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Does distance really matter? Assessing the impact of KIBS proximity on firms' servitization capacity: evidence from the Basque country

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ABSTRACT:

Servitization strategy is becoming increasingly recognized as a key source of value with important competitive and economic implications across the globe. It has been proven to contribute to territorial performance through the provision of services to manufacturing businesses. However, this contribution has largely been the consequence of the configuration of local industrial structures, and most importantly, of the interconnectedness between manufacturing firms and knowledge-intensive business service (KIBS) firms. Hence, the process of territorial servitization is highly conditioned by the association between manufacturing businesses and KIBS firms. To date, the literature on territorial servitization has mostly described the implications of KIBS firms for service deployment and service innovation in manufacturing, with knowledge and technological capabilities being considered the main variables in its success. Nevertheless, the literature is silent on how the geographical distance between KIBS firms and manufacturing companies may affect servitization capacity. This paper aims to raise the importance of the geographical distance of KIBS firms in manufacturers' servitization capacity. To meet this aim, an analysis of two manufacturing companies; *Alpha* and *Beta*, is provided. They are both located in the Basque country but collaborate with KIBS firms located in different geographical areas, either "inside" or "outside" the Basque region. Through a qualitative study based on (i) measuring these firms' capacity for servitization, and (ii) in-depth interviews, results suggest that geographical distance plays a key role in the KIBS firm-Manufacturer relationship for servitization capacity purposes, and should be regarded as an important aspect for successful territorial servitization.

KEYWORDS: servitization capacity; knowledge-intensive business service (KIBS); geographical distance.

JEL CLASSIFICATION: L14; L23; L60; M11.

¿Realmente importa la distancia? Evaluación del impacto de la proximidad de las KIBS en la capacidad de servitización de las empresas: evidencia de estudios en el País Vasco

La estrategia de servitización está siendo progresivamente reconocida a lo largo del mundo como una fuente clave de valor con importantes implicaciones competitivas y económicas. Se ha demostrado, entre otras cosas, que contribuye al desempeño territorial mediante la prestación de servicios a empresas manufactureras. No obstante, esta contribución se debe en gran parte a la configuración de las estructuras

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industriales locales, y lo que es más importante, a la interconexión entre empresas manufactureras y empresas de servicios empresariales intensivos en conocimiento (KIBS). En consecuencia, el proceso de servitización territorial está muy condicionado por la asociación entre empresas manufactureras y empresas KIBS. Hasta la fecha, la literatura sobre servitización territorial ha descrito principalmente las implicaciones de las empresas KIBS en el despliegue de servicios y la innovación de servicios en la manufactura, considerando el conocimiento y las capacidades tecnológicas las principales variables de su éxito. Sin embargo, la literatura es escasa o casi inexistente respecto de cómo la distancia geográfica entre las empresas KIBS y las empresas manufactureras puede afectar la capacidad de servitización. Por consiguiente, este documento tiene como objetivo plantear la importancia de la distancia geográfica de las empresas KIBS en la capacidad de servitización de los fabricantes. Para cumplir con este objetivo, proporciona el análisis de dos empresas manufactureras; Alfa y Beta. Ambas situadas en el País Vasco, pero en colaboración con firmas KIBS ubicadas en diferentes áreas geográficas, ya sea “dentro” o “fuera” del País Vasco. A través de un estudio cualitativo basado en (i) medir la capacidad de servitización de estas empresas y (ii) entrevistas en profundidad, los resultados sugieren que la distancia geográfica juega un papel clave en la relación empresa KIBS y la capacidad de servitización del fabricante, y debería ser considerada como un aspecto importante para el éxito de la servitización territorial.

PALABRAS CLAVE: capacidad de servitización; servicios de negocios intensivos en conocimiento (KIBS); distancia geográfica.

CLASIFICACIÓN JEL: L14; L23; L60; M11.

1. INTRODUCTION

Servitization refers to the transition process that involves the innovation of an organization's capabilities and processes to shift from selling products to selling integrated product and service offerings (Vandermerwe and Rada, 1988). In manufacturing environments, servitization has proven to be an important source of competitiveness and differentiation, as it enables manufacturing companies to sustain a competitive advantage over their competitors (Vendrell-Herrero et al., 2017).

However, the development and provision of services differs greatly from the traditional design and manufacture of products (Bustinza et al., 2019a). The dynamic nature of services requires companies to reformulate their organizational structures, capabilities, talent, and conception of value to be truly effective in manufacturing settings (Bustinza et al., 2015). Consequently, servitization demands that firms consolidate their service capabilities in order to overcome the various critical junctures that they face in their service-provision transition.

According to Vargo and Lush (2008), manufacturing capabilities and service capabilities emerge from two opposite standpoints or dominant logics for understanding value; whereas manufacturing capabilities (goods-dominant logic) emphasize value-in-exchange, the service-dominant logic emphasizes value-in-use. Hence, while traditional manufacturing capabilities settle on tangibility, economies of scale, trade-off among costs and quality, and product functions, service capabilities focus on intangibility, customization, flexibility, customer centricity, and innovation (Alghisi and Saccani, 2015). Accordingly, the transition towards servitization can be very complex and in some cases may result in a dead end, bringing serious consequences for the organization and its survival. This situation has been referred to as the “service paradox” (Gebauer et al., 2005). It manifested as a reverse or backward transition, which has been defined as “deservitization” (Valtakoski, 2017).

In most cases, problems arise from the inability of a company to establish coherent guidelines toward service orientation (Lenka et al., 2018), something that requires the commitment of the entire organization and demands integrating distinctive knowledge and capabilities not traditionally required in product-based firms (Opazo-Basáez et al., 2019; Vendrell-Herrero et al., 2020). In order to mitigate possible difficulties and expedite the transition toward services, product-based firms seek the essential capabilities that they do not possess in external partners, building relationships with particular “entities” that have deep knowledge

in technical areas that exceeds the knowledge portfolio of the firm. They are defined as knowledge-intensive business service (KIBS) firms (Lafuente et al., 2017).

Knowledge-intensive business service (KIBS) firms are defined as expert organizations or private companies that use professional knowledge related to specific (technical) disciplines to develop and provide advanced, highly intellectual "value-added" business services. In servitized contexts, KIBS firms are increasingly recognized as "bridges for innovation" in services (Bustinza et al., 2019b), and vectors of knowledge transmission (Strambach, 2008), as they provide a platform to create and transfer service innovation, in addition to developing and co-producing service-oriented knowledge together with manufacturing firms and other players in the value network (Lafuente et al., 2020).

The blossoming of KIBS firms has promoted proactive and open knowledge sharing between otherwise unconnected firms in the regional, national and international context. This has revitalized depressed regions and sectors (Gomes et al., 2019) and fostered the emergence of highly specialized competitive poles in the form of either "clusters" or "industrial districts" (Grandinetti, 2011). The convergence of high-level knowledge and innovation services in manufacturing has generated a synergistic development of economic sectors that not only has benefited firms with the need for servitization, but has also bolstered once non-competitive geographical areas that have found in KIBS firms a catalyst for local networks, partnerships, and innovation systems (Liu et al., 2019).

As manufacturing competitiveness increasingly depends on innovative knowledge contents, KIBS firms play an important role in offering manufacturers access to a stock of knowledge capital created, accumulated or disseminated by them (Lafuente et al., 2018) and in helping them to develop highly innovative value-adding services (Lafuente et al., 2017). As such, the interconnected coexistence of manufacturers and service providers has given rise to a new notion of territorial competitiveness, built on the premise that servitization is the main axis for knowledge transfer between companies and KIBS firms; this is the concept of territorial servitization (Lafuente et al., 2019).

At the territorial level, the interconnectedness between product-based firms and KIBS firms could improve and increase the capacity of a territory to be competitive (Vendrell-Herrero and Wilson, 2017). However, further research is still needed on the mechanisms through which this collaboration can be effectively carried out, and the key factors that might strengthen or weaken these types of relationships (Hu, 2017). Although existing literature on KIBS firms considers geographical proximity to be one key factor influencing the relationship between KIBS firms and manufacturers (e.g., Growe, 2019), research is still lacking on the effect that KIBS firms' geographic proximity has on firms' servitization capacity and the factors that might positively or negatively influence this effect.

To address this gap, this paper aims to empirically assess the impact of KIBS geographical proximity on firms' servitization capacity through a qualitative study of two manufacturing companies located in the Basque country, *Alpha* and *Beta*. Both of them are servitized and collaborate with KIBS firms to enhance their service provision capacity, but one of them has the KIBS collaborators in the Basque Country (in Spain) and the other one out of the Basque country (in France).

To measure the impact of KIBS geographical proximity on each of the firm's servitization capacity, two rounds of in-depth interviews were conducted with two firm's representatives. In the first stage, each interview focused on each of the firm's servitization capacity, taking Coreynen's servitization capacity tool as a framework (Coreynen et al., 2018). In the second stage, interviews centered on the impact that KIBS firms have on the company's servitisation capacity. This combined approach enabled us to rate and compare each of the firm's current servitization capacity and the impact that KIBS firms have had in enhancing this capacity.

Key findings suggest that firms' servitization capacity results are higher when KIBS collaborators are in a geographical area that is closer to the relevant manufacturing company. Furthermore, it has been shown that KIBS firms' impact on servitization capacity is also higher in organizations with KIBS collaborators located nearer to their operations. These results validate the notion that the relationship

between manufacturers and KIBS firms positively affects the servitization capacity when both companies are closer to each other.

This paper is organized as follows. Section 2 presents the conceptual background for this study by reviewing the relevant literature on Servitization, territories, KIBS firms and KIBS inter-organizational partnerships. Section 3 provides a description of the research setting, the companies, and the methodology and data used to assess both servitization capacity and KIBS firms' impact on servitization capacity. Section 4 reports the findings of the study based on the analysis of Coreynen's servitization capacity tool and an in-depth interview. Section 5 provides a discussion, some conclusions, and a prospectus for future research.

2. CONCEPTUAL BACKGROUND

2.1. SERVITIZATION, TERRITORIES AND KIBS FIRMS

Faced with more and more complex scenarios, companies need to develop either defensive or offensive strategies to cope with increasing competition, and enhance the maturity of their own firm (product or technology) within their sector or market (Bustinza et al., 2018). In order to successfully meet this challenge, manufacturers are increasingly adding services to their value proposition, whether by a joint proposal or by substituting the property of the good and using a strategy that has been named servitization (Vandermerve and Rada, 1988). These new hybrid product-service systems or fully servitized systems have been gaining momentum as manufacturers have realized that traditional, well-known downstream services are not 'a necessary evil' but a source of competitiveness based on the value offered to the customers (Galera-Zarco et al., 2014; Vendrell-Herrero et al., 2014).

The transformation, however, implies a profound change in the mindset, skills, culture and, frequently, in the whole structure of the company (Opazo-Basáez et al., 2019). This sometimes results in negative financial results (Visnjic, et al., 2016) or even in a backward transformation called *deservitization* (Valtakoski, 2017). But there is space for hope, as it seems that success can be accomplished if a strategy is properly devised (Opazo-Basáez et al., 2018). Hence, there is an increasing interest in the field of servitization, which focuses on offering definitions, describing the purpose(s) of the process, and communicating the benefit(s) obtained and the obstacle(s) to be avoided, both from the point of view of creation and of the growth of firms and sectors (Galera-Zarco et al., 2014; Vendrell-Herrero and Wilson, 2017).

Nevertheless, despite the increasing production of academic papers on the subject (more than 1000 articles in 2018), several authors have acknowledged the need to further the knowledge of this field inside and across the communities that are studying it (Rabetino et al., 2018). Changes in the business model due to servitization and the positive effects of constructing a collaborative product-service ecosystem (Bustinza et al., 2019b) are some recent examples of the efforts to provide this academic domain with more valuable and up-to-date knowledge.

KIBS organizations are considered an important stakeholder in the knowledge economy (Lafuente et al., 2010), as they play a major role in the transition from an industrial economy to a knowledge-based one (Lafuente et al., 2017). Similarly, many international institutions have acknowledged the role of KIBS firms in the development and better performance of the economy. The OECD (2001) reported that this was the fastest growing sector in the OECD countries during the 1980s and the 1990s. The European Commission (2007) has also confirmed previous studies by the OECD (2005) and declared that KIBS companies were "*likely to be one of the main engines for the future growth within the European Union*". This included highlighting their importance in the annual employment growth of the European Commission (2011).

During the last decade, the role assigned to KIBS organizations as "*bridges for innovation*" has garnered interest from the academic research community, and several authors have assessed their

contribution to regional and national innovation systems in European regions (e.g., Gomes et al., 2019), as well as in the economic development of particular regions or countries (Liu et al., 2019)

Recently, Vendrell-Herrero and Wilson (2017) pinpointed the positive association between servitization and territorial competitiveness. Likewise, Lafuente et al. (2017) analyzed the interactions between the manufacturing sector and knowledge-intensive business services from the territorial perspective, and defined territorial servitization as all the results that different kinds of mutually dependent associations of knowledge-intensive service companies and manufacturing firms create or develop within a focal territory. They also stated that territorial servitization is crucial to developing a more resilient industry, which would eventually lead to higher, more balanced growth that can be better distributed within the community (Lafuente et al., 2019).

2.2. KIBS FIRMS AND INTER-ORGANIZATIONAL PARTNERSHIPS

In order to gain competitiveness and adapt to fast-changing market demands, manufacturing firms are increasingly embracing product-service innovative capabilities (Bustinza et al., 2019a). Within this context, manufacturers face key decisions about whether to develop service innovation internally or in partnership with others (Rabetino et al., 2017). While Veugelers and Cassiman (1999), among others, have held that in-house innovation is important, several authors have argued that this is no longer enough to respond rapidly and maintain cutting-edge sophistication, and that collaborative partnership is needed between manufacturers and KIBS firms (Bustinza et al. 2019a). When it comes to servitization, decisions to make, buy or form alliances (Bustinza et al., 2019b) are very important for manufacturers. Regarding the decision to form alliances, there is a growing interest in analyzing different types of collaborations and partnerships in the servitization literature. Recent publications have studied related topics, such as the role and impact of servitization through external strategic partnerships with KIBS providers (Hu, 2017).

Collaborative or inter-organizational partnerships are an important organizational form covering a wide range of research topics such as mergers and acquisitions, strategic alliances, joint ventures and entrepreneurial partnerships (Liu et al 2019). The essence of inter-organizational partnerships lies in the interactions and interdependences among the participants (Liu et al. 2019). Moreover, collaborations with external partners may provide opportunities to offer bundles of products and services, without necessarily involving increased investment (Bustinza, et al., 2019a). Collaborating with KIBS companies instead of other types of agents (such as public research centers) offers an advantage for manufacturers, because they can ensure greater responsiveness and proximity to private firms' culture and vocabulary. Furthermore, KIBS firms exhibit a stronger ability to think along with private firms in terms of market applications and product and process design. They are also more prone to explore innovation matters, particularly in terms of affinity (i.e., shared view) to work with short-term assignments (Kamp and Ruiz de Apodaca, 2017).

The advantages of partnership with KIBS include, firstly, that manufacturers can experiment with service provision without fully internalizing the risks and costs of service implementation (Cusumano et al., 2015). Secondly, that KIBS partnerships help manufacturers to manage the paradox of focusing on core manufacturing activities while diversifying and differentiating their products by developing complementary innovative services (Einola et al., 2016), especially to devise and provide advanced business for SME manufacturing firms (Muller and Zenker, 2001). Thirdly, it helps servitized manufacturers avoid the risk of bankruptcy, since their internal functioning is not affected; and finally, it may be valuable in overcoming and managing the paradoxes involved in growth and diversification (Einola et al., 2016).

Although KIBS organizations have been mainly studied at the microlevel, there is an increasing interest in territorial servitization (Lafuente et al., 2017) that takes into account the spatial perspective of servitization (Castellon-Orozco et al. 2019). Research on territorial servitization has claimed that the collaboration between KIBS and manufacturing firms has several benefits not only for the specific organizations involved, but also for their region as a whole. In addition to the benefits for manufacturers, the territorial impact of servitization through partnerships between manufacturing firms and their KIBS collaborators could improve a territory's ability to compete by developing a strong manufacturing sector

that increases jobs (Gomes et al. 2019). Several scholars have stated that KIBS can turn knowledge and technology into improvements in regional competitive performance (Strambach, 2008), while other authors have studied the key role that KIBS plays in developing and revitalizing multi-industry districts and clusters (Liu et al. 2019).

The local coexistence of interconnected manufacturers and service providers is at the core of territorial servitization (Gomes et al., 2019). Face-to-face contacts between manufacturing firms and KIBS organizations are usually needed to deliver services (Growe, 2019). Accordingly, recent studies have introduced the spatial proximity of KIBS into the servitization debate. The literature on KIBS has considered spatial proximity as one key factor influencing the relationship between manufacturers and KIBS firms (Castellon-Orozco et al., 2019; Growe, 2019; Vendrell-Herrero et al., 2019), but further research is still needed on the effect of KIBS firms' geographic proximity on organization's servitization capacity and the factors that might positively or negatively influence this effect.

3. METHODOLOGY

3.1. RESEARCH SETTING

This study analyzed two industrial from the Basque Country, one of the major industrial centers in Spain. This setting was chosen for several reasons. Firstly, because the Basque Country's economy has been strongly manufacturing-based since the beginning of the 20th century. In 2016, manufacturing accounted for 46.7% of industry's gross value added (GVA), and 25.4% of the total GDP (European Commission, 2019). Industrial production is diverse, but all the activities derived from metal, such as the production of steel and machine-tools, are particularly important. However, other sectors are also strong, such as the chemical and petrochemical industry and refineries, which account for a significant part of the region's GDP. Hence, the main industrial sectors of the Basque economy are machinery, aeronautics and energy. The region is clearly better endowed than the EU-15 average, as employment in industry represents some 22 percent in the Basque Country, whereas this is around 17 per cent for EU-15 (Orkestra, 2015; European Commission, 2019).

Secondly, there is a strong drive to review and renew the region's competitive basis by innovating and applying industrial policies (Aranguren, et al., 2014). New technologies and research and development (R&D) initiatives are becoming essential. Basque companies manufacture a wide variety of capital goods, durable goods, and other intermediate products (European Commission, 2019). However, in the transition to competitiveness of traditional manufacturing activities in the context of today's economy, attention has been turned to the upgrading of existing activities through a concerted focus on advanced manufacturing. Consequently, a range of policy measures are being employed to facilitate the upgrading of the current activities toward an approach that is better suited to the region's strategy. Primary support for advanced manufacturing is coordinated through the SPRI¹ (Basque Business Development Agency) and the Department of Economic Development and Competitiveness² is responsible for the region's advanced manufacturing strategy. Other regional agents also play important roles in supporting advanced manufacturing activities. Recent studies have shown an increased interest in studying manufacturing 4.0 in servitization (Frank et al., 2019), and the increasing importance of KIBS as a catalyst for innovation (Bustanza et al., 2019a).

And thirdly, the importance of KIBS in the Basque Country is another solid reason to choose this research context. The KIBS sector in the Basque Country grew from around 60,000 employees plus self-employed people in 2004 to close to 70,000 in 2010 (Kamp and Alcalde, 2014). KIBS employment is above 7% of the total employed population in the Basque Country (above Spain, with 6.4%, above the

¹ <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/organisation/spri-basque-business-development-agency>

² <http://datos.bne.es/entidad/XX5382299.html>

EU-12, with 4.4%, and similar to the EU-15 countries (7.4%) (Orkestra, 2013). Compared to other regions in Spain, the share of KIBS in the overall market is smaller in the Basque Country than in Madrid (12.9%), but it is similar to the percentage in Catalonia (7.5%) and Navarre (5%). From an evolutionary perspective, KIBS firms in the Basque Country shifted from an employment of 6.6% in 2004 to 7.3% in 2010 (Kamp and Alcalde, 2014). In 2014 the workforce employed in the KIBS sector increased to 8.2 percent, whereas the EU-15 average is 8.84 per cent (Orkestra, 2015).

3.2. DESCRIPTION OF THE CASE STUDIES

DESCRIPTION OF COMPANY 'ALPHA'

Alpha is a European leader in milling, boring and turning technology, with 57 years of experience driven by innovation. *Alpha* offers a wide range of milling machines, boring machines and vertical lathes, multifunction solutions and automated systems, and provides professional advice in machining engineering. It also has a team of highly experienced technicians who evaluate the production and machining processes of their customers (both remotely and on-site) and provide solutions for their optimization.

The success of *Alpha* has been based on excellent quality standards, premium service, state-of-the-art, differentiated technology, and a strong international outlook. *Alpha* develops innovative solutions committed to the technological progress of its customers, in order to be highly productive and efficient in respond to the most demanding machining challenges, setting new standards in milling, boring and turning (for further details, see Table 1).

TABLE 1.
Companies' data

Alpha	
Number of employees	300
Annual revenue (Mill)	100
Type of service provided	Cloud-based service platform, virtual machine management.
Number of years servitized	4 years
Number of years in the industry	57 years
Service turnover (%)	18%
Product lifespan (mean in years)	20 years
Type of KIBS partner	Technological center (t-KIBS)
KIBS location	Elgoibar, Basque Country, Spain
KIBS scope (support)	Devising, developing, and marketing technologies
Beta	
Number of employees	500
Annual revenue (Mill)	95
Type of service provided	Product development, reengineering, and repair
Number of years servitized	17 years
Number of years in the industry	19 years
Service turnover (%)	5%
Product lifespan (mean in years)	7 years
Type of KIBS partner	Technological division (t-KIBS)
KIBS location	Bressuire, Deux-Sèvres, France
KIBS scope (support)	Innovation adoption, product development, market knowledge

DESCRIPTION OF COMPANY 'BETA'

Beta is a leading global automotive supplier company specialized in the design and production of roofs for the automotive sector. The company principally focuses on design, engineering, manufacturing and customer service for closure systems, interior systems, and motors & electronics, and is currently positioned among the three main manufacturers of this segment of products worldwide.

Formed in 1999, this tier-one supplier is focused on achieving sustained global growth, providing excellent customer service, and driving innovation. *Beta* has sixteen production plants and six R&D centers in seven countries (United States, Mexico, Germany, Slovakia, Romania, China and India). Its clients include the main vehicle builders (OEMs), with a significant presence of Chinese OEMs (for further details, see Table 1).

3.3. METHOD

The study described here followed a qualitative research blueprint which took an inductive approach (Eisenhardt, 1989; Thomas, 2006). This qualitative methodology is considered eminently suitable for studying strategical, organizational, and technological transference, adoption, and use within organizations (Cavaye, 1996). It is also deemed to be useful in establishing “new theoretical constructs, bounds and/or midrange theory from case-based, empirical evidence” (Eisenhardt and Graebner, 2007).

Specifically, a case study research protocol was used (Sánchez- Montesinos et al., 2018; Basaez et al., 2014), which allowed researchers to better incorporate contextual aspects such as the history of the company, its institutional setting, and its organizational strategy (Meredith, 1998). Furthermore, this method is widely accepted as a suitable approach for empirical inquiry when the phenomena to be studied cannot easily be decoupled from its organizational and/or geographical context (Lockström et al., 2010), enabling researchers to gain better insight into their object of study (Welch et al., 2011). Given that the goal was to gain an understanding of the importance of the KIBS organization’s geographical proximity for *Alpha* and *Beta*’s servitization capacity, a single-case strategy was used. This made it possible to portray these illustrative cases, which could serve as an inspiration for practitioners in building new theory and encourage new research connected with servitization and geographical locations (Maffei, 1995).

A semi-structured or unstructured approach was used for data collection. Two rounds of in-depth interviews with a company representative of each company were conducted by two of the authors during the month of July 2019 in each company’s headquarters (for further details, see Table 2).

TABLE 2.
Respondents’ data

Alpha	
Age	37 years old
Sex	Male
Position	Service & Solutions Director
Number of years in the current position	4
Number of years in the company	12
Number of years in the industry	15
Beta	
Age	48 years old
Sex	Male
Position	Engineering Director
Number of years in the current position	4
Number of years in the company	21
Number of years in the industry	22

Each respondent participated in two rounds of interviews carried out at the companies’ headquarters. All interviews were recorded and extensive notes were taken.

In the first stage, the interviews were focused on the servitization capacity of each of the firms, using Coreynen’s servitization capacity tool as a framework to measure that effect (Coreynen et al., 2018). This tool consists of 48 questions about three servitization categories or service-related organizational factors: (i) capabilities for service development, (ii) capabilities for service deployment and (iii) the service orientation of corporate culture, which were rated on a 7-point scale (ranging from 0 = “totally disagree”

to 7 = "totally agree"). As a result, respondents could calculate the average scores for each construct and plot them for comparing servitization capacity among companies, departments, and/or different divisions.

In the second stage, interviews were focused on the effect that KIBS providers had on the company's servitization capacity. Respondents were encouraged to engage in discussion and share their perceptions on the impact that KIBS firms had on each of the servitization categories or service-related organizational factors. All interviews were recorded and lasted approximately an hour and a half each. During the interviews, extensive notes were also taken, providing useful insights for the study.

Subsequently, respondents were asked to rate the impact that they perceived the collaborating KIBS firm had on the servitization categories and service-related organizational factors. Their response options were rated as follows: 0 = "No impact", 1 = "Low impact", 2 = "Medium impact", 3 = "High impact" and 4 = "Critical impact". Altogether, this combined approach enabled us to gain further knowledge of the current servitization capacity of each firm and the impact that the KIBS organizations had on that capacity. It also made it possible to rate and compare the differences and similarities descriptively.

4. FINDINGS

The results of our two-step analysis reveal major differences between the two focal firms. The first part of the analysis, which used the servitization tool (Coreynen et al., 2018), revealed both differences and similarities between the two companies. In general terms, it was found that *Alpha* possessed greater servitization capacity than *Beta*, with a total average score of 6.0 and 5.2, respectively. The first overall result showed a servitization capacity of 85.7% for *Alpha* and 74.3% for *Beta*.

With regard to the three general servitization categories or service-related organizational factors in the servitization tool, the analysis showed that *Alpha* had superior capacity in all the three components analyzed. However, some differences, particularly at the sub-category level, favored *Beta*, namely Sensing (same result), and Digitization and Employee behavior (higher result). However, in the remaining seven sub-categories (Seizing, Reconfiguring, Customization, Network management, Management values, Management behavior, and Employee values) *Alpha* scored more highly and therefore proved to have greater capacity.

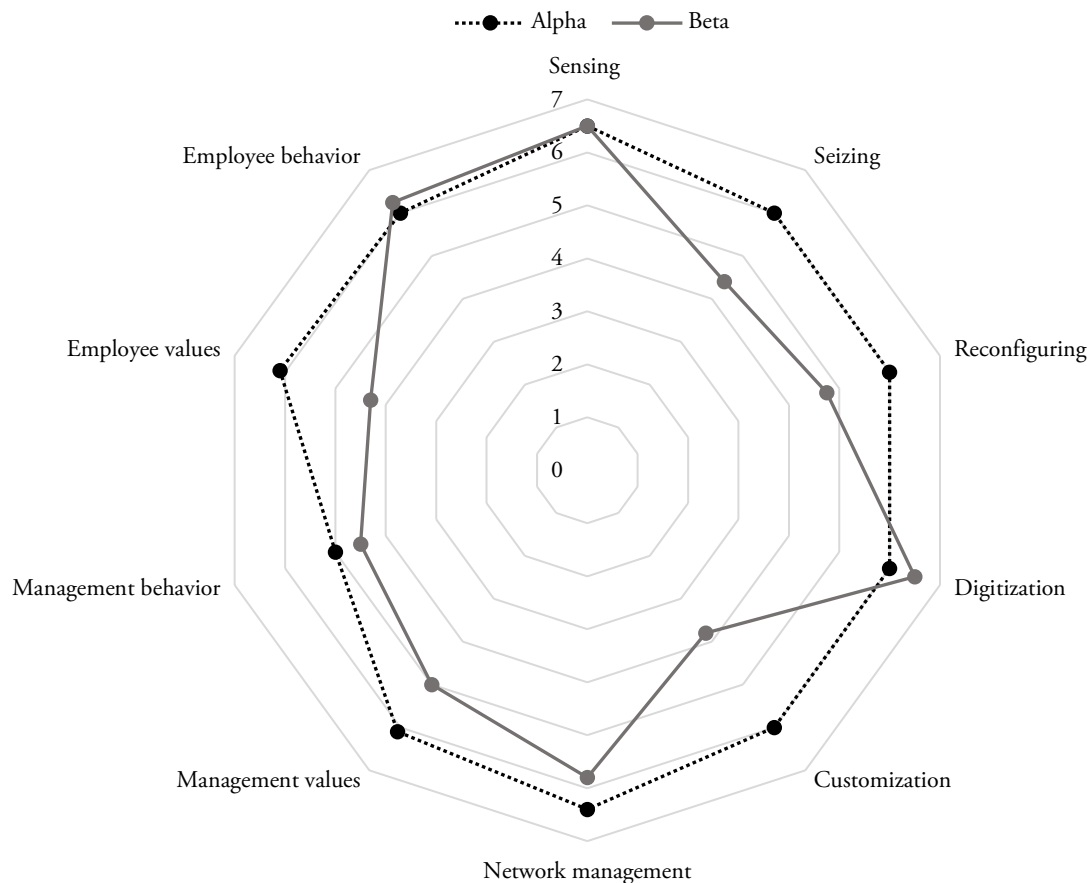
The results for the two companies regarding servitization capacity and the associated general servitization categories or service-related organizational factors (see Table 3 above) are shown below.

TABLE 3.
Results of the servitization capacity tool analysis

Categories	Alpha	Beta
<u>Service development</u>		
Sensing	6.5	6.5
Seizing	6.0	4.4
Reconfiguring	6.0	4.75
<u>Service deployment</u>		
Digitization	6.0	6.5
Customization	6.0	3.8
Network management	6.4	5.8
<u>Service orientation</u>		
Management values	6.1	5.0
Management behavior	5.0	4.5
Employee values	6.1	4.3
Employee behavior	6.0	6.25
Total average score	6.0	5.2
Percentage	85.7%	74.3%

A radar chart was plotted for each of the companies in order to exhibit the differences descriptively and graphically. At first glance it can be seen that *Alpha's* radar was much wider than *Beta's* radar, and that it had higher scores in various sub-categories. *Alpha* (black line) had greater servitization capacity than *Beta* (grey line) (see Figure 1 above).

FIGURE 1.
Comparison of the firms' servitization capacity



The results of the second phase were based on an assessment of the KIBS collaborating firms by both *Alpha* and *Beta*. This was aimed to identify if the servitization capacity could be determined by the geographical proximity of the KIBS partner firm. Both organizations depended heavily on their relationship with the KIBS company to servitize, so geographical distance could be a determining factor in making this process easier or more difficult.

Both respondents were encouraged to assess the impact that the collaborating KIBS company had on each of the sub-categories of the servitization tool. The results from this stage can be contrasted with the scores obtained in the first stage. An extensive description of the respondents' perceived impact was also analyzed using the tool.

The respondents were asked to rate the impact by using a 4-point Likert scale: 0 = "No impact", 1 = "Low impact", 2 = "Medium impact", 3 = "High impact", and 4 = "Critical impact". They then complemented their evaluation with a detailed description (see Table 4 above).

TABLE 4.
Impact of KIBS firms on the company's servitization capacity

Based on daily operations, please rate the impact perceived from your collaborating KIBS firm on strengthening the following categories. " Response options: 0 = "no impact", 1 = "low impact", 2 = "medium impact", 3 = "high impact", and 4 = "critical impact".

General categories	Sub-categories	Alpha	Beta
Service development	Sensing	<p><u>Critical impact</u></p> <p>The collaborating KIBS firm plays a key role in mapping and identifying digital services (advanced services) in the industry. The KIBS firm also provides a competitors' analysis on services implemented (service benchmarking).</p>	<p><u>Critical impact</u></p> <p>The collaborating KIBS firm plays an essential role in analyzing trends in the market and among competitors, looking for customer trends in terms of services. The KIBS firm also participates in selecting and proposing services with potential for differentiation.</p>
	Seizing	<p><u>Medium impact</u></p> <p>The collaborating KIBS firm provides a competitive intelligence bulletin periodically with significant market and technology information. The KIBS firm also supplies knowledge on how to package the service into a product (technical knowledge), and if necessary, it helps in replicating (developing) competitors' services.</p>	<p><u>Low impact</u></p> <p>The collaborating KIBS firm intermittently provides critical knowledge of service development. Principally due to customers requesting very "traditional" or "closed" product capabilities, this generates a major barrier for integrating new knowledge on services.</p>
	Reconfiguring	<p><u>High impact</u></p> <p>The company strongly relies on the KIBS firm to reconfigure assets in multiple areas where the adoption of new technologies demands streamlining former business areas or processes. Upgrading operative or organizational structures and processes is seen as a differentiating element to achieve competitive advantage, and the "fresh" perspective of the KIBS firm is highly regarded.</p>	<p><u>Low impact</u></p> <p>The company operates on a more individual basis, since it seeks flexibility and reconfiguration of assets preferably at internal level. Yet, when the reconfiguration required exceeds the company's capacity, they tend to collaborate with the KIBS firm and integrate it into the process. However, they usually focus their efforts on finding solutions internally and individually.</p>

TABLE 4. Cont.
Impact of KIBS firms on the company's servitization capacity

Based on daily operations, please rate the impact perceived from your collaborating KIBS firm on strengthening the following categories. " Response options: 0 = "no impact", 1 = "low impact", 2 = "medium impact", 3 = "high impact", and 4 = "critical impact".

General categories	Sub-categories	Alpha	Beta
Service deployment	Digitization	<p><u>High impact</u> The company possesses an internal IT department that operates conjointly with the KIBS firm. They are aligned in order to integrate new technologies and optimize the digital infrastructure to better provide digital services.</p>	<p><u>High impact</u> The company possesses a unified IT system where the KIBS firm is integrated. This integration allows (both) tracing and retrieving manufacturing information relevant for reconfiguring product and services and disclosing new paths for service provision.</p>
	Customization	<p><u>High impact</u> The company collaborates with the KIBS firm in order to (jointly) develop new digital service propositions targeted to meet customers' requirements. These services are crafted firstly based on the specific requirements of each individual client. However, when the new service proves to be efficient, it is integrated in other products with a similar architecture to provide higher value to similar clients.</p>	<p><u>Low impact</u> The company collaborates with the KIBS firm to innovate and offer customized solutions, but in a very restricted manner. This is principally due to the fact that the value of customization is not perceived as a differentiating factor by its customers. The company prefers to focus on technical aspects of the product that are more highly valued by its clients.</p>
	Network management	<p><u>High impact</u> The company heavily relies on the KIBS firm for finding technological partners and possible collaboration opportunities on digital service development. The KIBS firm plays a key role in localizing, selecting, contacting, and integrating new partners that fit the company's technological aims.</p>	<p><u>High impact</u> The KIBS firm highly influences the company's relationship with international partners that do not operate at local level. This facilitates close relationships with foreign partners at a faster pace, assuring their availability and avoiding possible cultural mishaps, in addition to providing additional technical knowledge.</p>

TABLE 4. Cont.
Impact of KIBS firms on the company's servitization capacity

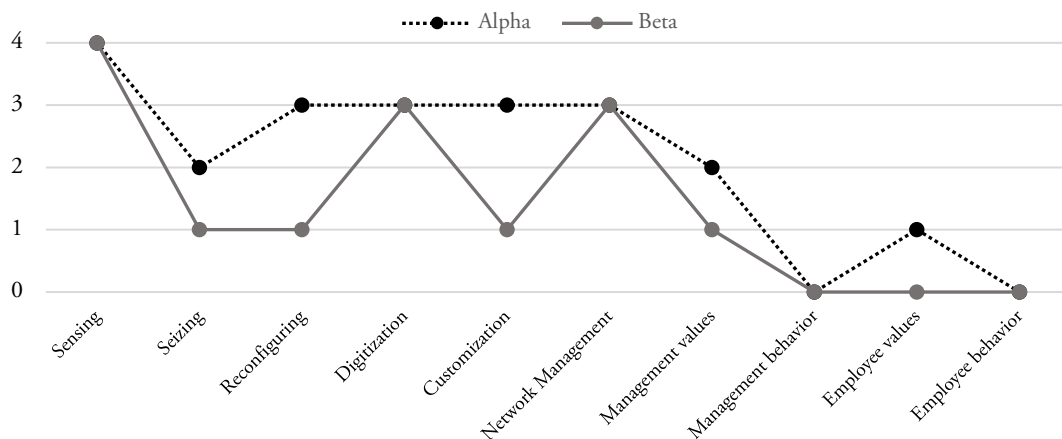
Based on daily operations, please rate the impact perceived from your collaborating KIBS firm on strengthening the following categories. " Response options: 0 = "no impact", 1 = "low impact", 2 = "medium impact", 3 = "high impact", and 4 = "critical impact".

General categories	Sub-categories	Alpha	Beta
Service orientation	Management values	<u>Medium impact</u> The KIBS firm influences the company in terms service development, but the philosophy of the company was oriented toward services deployment way before. However, the collaboration with the KIBS firm instilled in the organization a new way of operating, understanding digital service deployment as a differentiating aspect.	<u>Low impact</u> The KIBS firm promotes service orientation. However, the company possesses a conditional philosophy toward services; the company is willing to consider services as a key element in their operations, but as long as they are highly regarded by customers and consequently profitable.
	Management behavior	<u>No impact</u> The KIBS firm is perceived to have no influence on the company in terms of promoting service behavior. The company acknowledges having a strong disposition (guideline) toward services that comes from its internal philosophy and the recognition that services provide competitiveness.	<u>No impact</u> The KIBS firm seems to have no effect on service behavior within the company. The company perceives that services may lead to better results, and they are willing to invest in them, but only if the client is willing to pay what the services are worth.
	Employee values	<u>Low impact</u> The company's workers have deeply internalized that services are critical for its success. However, the KIBS firm has provided them with a holistic view that has helped them to understand that the entire organization (not only a specific division) is actually the service provider.	<u>No impact</u> The company's employees consider service provision to be important, but only to a certain extent. However, the KIBS firm appears to have neither an impact nor any effect. Indeed, the company promotes competitiveness and incentivizes cost efficiency above all other factors.
	Employee behavior	<u>No impact</u> The members of the organization have a general understanding that services are important. This view has been internalized without the influence of the KIBS firm. In fact, employees by themselves conceive services as a new development or competitive source.	<u>No impact</u> The company's workers themselves look for new service opportunities, without the KIBS firm being involved. In this regard, they recognize the necessity to seek new opportunities. However, there is no solid conviction that services may be the key decisive element.

This analytical process enabled us to determine the effect that the KIBS collaborating company had and on the servitization capacity and process of each company (along the various servitization categories), on an individual basis.

The analysis showed that *Alpha* and *Beta* had overlapping scores in 5 out of the 10 sub-categories contained in the servitization tool: Sensing, Digitization, Network management, Management behavior, and Employee behavior. However, *Alpha* (black line) perceived the KIBS collaborating firm to have a higher impact than *Beta* (grey line) on its servitization capacity for the remaining sub-categories (Seizing, Reconfiguring, Customization, Management values, and Employee values) (see Figure 2 above).

FIGURE 2.
Perceived impact of the KIBS firm on servitization categories



5. DISCUSSION AND CONCLUSIONS

This study used a qualitative methodology, specifically a case study (Welch et al., 2011; Basaez et al., 2014; Sánchez- Montesinos et al., 2018), to analyze the servitization capacity of two companies (*Alpha* and *Beta*), located in the Basque country, Spain. They are manufacturing companies that use a KIBS collaborating firm to foster their capacity to provide services in addition to its traditional (product-based) value offering (Bustinza et al., 2019a; Bustinza et al., 2019b; Lafuente et al., 2017; Lafuente et al., 2020).

Coreynen's servitization capacity tool was employed to assess the servitization capacity of each company. It showed that *Alpha* had a greater capacity than *Beta*. This might be explained by the fact that the *Alpha* has a greater focus on service development, service deployment, and service orientation. *Alpha* scored highly on all of these categories and achieved 85.7% servitization capacity, whereas *Beta* only obtained 74.3%. The results demonstrated a strong commitment and a clear organizational inclination to incorporating services into their operations to compete in manufacturing settings (Vendrell-Herrero and Wilson, 2017; Lafuente et al., 2018; Liu et al., 2019).

In order to determine whether the collaborating KIBS company had any impact on the servitization capacity of the companies, a second analysis was carried out to discover how each of the firms rated this impact.

The results established once again that *Alpha* perceived that the KIBS collaborating company had a higher impact on its servitization capacity. This served to form the first major interlinked relationship: the higher the capacity, the greater the perceived impact of the KIBS partner company.

At the same time, this result suggests a new emerging relationship, as it shows a positive connection between the servitization capacity, the perceived impact of the KIBS company, and partner's (i.e., KIBS firm's) proximity. Based on these results, it can be concluded that there was a positive relationship that

demonstrates the importance of geographical proximity for firms pursuing collaboration strategies with a KIBS partner aimed at integrating complementary services as a new competitive source of value (Lafuente et al., 2017; Growe, 2019; Vendrell-Herrero et al., 2019).

Thus, *Alpha*, which servitizes with the support of a KIBS collaborating company located in the Basque country (i.e., geographically closer) was shown to have greater servitization capacity; but it was also found that the KIBS collaborating company was perceived to have a higher impact on *Alpha* according to the tool's categories. These results open a new theoretical frontline linked to the importance of geographical location when establishing collaboration strategies, particularly when manufacturing innovation is pursued, as in the paradigm shift involved in servitization (Lafuente et al., 2017; Bustinza et al., 2019a; Bustinza et al., 2019b; Gomes et al., 2019; Lafuente et al., 2019; Liu et al., 2019; Vendrell-Herrero et al., 2020).

Although the results obtained cannot be generalized due to the methodological limitations of case studies, these results highlight the importance of geographical interconnectivity for territorial and organizational competitiveness (Growe, 2019; Lafuente et al., 2017; Vendrell-Herrero and Wilson, 2017; Vendrell-Herrero et al., 2019). This article shows the importance of geographical proximity in establishing strategic relationships aimed at strengthening service deployment in manufacturing companies (Bustinza et al., 2019a; Vendrell-Herrero and Wilson, 2017).

Future research should consider geographical proximity when pursuing KIBS firms' collaboration in highly innovative manufacturing settings, and determine whether other aspects such as technology, knowledge, and/or organizational characteristics also play a crucial role.

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