective of the companies that decide to implement it (e.g., Tukker, 2004; Suarez et al., 2013; Vendrell-Herrero and Wilson, 2017) and not from the point of view of those that supposedly benefit from its effects. That is, the effect of servitization on manufacturer's performance is widely studied, but not the effect on the firms/users of the services. In addition to this, this paper provides an understanding of the fundamental role of co-creation in the design of services in a B-to-B context, incorporating market performance indicators, contributing towards the servitization/performance measurement debate (e.g., Gebauer et al., 2005; Neely, 2008).

Main findings from this research suggest that servitization plays an important mediating role when it comes to its impact on performance. This supports previous literature and aligns with Baines et al. (2009), Neely (2008), Hultén (2012) and Visnjic and Van Looy (2013), to name but a few from the previously reviewed studies. The results from the present study also reveal an absence of impact of base services on both servitization and performance. On the other hand, with high co-creation levels, intermediate services have a positive direct impact on performance and an indirect effect through servitization. However, the main contribution is related to advanced services that have been found to be moderated by co-creation showing a significant impact on performance through the mediating effect of servitization when the level of co-creation is high. These findings support previous research that emphasizes the role of co-creation in servitization (e.g., Kim et al., 2007, 2010; Visnjic and Van Looy, 2013; Van Looy, Gemmel and Van Dierdonck, 2003).

In terms of managerial implications, this paper emphasizes the importance of involving customers in the design and delivery of services – that is, co-creating services based on customers' needs instead of on only what providers believe they can offer as argued by previous research (Sanders and Stappers, 2008; Vargo and Lusch, 2008; Kowalkowski et al., 2012; Ruizalba et al., 2016). In that sense, managers of companies involved in servitization strategies should focus their efforts on assuring that the servitized firms (customers) are improving their processes and developing their capabilities. These efforts imply that a new servitization culture is therefore needed in this sector, one that implements co-creation and recognizes the potential of intermediate and advanced services and its importance in the achievement of higher performance outcomes (Lightfoot et al., 2013) incorporating co-creation in the design of services. This servitization culture can be cultivated with the development of the previously suggested elements, which include: the improvement of processes and capabilities, competition through the development of product-service system instead of products only, creation of mutual value (bi-directionality), development of consistent intra and inter-firm channels of communication, co-creation, mutual learning and collaboration in the design and delivery of services, generation of new sources of revenue and higher performance, long term relationships and sustainable competitive advantage. We propose these elements should be present in a strategy in order for the business model to be regarded as servitization. This approach will ultimately lead companies/supply chains as a whole to a real orientation to servitization that is mutually beneficial. As a result, instead of "flying blind", pharmaceutical companies need to dedicate time and attention to the co-creation of services with their customers. This is supported by Visser et al. (2005) and Ramirez and Mannervick (2008) in regards to the role co-creation in service design processes and by Grisseemann and Stokburger-Sauer (2012), Santos-Vijande, González-Mieres and López-Sánchez (2013), Biggemann, Williams and Kro (2014) and Taghizadeh et al., (2016) in regards to the role of co-creation on performance.

Thus, to improve performance through servitization, practitioners need to keep investing in advanced services (a *sine qua non* condition but not enough on its own), whilst simultaneously assuring the improvement of processes and the development of capabilities (servitization), given that servitization operates as a moderating factor only when a high level of co-creation is present. Finally, pharmaceutical managers must not ignore intermediate services, which have been shown to always have an impact on performance, exhibiting both a direct and an indirect effect on performance through servitization, when the level of co-creation in the design of services is high.

6. Conclusion

This paper focuses on the impact of co-creation on the implementation of servitization strategies. More specifically, we investigated the impact of different levels of services (base, intermediate and advanced) on servitization (i.e., the development of processes and capabilities) and on performance, using co-creation as a moderating factor. Main findings seem to suggest that the moderating effect of co-creation occurs when advanced services are considered and through the mediating effect of servitization, and when the degree of co-creation in service design is high there is a positive impact on performance.

As a result, this study allows a better understanding of the role of advanced services in servitization strategies as well as the mediating role of servitization on performance. The suggested research framework also highlights the lack of impact of base services on both servitization and performance. Conversely, intermediate services have a positive direct impact on performance and an indirect effect through servitization, but only with high co-creation levels.

This paper contributes therefore to the servitization literature by suggesting some elements to be incorporated in the servitization conceptualization and definition that sees the servitization strategy as the adoption of a specific business model and clarifies the role of co-creation. Moreover, it provides an understanding of the fundamental role of co-creation in the design of services in a B-to-B context.

From a practical point of view, these findings imply that, instead of “flying blind”, pharmaceutical distributors, and by analogy managers in other sectors, need to commit whole-heartedly to co-create in the design of services with their customers. Within the limitations of this study, it can be concluded that, if practitioners wish to improve performance through advanced services, this has to be done necessarily through servitization (mediating factor) and only when a high level of co-creation is present.

7. Limitations and suggestions for future research

Main limitations of the present paper refer to the limited definition and operationalization of servitization. This is due to the exploratory nature of available research, mainly based on case studies, and due to the lack of clear operationalization in the research available at the time of data collection. This area of research is particularly recent as a construct and a consensual measurement/evaluation of the concept remains ambiguous. Thus, although this study has been developed as part of a larger research project, the present paper focuses solely on the perspective of firms/users of the service within the pharmaceutical industry. Hence, suggestions for future research include developing a more comprehensive servitization measurement instrument that incorporates some of the aforementioned elements. It is also suggested that future research contemplates servitization at different levels (multi actor analysis) and the need to empirically test this model in other industries (and adjust accordingly if necessary). Another limitation refers to the sample analysed, which considers only established firms. Therefore, further work might want to look into the role of new entrants in the servitization of the pharmaceutical industry. This can have future implications, in line with recent findings that suggest that in certain conditions the entry barriers diminish when established firms and users decide to enter into knowledge exchange based on relational agreements, and therefore new entrants might gain more power quickly (Bigdeli et al., 2017).

Moreover, given the role attributed to advanced services, and the established importance of good coordination between marketing and sales (Matthyssens and Johnston, 2006), it is also suggested that future research considers the internal capabilities needed to develop and implement advanced services from the perspective of the Internal Market Orientation (IMO) (Gounaris, 2008; Lings and Greenley, 2005; Ruizalba et al., 2014). Additionally, the role of service employees and Customer Orientation of Service Employees (COSE) (Henning-Thureau, 2004) as well as how stability of employees may affect inter-firm relationships (Johnston and Hausman, 2006) should also be investigated.

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APPENDICES (Tables)

Table 1. Standardized loadings, Reliability (ρ) and Averaged Extracted Variance (AVE) in the whole sample and high/low co-creation groups

Observed and latent variables	Whole sample ⁺	High co-creation group ⁺	Low co-creation group ⁺
Base services	$\rho = 0.81$; AVE = 0.52	$\rho = 0.82$; AVE = 0.54	$\rho = 0.80$; AVE = 0.50
Other health products distribution	0.78	0.80	0.76
Other not health products distribution	0.73	0.77	0.68
Special and urgent deliveries	0.73	0.78	0.68
Vaccines services	0.63	0.57	0.71
Intermediate services	$\rho = 0.91$; AVE = 0.63	$\rho = 0.90$; AVE = 0.61	$\rho = 0.92$; AVE = 0.6
ERP software	0.81	0.76	0.85
Software maintenance	0.86	0.84	0.87
Hardware maintenance	0.82	0.84	0.80
Training related to IT	0.79	0.78	0.80
Management training	0.76	0.75	0.76
Marketing and communication	0.70	0.69	0.73
Advanced services	$\rho = 0.88$; AVE = 0.56	$\rho = 0.90$; AVE = 0.60	$\rho = 0.86$; AVE = 0.50
Management consultancy	0.44	0.48	0.41
Management and communication *			
Social media consultancy and training*			
Magazines elaboration	0.85	0.90	0.81
Technical/professional training	0.87	0.90	0.84
Financial services	0.84	0.84	0.83
Health and safety*			
Renovation and decoration services	0.79	0.81	0.75
Brand management	0.61	0.63	0.59
Servitization	$\rho = 0.85$; AVE = 0.74	$\rho = 0.89$; AVE = 0.80	$\rho = 0.80$; AVE = 0.66
The use of services provided by my pharmaceutical distributors help me to improve the processes of my pharmacy store	0.92	0.92	0.89
The use of services provided by my pharmaceutical distributors help me to improve my capabilities	0.80	0.87	0.74
Financial performance	$\rho = 0.83$; AVE = 0.61	$\rho = 0.86$; AVE = 0.66	$\rho = 0.72$; AVE = 0.54
Profitability of sales	0.82	0.85	0.77
Profitability of assets	0.77	0.81	0.72
Overall profit	0.75	0.79	0.71
Market performance	$\rho = 0.78$; AVE = 0.54	$\rho = 0.78$; AVE = 0.54	$\rho = 0.77$; AVE = 0.53
Total sales	0.79	0.83	0.73
Market share	0.73	0.78	0.69
Competitive position in relation to the main competitor	0.68	0.58	0.77
Performance (second order latent variable)	$\rho = 0.89$; AVE = 0.80	$\rho = 0.92$; AVE = 0.84	$\rho = 0.84$; AVE = 0.70
Financial performance	0.92	0.94	0.87
Market performance	0.87	0.90	0.83
Degree of co-creation	$\rho=0.75$; AVE=0.50		
We actively work with our distributor in the design of services	0.70		
We use our experience in the sector to design services jointly with our distributor	0.80		
We invest a lot of time collaborating with our distributor in the development of services	0.63		

*Deleted items; † All unstandardized coefficients are significant

Table 2. Heterotrait-Monotrait ratio of correlations (HTMT).

	1	2	3	4	5	6	7
Base services (1)	0.00						
Intermediate services (2)	0.17	0.00					
Advanced services (3)	0.44	0.21	0.00				
Servitization (4)	0.36	0.08	0.71	0.00			
Financial performance (5)	0.24	0.29	0.48	0.49	0.00		
Market performance (6)	0.14	0.45	0.32	0.33	0.80	0.00	
Degree of co-creation (7)	0.10	0.18	0.20	0.09	0.06	0.11	0.00

Table 3: Research findings on whole sample and the moderating role of degree of co-creation[†]

Relationships (structural model)	Whole sample	Multi-group analysis	
		High degree of co-creation	Low degree of co-creation
Base services \square Performance	-0.05	-0.01	-0.16
Base services \square Servitization	0.06	0.14	-0.10
Intermediate services \square Performance	0.34*	0.38*	0.31*
Intermediate services \square Servitization	0.11	0.22*	0.01
Advanced services \square Performance	0.15	0.19	0.18
Advanced services \square Servitization	0.64*	0.67*	0.59*
Servitization \square Performance	0.22*	0.23*	0.12

[†] Unstandardized coefficients; * p < 0.05