

An analysis of the trajectories of product firms' servitization journey: contributions from a case study in a complex-product manufacturer

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Abstract

Many manufacturing companies have been facing service offering as a complementary pathway to their products. There are different possible motivations for that, relying on competitive, demand-based or economic factors. Also, it is well-known that the differences in the industry lifecycle may demand the provision of different types of services. Thus, trajectories of the innovation journey may be affected by both internal motivations and external contextual aspects. The main purpose of this paper is to identify and analyze possible trajectories for servitization of manufacturing companies. To this aim, we used a longitudinal case study analysis at a multinational elevators manufacturer. Based on interviews and documental review, we map a servitization journey of 45 years in this company, allowing us to understand strategic decisions and motivations for each stage of this journey. As a result, a conceptual framework was proposed where 20 milestones were identified, correlated with 10 motivations, which four arose as new possible motivations for servitization. The principal trajectory pattern identified occur during the last phase of industry lifecycle, when manufacturing companies face a higher variety of possible servitization paths to become a systems provider than a complex products provider. Enablers and barriers of the servitization trajectories are then discussed, in order to understand company's behaviors and actions.

Key-words: servitization trajectory, product-service systems, complex products, servitization paths, product-centric servitization, manufacturing companies' motivations

1. Introduction

Services are becoming an alternative way for manufacturing companies to differentiate their offering, obtaining competitive advantage in their industry (OLIVA & KALLENBER, 2003; VISNJIC & VAN LOOVEY, 2012). Many manufacturing companies have been facing service offering as a complementary pathway to their products. This has been called by the literature as the servitization journey (or process) of manufacturing firms (BAINES *et al.*, 2009). There are different possible motivations for that, relying on competitive, demand-based or economic factors (RADDATS *et al.*, 2015), and through different operations models regarding industry lifecycle (CUSUMANO, KAHL & SUAREZ, 2015). By now, the service addition to product has already represented gains in value creation for many (BAINES *et al.*, 2009), although the profitability of this strategy has been questioned in some cases (GEBAUER, FLEISCH & FRIEDLI, 2005).

Raddats *et al.* (2015) stated that manufacturers must change their product-oriented mindset to prioritize services in business strategy. While being approached as an innovation in business model, sometimes, during servitization, the value proposition of manufacturing companies can be the same and just change how it is defined, designed and delivered (PAWAR, BELTAGUI & RIEDEL, 2009). It means that the same value proposition can be operationalized by different products, services or a combination of both.

Servitization trajectories have been presented as a unidirectional and service-targeted path (TUKKER, 2004). However, it is necessary to evaluate different trajectories that a manufacturing company can choose while evolving through different types of product-service

systems (KOWALKOWSKI *et al.*, 2017). Smart connected products are an example of how to add sensors, actuators, software and connectivity to products to provide services to customers and support competitive advantage for manufacturing firms (PORTER & HEPPELMANN, 2014). The needed focus here is the final step in service conception to a company, that compelling offerings might be not only services, as affirmed by Auguste *et al.* (2006), but also development of products that sells a service and differ from competitors.

The results of Neely, Beditinni and Visnjic (2011) research suggests that it is necessary to understand much better the transition to services from manufacturing companies, the trajectory of their business model innovation process and the enablers that drive manufacturers through the value offer and provision of such services. It is well-known that the differences in the industry phases demand the provision of different types of services (CUSUMANO, KAHL & SUAREZ, 2015). Therefore, it is also important to characterize these movements and identify key factors that affect servitization (CUSUMANO, KAHL & SUAREZ, 2015).

According to Storbacka (2011), 'sharing the knowledge of how a service was developed and delivered throughout the company is critical in a service environment, since developing repeatable and scalable processes is an important aspect of successful service and solution provision'. The transition management, as an organization moves from a traditional product-sale model to a Product-Service System (PSS) model is a growing subject in the literature and it is recognized that there has been insufficient work carried out to capture and present successful PSS applications (BAINES *et al.*,2007).

Bearing this in mind, the research problem established in the present study is that the servitization is normally approached as adding services to products to offer PSS (BAINES *et al.*,2007). However, this approach benefits only the service oriented-servitization. In the case of product-oriented servitization, adding intelligence to the product (softwares) and interaction with the environment (actuators and sensors) or connectivity can also result on a PSS.

Summarizing our arguments, trajectories of the innovation journey may be affected by both internal motivations and external contextual aspects. Therefore, the main purpose of this paper is to identify and analyze different product-oriented servitization trajectories. To this aim, we used a longitudinal case study analysis at a multinational elevators manufacturer. We aim at mapping the servitization trajectory of this company, where we identified (i) a timeline the company's offering evolution along its industry lifecycle context; (ii) the milestones of the company's product and service releases; (iii) the motivations that lead the company through the changes identified; and (iv) the patterns by the correlation between motivations and company response. The paths of servitization identified help to understand the dependence on external motivations and firms resources during the decision making process for the servitization journey.

The next section presents a brief theoretical background. The third section describes the methodological procedures for data collection and analysis, giving an overview about de case study selection and context. At the fourth section, the results are exposed and discussed regarding their theoretical contribution and managerial implications. At the last section we present the conclusion and propositions for future studies.

2. Theoretical background

There is a paradigm change especially in manufacturing companies as Neely, Beditinni, Visnjic (2011) illustrate. According to these authors, i) products are no more the most important value inside a company, ii) at the strategic level, new business models are developed to identify and sell solutions, iii) services and support engineering capabilities are centered in creating relationships instead of operating through transactions, and iv) partnerships are not stablished only with suppliers but with all stakeholders in the companies' network.

Baines *et al.* (2007) defends that this concept reflects the evolution of tangible product as being transferred to an inseparable service system integrated inside a company. In this context, the concept of Product Service-System arises. PSS can be visualized as a new operation method in order to aggregate functionality to a value proposition on a business model, in a way that incorporates additional services to a product (BAINES *et al.*, 2007). There is a changing meaning on the sales point of view, based not only on product sale but on its use sale. PSS is also a ‘product(s) and service(s) combined in a system to deliver required user functionality in a way that reduces the impact on the environment’ (BAINES *et al.*, 2007).

2.1. Servitization paths and trajectories

Several researchers have tried to establish servitization typologies (*e.g.* TUKKER, 2004; BAINES, 2013; CUSUMANO, KAHL & SUAREZ, 2015). One attempt to do that is by comparing services to products. Differently from products, services depend on customer's inputs for their individual delivery (SAMPSON, 2010). Some authors understand services as being complementary to products, in order to help producers in increasing sales (OLIVA & KALENBERG, 2003). According to these authors, services can be useful to customers while helping them during the use of products (CUSUMANO, KAHL & SUAREZ, 2015). Through the adoption of a servitization strategy by manufacturing firms, services have gained importance in new markets and faced main changes in the role it plays during PSS offer evolution.

To Tischner *et al.* (2002), a PSS can be defined as ‘tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs’. The operationalization of additional services to the traditional product sales could be first summarized as after-sales services (*e.g.* repair, re-use, maintenance, and recycling, or even training or consulting) (BAINES *et al.*, 2007).

In literature, diverse typologies have been proposed as long as different systems and applications had emerged in industry (*e.g.* TUKKER, 2004; BAINES *et al.*, 2009; CUSUMANO, KAHL & SUAREZ, 2015). These typologies represent the possible paths a manufacturing company can choose to follow while responding to market and technological opportunities. Figure 1 resumes the most accepted approaches from literature.

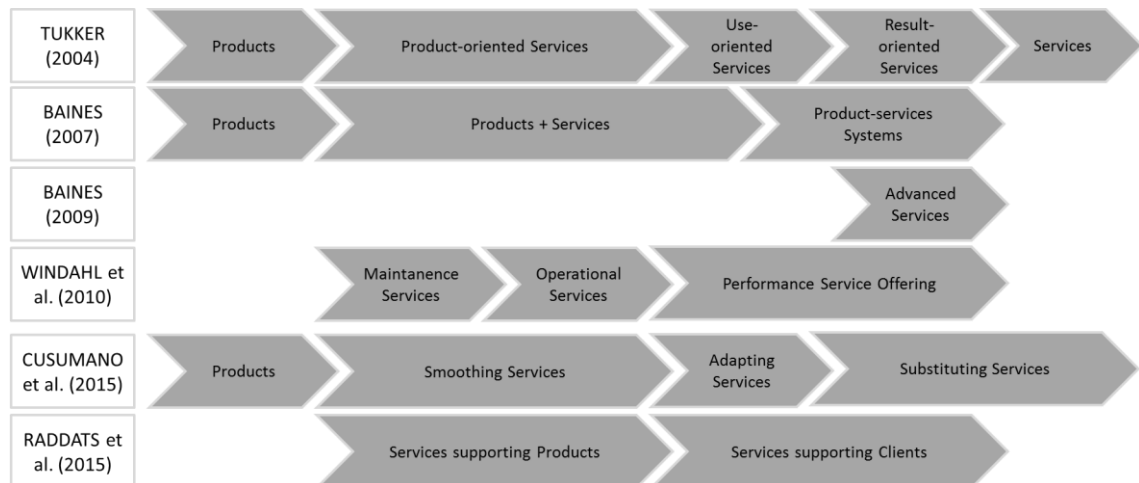


Figure 1. Types of services according to different authors.

Tukker (2004) classified and organized PSS in eight different types according to main categories of services arrangements. The first one is the product-oriented services. In this arrangement, the company has its major sales revenues in products, and some services are added to complement the product. The other main category is use-oriented services. In this type, the revenue harvesting is not from the product itself, because the product still plays its role but owner to the provider even after the transactions. The product is made available and

sometimes can be shared with more users. The last main category is result-oriented services. This one is characterized by an agreement between consumer and company to achieve determined result, and not necessarily there is a product involved.

Baines *et al.* (2009) criticized Tukker's framework claiming that it tends to focus on the features and examples of the offering rather than focusing on the intrinsic values (cost, quality, time). Hence, it is of 'limited value to an organization seeking to configure their wider production and support service operations'. However, it's easy to find literature comparable to Tukker's taxonomy, *e.g.* Raddats *et al.* (2015) e Mathieu (2001) addressed similar offering with different nomenclatures such as services supporting their products (SSP), whereby the direct recipients of the services are their products and services that support the client's actions in relation to the supplied products (SSC) and solutions, which are longitudinal relational processes designed to solve strategic customer-specific problems (STORBACKA, 2011). Similarly, Kowalkowski *et al.* (2016) illustrates examples of types of services such as after-sales services, value-added services, services supporting the product, or services supporting the customer.

Cusumano, Kahl and Suarez (2015) proposed three basic services that might be created by a company during a lifecycle industry: the smoothing services, adapting services and substituting services. The first one does not alter the product functionality and promotes a standard transaction between firm and client and is known as smoothing services. By contrast, adapting services impacts on the product functionality, once it can develop news uses or adaptations of the product. The substituting services are considered more innovative, and replace the product turning it into a complementary share of the offer. Others terms that are found on studies are transition from products to services (OLIVA & KALLENBERG, 2003), integrated solutions and systems integration (DAVIES, 2004), and service infusion (BRAX, 2005), and service business development (FISCHER *et al.*, 2012).

Complementarily, the literature has identified that the adoption by different types and intensities of services can occur simultaneously and can vary over time, regarding the moment of the industry life cycle and have a start and an end well defined (CUSUMANO, KAHL & SUAREZ, 2015), the gain of knowledge over services by the provider and aim on complete dematerialization (TUKKER, 2004), and the need to customize offers and gain advantage on differentiation or standardize it and gain advantage on cost reduction and occur cyclically (KOWALKOWSKI *et al.*, 2015). The succession of service alternatives chosen by the manufacturing companies is the servitization trajectory. The decisions on which path to follow are associated to different motivations (RADDATS *et al.*, 2014).

2.2. Product-centric servitization strategy

The service strategy determines how the manufacturer competes with services in a given market to achieve differentiation (RADDATS & KOWALKOWSKI, 2014). One strategy that Tuli, Kohli and Bharadwaj (2007) proposed is a new perspective on the concept of a solution; in contrast to extant product-centric views, they suggested that solutions should be conceptualized as a customer– supplier relational process.

Cusumano *et al.* (2015) indicates three main phases of industry lifecycle and relates different companies' motivations and reactions about these external factors, to develop their servitization strategy. The "ferment" phase in the industry lifecycle is characterized by a high level of uncertainty. Output volumes are low and firm focus on product innovation. During this phase, product firms and customers have not accumulated significant knowledge yet about products, their performance characteristics, or usage patterns. The transition period is characterized by decreasing uncertainty and product cost, once it has increasingly standardized products with progressively better-understood usages. The mature phase experiences low levels of product and market uncertainty and increased cost-based competition.

In this context, smart products are taking place motivated by technological changes, especially in mature phase of industry lifecycle, and they are closely related to the concept of Product-as-a-Service Business. Today many industrial companies are beginning to offer their products as services—a move that has major implications for sales and marketing. The goal of salespeople becomes customer success over time, instead of just making the sale. That involves creating “win-win” scenarios for the customer and the company and manufacturing goes beyond production of the physical object.

According to Porter *et al.* (2015), product designs need to incorporate additional instrumentation, data collection capability, and diagnostic software features that monitor product health and performance and warn service personnel of failures. As software increases functionality, products can be designed to allow more remote service. Products delivered as services must also capture usage data so that customers are appropriately charged. This requires clear thinking about the type and location of sensors, what data will be gathered, and how often it should be analyzed.

Essentially, Porter *et al.* (2015) design the following types of services strategy. These strategies can be considered as product-centric servitization. One stop service strategy: because technicians can diagnose problems remotely, they can have the parts needed for repairs in their trucks the first time they arrive at the customer site. They can also have supporting information for executing the repairs. Only one visit is necessary, and success rates rise. Remote service strategy: smart, connected products make delivering service via connectivity increasingly feasible. In many cases products can be repaired by remote technicians in the same way that computers are now often fixed. As a result, service costs, equipment downtime, and customer satisfaction have improved dramatically. Preventive service: using predictive analytics, organizations can anticipate problems in smart, connected products and take action. The company can also update a machine with preventive fixes when feature enhancements are added, sometimes remotely. Augmented-reality-supported service strategy: information about a product’s service needs and step-by-step repair instructions, service efficiency and effectiveness can increase dramatically. New services: the data, connectivity, and analytics available through smart, connected products are expanding the traditional role of the service function and creating new offerings. Indeed, the service organization has become a major source of business innovation in manufacturing, driving increased revenue and profit through new value-added services such as extended warranties and comparative benchmarking across a customer’s equipment, fleet, or industry.

On the other hand of product-centric servitization strategy, the services may take place in providing solution, on a value co-creation that requires the successful combination of resources from organization and customer, into a valuable solution (VARGO & LUSCH, 2004). For example, while the provider offers capital goods, such as machinery and technology, the customer needs to apply its own resources, it could be employees or in case of an elevator company, the building construction know-how for example. The more complex and extensive the offering, the more knowledge components are required. Breaking down the component down to products and services and further into associated knowledge components, the integrated solution can be interpreted as a bundle of knowledge components. The bundle includes different types of knowledge, including knowledge embodied in physical products, intangible yet codified knowledge, such as software in information systems, and tacit knowledge, such as the know-how of service experts (VALTAKOSKI, 2017).

2.3. Framework for a product-centric servitization trajectory

In order to enhance the theory building research, and in the light of the theoretical background presented, a framework was designed to have a prior view of the general constructs or categories we intend to study, and to shine through their relationships. Such framework is necessary to explain the main variables that are to be studied and the key factors amongst this longitudinal research (VOSS, 2002). The framework designed (Figure 2) reflects

the servitization trajectory through the industry lifecycle phases (CUSUMANO *et al.*, 2015). In each phase, we proposed that products and services' releases are milestones that illustrate a servitization path inside the company current strategy.

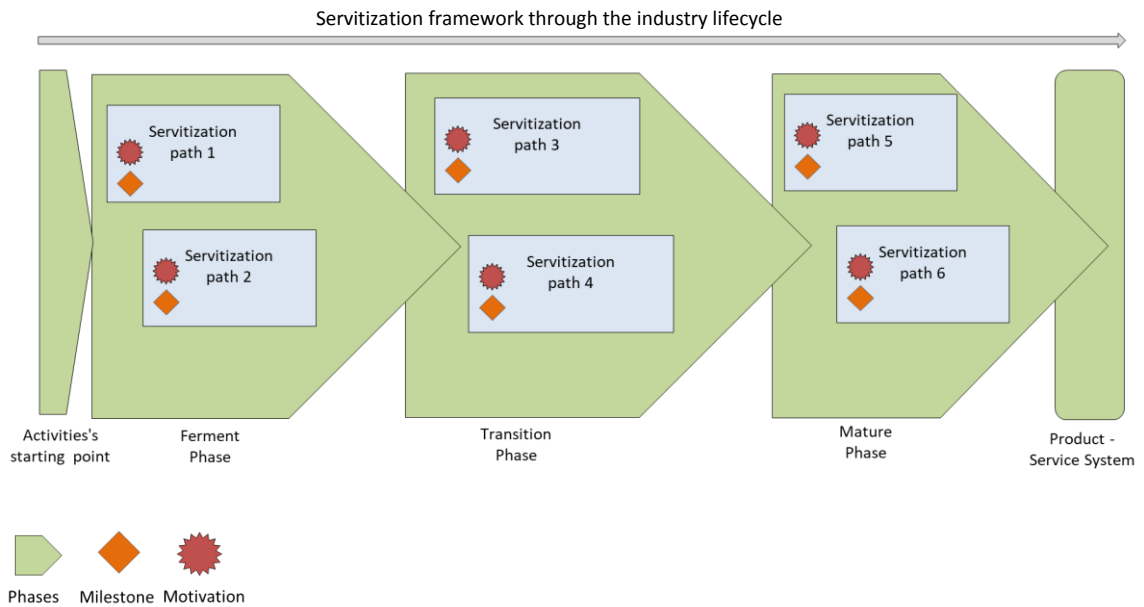


Figure 2. Conceptual framework: Servitization trajectory through the industry lifecycle with milestones and motivations identified for each servitization path.

In answering Cusumano *et al.* (2015) call to study the characteristics and differences in these industry phases and the relation with certain kinds of services over others, and identify key factors that help explain changes in services, the framework contemplates possible motivations that should be related with the product-centric servitization strategy, and it can be an effect of the industry lifecycle phase characteristics or transition, and so, those motivations may cause the servitization path identified. These relations will be well-defined once milestones and motivations are identified, and will be compared with some literature findings.

Cusumano *et al.* (2015) point out some motivations that may appear such as (i) product firms invest in services in order to diversify their revenue and profit streams when entering the mature phase of industry evolution; (ii) product firms might offer services under different competitive circumstances and not only as a response to industry maturity or product commoditization; (iii) uncertainty may be so high during the early phase of an industry that services emerge as substitutes for products.

Raddats *et al.* (2014) also indicate that a manufacturer is held by customers, so its motivations may be based on a number of intangible issues which can positively impact the success of its services. Additionally, knowledge-based capabilities, processes and organizational structures might interfere on organizations movements to servitization paths. We intend to see if those patterns appear and which new motivations a product-centric servitization might show up.

3. Method

This section is divided in three subsections. The first one classifies the nature of research, its approach and selected procedure. The second subsection characterizes the company's variables, context and market, in a way that supports the case study selection case study selection, which orientate the application of this study. Finally, the third subsection systematizes and synthesizes the procedure to data collection and analysis.

3.1. Research classification

This research is nature applied, once was conduct to identify strengths and report fragilities from company's servitization model. Its purpose is exploratory, what enables the subject study from several viewpoints and aspects, making explicit the research problem through hypothesis constructions (PRODANOV, 2013). It has qualitative approach, which is characterized by the natural environment as the direct data source and phenomenon interpretation. Its procedure is classified as case study.

Remeneyi *et al.* (2002) proposed that case studies can help researchers, professors, and students to explore and understand how determined phenomenon established itself in some organizations. Yin (2005) emphasize that the study case utilization also is recommended when it is desirable to answer questions that's clarify several processes on a company or industry.

3.2. Case study selection

The case study was conducted in a multinational manufacturing company that gives solution in vertical displacement. The significance in the choice of this company to the current study is based on three main factors. In first place, the company is product-centric, what means the mission is to provide vertical displacement with products with their seal. There is no projection to outsource the manufacturing activities because it has been considerate its core business. Despite that, the company, and the market where it is placed, has a background of services needs and this organization has a mindset of service infusion on product.

Collaborator's culture already demonstrates differentiation focus, as said one of the employees at the first contact with the research team, "the difference between an elevator from company A to an elevator from company B is the quality of intrinsic service". It brings to the second factor that is: the company's competitive advantage is based on differentiation and it has achieved success in many its operations concurrently service growth. In third place, this organization has an dual characteristic, its relation with clients is evidenced both Business-to-Business, once the sales are made with government (through bidding), construction companies and commercial buildings, and Business-to-Customer, having transactions directly with final customer such as residential consumers, receivers, and others.

The main company's products are elevators, fingers, footbridges, electronic and mechanic bridges, moving staircases and conveyors. On the other hand, the actual services are divided in installation, repair, maintenance and modernization. Services merged with the product are more recent and will be discussed on the sequence, but can be generalized as connectivity and machine intelligence. In order to design the current market, it will be listed several key aspects. The market is solid and well defined, composed by traditional and large firms.

In Brazil, the company is one of the greatest lifting solutions manufacturer. Its Brazilian industrial park employs around 4000 workers and registered a revenue of 1,2 billion of reais at 2015/2016 fiscal year. The factory attends the national Market and also exports to all Latin America. In Brazil, there are 61 branches and service stations located in different regions, ensuring national coverage.

Due to the requirement of a complex manufacturing structure, the production is restricted to a few multinational groups. The company studied is one of the three world leaders of this oligopoly and owns 14% of market share. Other relevant information with a special value for this study is that services are responsible for 60% of company's revenue. This number is common in this sector once the services of maintenance, for example, it's not only fulfilled by the product producer. In other words, services are a strategic way to retain old clients or capture new ones.

3.3. Data collection and analysis

Data collection was structured on a longitudinal research, through documental and historical data gathering. Also, a framework that provided the phases of industry lifecycle (CUSUMANO, KAHL & SUAREZ, 2015) was applied in order to drive semi-structured one-on-one

interviews. Nonetheless, the interviewees were not restricted to limit their ideas on this framework, once the conduction of interview was open to other inputs that the company employees might take into consideration. In the beginning of each interview, the framework was explained and an introduction of concepts as services, servitization and product oriented servitization was given. The interviews took approximately one hour to complete. They were conducted by a single researcher and took place at the company installations.

The sample consists in six collaborators in a multidisciplinary team of service management, marketing, logistics, innovation and R&D department. This protocol allowed different pathways of debate to subsequently be used on results and discussion sections. It was deliberated chosen polar types, because cases with sharply contrasting characteristics highlight the differences studied (VOSS,2002). The departments see the transitions phases in different perspectives of the company.

Department	Position	Years with the company
Marketing	National Manager	10
Services management	Jr. Analyst	6
Services management	Sr. Analyst	32
Logistics	National Manager	28
Innovation	Director	20
Shared Services Center (SSC)	Sr. Analyst	21
Research and Development (R&D)	National Manager	15

Table 1: Interviewees description.

The road map through framework tool during the meetings had as a purpose identify the service growth trajectory of the company, recognizing releases of products and services, motivations that lead the company into every scenario and management plans that supported the stages of transition. Additionally, to enhance the discussion, some general questions should also be answered, such as follows: (i) which were the main difficulties faced by your company and what was the strategies developed; (ii) from now on, how your company will change its past strategy, for example, having focus on standardization or customization (BAINES *et al.*, 2008; KOWALKOWSKI *et al.*, 2015); (iii) what do you find as being key drivers and general enablers and how it was implemented. Literature review cases were also used to compare results.

For data documentation, every interview was recorded and then transcribed. For data coding, information provided was encoded through QSR NVivo® 10 software, which is based on content analysis method. The classification utilized was an aprioristic type, once the researcher has, in advance, categories interests pre-defined. The research elaborated 18 total codification nodes. All the interviews, documental and historical data were encoded according servitization paths identified in each industry lifecycle phases, on a total of 8 nodes. From these initial nodes, branch of 8 more nodes for motivations categories. At last, there were 2 more nodes of barriers for servitization and enablers/strategies adopted by the company in this process. For data analysis, the classifications regarding the framework previously presented were organized in timeline logic, as interviewees identified the milestones and motivations along each phase. Milestones can be inferred as being the release of any product or service. The framework's constructs also included the servitization type identified (TUKKER,2004; BAINNES, 2007; BAINNES, 2009; WINDHAL,2010; RADDATS *et al.*, 2015).

Other information given was highlighted and compared with previous researches in order to plot any different behavior from already known literature. Finally, in parallel, it was accomplished a theoretical triangulation through additional data such as key performance indicators and reports analysis.

4. Results and discussion

Figure 3 summarizes our results according to the proposed conceptual framework. In total, 20 milestones were identified by the interviewees. The interviews data was confirmed by documental data collection, such as intranet portal information, catalogues, formal releases documents, company internal portfolio, key-performance indicators, formal reports to managers and marketing data. Every product release has intrinsically service related with the company competences at its action field, for example, a new product predict similar maintenance competence but it still implies on a new maintenance pattern due to new technical specifications of the product. Each milestone was pointed-out on a respective industry-life cycle phase during the interview, every classification was supported by historical data provided by company's marketing team.

The last two phases were the ones that most presented releases, both with 8 releases (it was either a new product, or new service or improvements on product/service already on portfolio). Some servitization paths do not follow Cusumano et al. (2015) previous research, in a way that substituting services do not occurred on ferment phase, but it is cited on the last one, the mature phase. However, results converge regarding smoothing services that show exclusivity on transition phase. The divergences may be justified by a variable not considered by Cusumano et al. (2015) such as the classification of complex products and systems (CoPS) (Raddats et al, 2015; Ren and Yeo, 2006). CoPS present customization on product or respective system, and differ from non-complex products because of its high level of added value. Ren and Yeo (2006) suggest that the CoPS classification can be sub-divided into complex products and systems, with complex products being standalone entities and systems being complex products that are fully integrated in a system. The principal distinction between them is that the first doesn't need a system to work properly. The relations between motivation, the servitization path adopted by the company and the products category will be discussed in further topic.

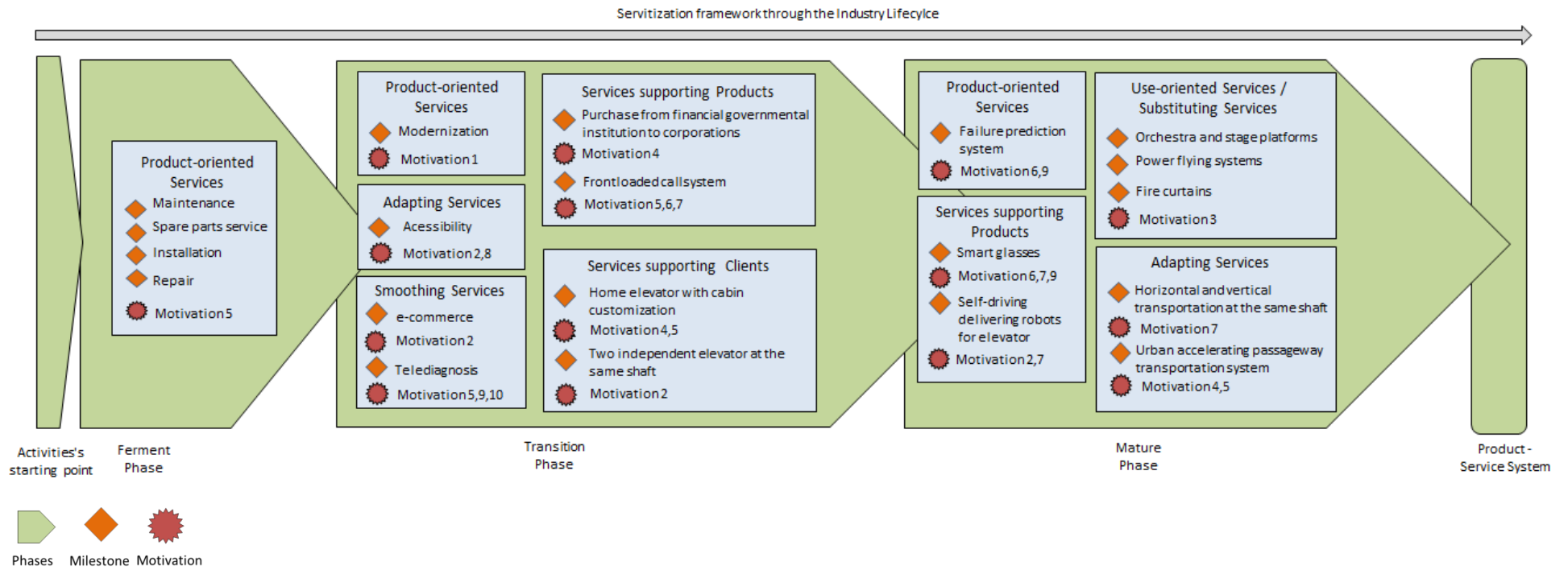


Figure 3: Framework for servitization trajectory of a manufacturing company.

It's important to emphasize that many of these milestones were related to two or more motivations that lead the company through the servitization path classified. In addition to that, motivations mentioned by the company's employees were already referenced in literature, in spite of four new findings, such as (i) new market entrance; (ii) technological advance; (iii) value exploitation and (iv) customer retention. There are two considerations regarding the last one. The company responds in different ways to this same motivation. On one way, the company looks at the necessity to improve the product in order to facilitate the service provision, in the other hand, it is prioritized the necessity to improve the service in order to improve product performance. Table 2 details motivations that appeared at data collection and illustrates convergences with literature and the new findings. As our results illustrate, the findings were recalled by different interviewees of several departments inside the company, what gives the relevance necessary to substantiate discussion.

Motivations	Interviewees (point of view – hierarchic and functional)	Phases of the Industry Life Cycle
(1) Diversify their revenue (CUSUMANO et al., 2015)	Services Sr. analyst	Transition
(2) Respond to different competitive circumstances (CUSUMANO et al., 2015)	R&D national manager, Innovation director, Logistics national manager	Transition, Mature
(3) Emerge substitutes for products (CUSUMANO et al., 2015)	Marketing national manager	Mature
(4) Expand demand for products in order to differentiate clients segmentation (RADDATS & KOWALKOWSKI, 2014)	Marketing national manager, Services Sr. analyst, R&D national manager	Transition, Mature
(5) Customer retention	Innovation director, R&D national manager, Services Sr. analyst	Ferment, Transition, Mature
(6) Competitors influence (CUSUMANO et al., 2015)	R&D national manager, Innovation director, Marketing national manager	Transition, Mature
(7) Search for differentiation (ULAGA & REINARTZ, 2011)	SSC Sr. analyst, Innovation director, Logistics national manager	Transition, Mature
(8) New market entrance	R&D national manager	Transition
(9) Technological advance	Innovation director	Transition, Mature
(10) Value exploitation	Inferred	Transition

Table 2: Motivations identified through servitization trajectory compared to previous researches.

4.1. Servitization paths at ferment phase

In this phase, there are the first services that emerged just on the beginning of company activities, side by side with the products releases, accompanied its sales. All four milestones identified in this phase were classified as product-oriented services (TUKKER, 2004), once products play the key role on company's revenue, and services are complementary. Maintenance, spare parts provision, installation and repair are the more traditional services at this market, and according to the SSC Sr. analyst, *"nowadays these services are the flagship of the company. Yet there are projects that aim to increase revenue from others services types. The representativeness depends on moment, because the market fluctuates"*. Company's KPI reports indicate that 70% of revenue is due to maintenance services, followed by installation, repair and spare parts service. Here, the motivation reported was not found in literature, which is that services releases allowed the improvement of products performance. As observed by Services Sr. analyst, *"every elevator sale, for example, has the possibility to include a service contract. This way, we are able to retain this client, with a long-term relationship. Besides that, the equipment's warranty is bounded by maintenance continuity with our company"*.

4.2. Servitization paths at transition phase

Here, servitization paths turn up to be more diversified, with five types identified. It is worth highlighting that, in this phase, returns over investments are more stable and product's costs are predictable. Besides that, customers are more comfortable with company offer proposals (CUSUMANO et al., 2015; ABERNATHY and UTTERBACK, 1978).

Still on product-oriented services, modernization service arises, which can be explained by Innovation director as follows: "property owners increasingly need to invest in modernizing their people transportation systems. We work with customers worldwide to prolong their system's lifespan, safely, intelligently and cost effectively". Modernization services may be useful in an aesthetic improvement of product or technological components change. It is a formal service not directly related with the product. The motivation was to diversify the revenue, as affirmed Services Sr. analyst, "our company added the modernization service on a way to ensure more than the traditional sources of revenue. We didn't want to lost clients for services companies that are not producers, which we call the conservatives". Here, the value exploitation as a motivation also appears, once the company changes the value of an old product by providing a new service related.

Adapting services (CUSUMANO et al., 2015) also took place, with accessibility market as a milestone. It was not only one product or service release, but entire new lines of products and for consequence, traditional services as cited above, were released. Here, other market is covered by the company's mobility solutions. The principal driver was different competitive circumstances, due to new legislation in force, which opened this new market entrance. According R&D national manager: *"government promulgated legislation in order to attend people with reduced mobility. From this, there was a market increase. Market was willing to pay for the technology due to law that emerged. So, our company developed the products to attend this attractive new market. Our services related were kind the same, because of competences we already developed with our old portfolio"*.

As smoothing services (CUSUMANO et al., 2015), i.e. services that do not alter the product functionality, appeared two milestones at transition phase. The first one considered was the company entry on e-commerce. Based on technology already available on market, a platform was released, also disposable to smartphones and tablets, extending the access facility of customer to sales. Such as accessibility milestone, motivation cited raised from competitive context changes. As affirmed by the logistics national manager: *"the big problem is that a parallel dark market exists, where elevator pieces are traded without outgoing invoice, a criminal practice that must be restrained by condominiums and its responsables"*. E-commerce arrived as a tentative to facilitate access by clients and to stop others irregular sources to buy components. The risks are lack of security related to elevators performance. The second milestone on this servitization path is telediagnosis. Some elevators have a telemetry system that, through sensors and software embedded, allows the equipment to communicate any failure to a central of technicians. Therefore, the customer doesn't need to go after the company, and the lead time to solve the problem is reduced once the company works proactively, improving product value. The great motivation here is equal to the first services releases of the company. The motivation is to improve product performance and retain clients, but it is also implied the technological advance as a second motivation.

In addition, services supporting products (RADDATS et al., 2015) were recognized: purchase from financial governmental institution to corporations and a more product related service, the frontloaded call system. The first one amplifies the product offer through credit card of an investment bank, as an incentive for corporations. Motivation to this milestone is to expand demand for products in order to differentiate client's segmentation, as observed by Marketing national manager: *"we needed to facilitate the acquisition of our products by other companies, as construction ones, one of our most important segmentation"*. On the other hand, frontloaded call system plays the same role of a service supporting products but in a

different way, through system product definition (Ren and Yeo, 2006). The frontloaded call system can be defined as a software that gather all same destination request at the same cabin, which optimizes waiting time of final users and the travelling capacity of an elevator. In this case, it was pointed-out three different motivations by interviewees. Competitors influence is one of them, as highlighted by R&D national manager: *“there was already a patent for this innovation but not enough technology to transform it on a business opportunity. Once processors decreased costs, concurrence started to release this type of service and our company couldn’t stand behind”*. It was also mentioned the necessity to improve the product in order to facilitate the service and result on client retention and the search for differentiation.

Last, services supporting clients (RADDATS et al., 2015) appear, which aim to propose strategic solutions to customer specific problems. Home elevator with cabin customization, according R&D national manager: *“combines energy economy solutions and also brings the possibility to customize the elevator cabin to better attend the aesthetics desired”*. This milestone had two motivations identified, the first was the necessity to improve the product in order to facilitate the service, as observed by Services Jr. analyst: *“the new product impacted positively on maintenance time duration and it’s an excellent option to modernization posteriore services”*. Other perspective is the necessity to expand demand for your products to different client’s segmentation, what Services Sr. analyst illustrates: *“people have mobility difficulties as far as grow older, the company developed a product to cover this opportunity and the services related require the same competences we already had”*. The other release is a product with two independent elevators at the same shaft. The intrinsic services are the faster mobility and other category of maintenance. It turns the space available to use more efficient, lower energy are consumed and it increases capacity, transporting 40% more passengers that a traditional elevator. As motivation, it’s a response for different competitive circumstances, as Innovation director points out: *“we intend to support cities, answering to urbanization requisites”*.

4.3. Servitization paths at mature phase

Also in mature phase, product-oriented services emerged in company’s releases. At this point, only one milestone was indicated, the failure prediction system. The R&D national manager observes: *“as digital-age partner, our global service engineers and technicians receive real time alerts for pre-issue repairs, enabling them to ensure every customer benefits from more proactive customer service”*. As motivation the company was influenced by competitors and also technological advance, as Innovation director affirmed: *“there is a strong technology tendency of Internet of Things and its applications. We decided to bring it inside our company and developed a predictive maintenance use”*.

Services supporting products appeared at the last phase with two milestones: smart glasses applicability and self-driving delivering robots for elevator servicing. The smart glasses are utilized to optimize maintenance service. The technician in visit to the client is allowed to show the control cabinet to a support team in the company, which assists the first one in order to identify problems. There are three motivations here, the first is a technological advance, because, according Marketing national manager, *“smart glasses are being used to modernize training. It’s also a tendency behind augmented reality”*. Innovation director also pointed it was a response to competitors, although *“was not direct competitors that opened our eyes to smart glasses applicability, IT companies released this technology and started this movement on other markets”*. The second is the search for differentiation, once it improves the quality of customer service. The self-driving delivering robots for elevator servicing is the other milestone into this servitization path. For elevator and escalator maintenance, spare parts are needed quickly, and these robots play this role, reducing distance in time and delivering any spare parts just as any bought elevator piece. There are two motivations according ours interviewees, one related to competitive circumstances such as affirmed by Logistics national

manager: *“our ever-growing cities need new solutions, especially for urban logistics. Our robots are capable of substitute fleet on ordinary traffic”*. The other is related to the search for differentiation, once this type of service is not usual at this market.

According the collected data, during mature phase appears a new servitization path, as follows: use-oriented services and or substituting services (TUKKER, 2004; CUSUMANO et al., 2015). Because their definitions are quite similar, here we consider it the same classification. The company released three services that depend on products and its technology but the product doesn't belong to the client after the service is provided. Orchestra and stage platforms, power flying systems and fire curtains play this role. Marketing national manager explains: *“we have experience in installing and servicing a broad range of stage systems in theaters”*. The motivation is quite clear as appear in previous researches, service emerges as substitutes for products and product plays the role of service. (CUSUMANO et al., 2015; VARGO et LUSCH, 2004).

Adapting services arises again at mature phase with two milestones. Horizontal and vertical transportation at the same shaft is the first release identified. It works as a subway station but inside a building, with an elevator without cables. It's a new service provided impacting directly on product functionality. According Innovation director, *“we want to reinvent the elevator concept. We wonder, how to save space, increase velocity and reduce waiting time? It's starting a new era to the way we see mobility. Nowadays, a skyscraper has half of its area occupied by shafts”*. It illustrates the search for differentiation as motivation. The second release classified here as adapting services is the urban accelerating passageway transportation system.

Logistics national manager enhances: *“it's a new technology that represents the company entry on public sector of mass transport”*. R&D national manager complemented with this view, affirming that what motivated the company was the desire to expand demand for products: *“[...] attending for example metro stations, because this is an accelerating passageway transportation system that offers an efficient solution to the challenges of urbanization [...] this is a solution that fill the gap related to people transportation in short distances”*. The second motivation is the customer retention, through the product improvement in order to facilitate the intrinsic service as well, once it doesn't require complicated management and maintenance tools.

4.4. Product-centric servitization strategy: cross-phases analysis

In order to explain gaps and divergences with literature about the occurrence of some servitization paths in other phases, the milestones were analyzed according the CoSP category. In general, we observe that the trajectory is shared almost equally between complex product and system categories. However, when the optical changes, occurs a pattern, as presented in Figure 4.

Number of milestones occurrences between Industry Lifecycle Phases and related CoSP category

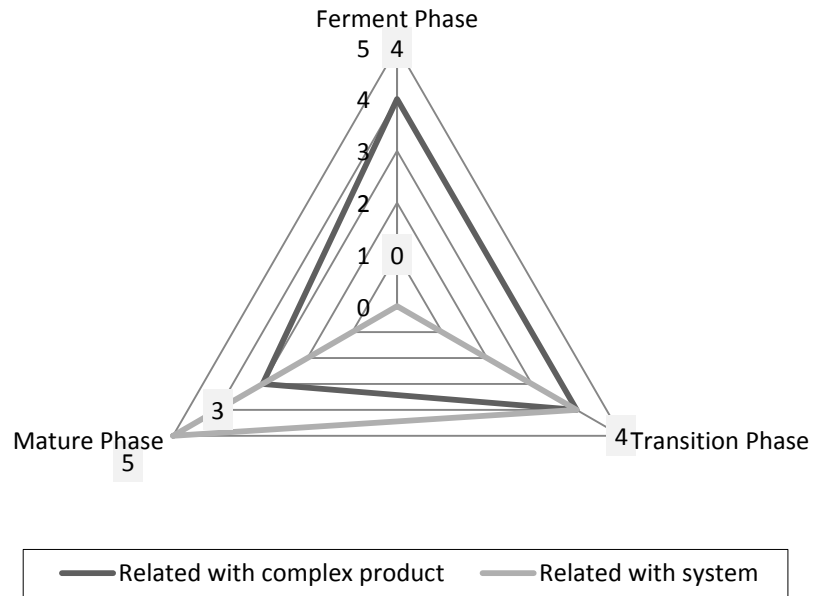


Figure 4: CoSP category in industry lifecycle phases.

In ferment phase, only complex products and related services were released. It can be explained by the company concern in this phase about a barrier in product's costs and services development, as Innovation director mentioned, *"the risk in R&D investments were too high, and return takes too long. We decided to stabilize first with what we already had at the time"*. In transition phase, systems started to be released, although milestones' categories were equally shared. At this point, the company started to rethink its mission as affirmed by R&D national manager, *"our mission is to help society in a better mobility, and perceived we were not only an elevator company. Our product is a consequence of this purpose sense"*. In mature phase, the number of systems releases exceeded the number of complex products related releases. As an enabler, Innovation director pointed out that *"research and development are of highest priority for us now. It is essential for the business success to protect innovation. Therefore, it was decided by company's management to reward good ideas of our numerous inventor teams and individual inventors. Frequently improved and developed products, processes and services are a major premise for remaining successful in the market"*.

As citations suggest, the relation between motivations identified and the servitization paths adopted were strictly related with company conduct. These relations are illustrated at Figure 5 and it also explores the relation of these two variables with the CoPS category.

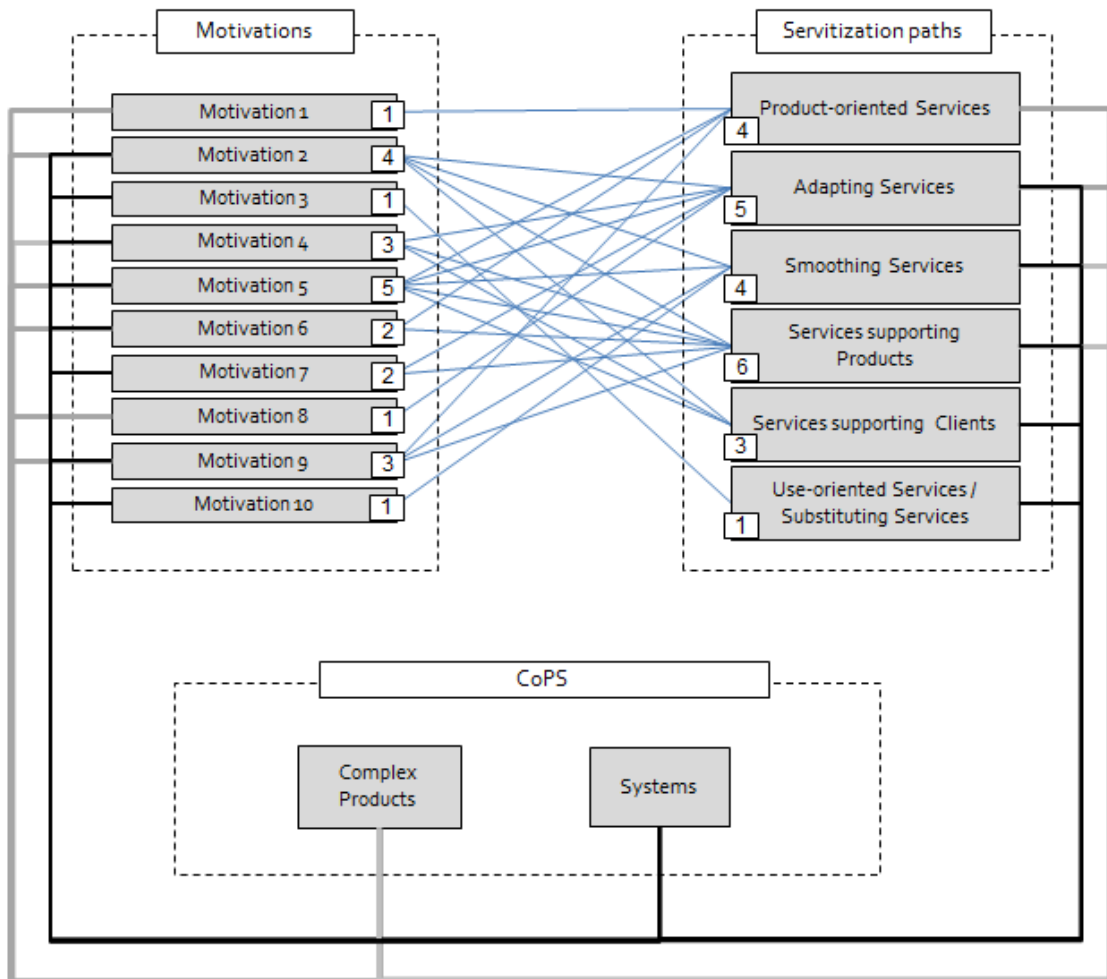


Figure 5: Relation between motivations and servitization paths adopted, according to CoPS differentiation.

It is worth highlighting that motivation 5, followed by motivation 2, were the ones that presented great number of relations with 5 and 4 distinct paths respectively, according to interviewees' responses. These motivations, the concern in responding to different competitive circumstances and retaining customers are the most related with complex products, what represents the majority number of releases in first phases. Motivations 3, 7 and 10 were related only with systems, it occurs because differentiation, value exploitation and services as substitutes are the drivers of the last phase, following the company tendency in move for systems value proposal, as Innovation director affirmed, *"the tendency in market is cheapen products, what add value are the news technologies, and this is the sale differential. Services development grows side by side, our product means one sale whereas the service means a contract of years"*. Therefore, servitization paths such as services supporting clients and use-oriented services/substituting services were strictly related to systems.

Services supporting clients and adapting services were the most representative ones and both related either to complex products and systems. The servitization trajectory didn't present some paths such as result-oriented services and substituting services. It can be explained by the standardization rather than customization strategy (LIGHTFOOT & GEBAUER, 2011; MATTHYSSENS & VANDENBEMPT, 2010) of the company, as answered by all interviewees when question (ii) of method was made.

Some barriers mentioned that might support the results and the relation between company's motivations and its conducts are presented as follows, (i) on earlier phase the product was not developed in a way to match with services development, the technicians had

a lot of problems to provide a good quality in the first services; (ii) the acceptance of a new culture when utilizing new tools and platforms for providing service was a big barrier and still are, with the employees and customers; (iii) the clients need to have a minimum of knowledge of that technology to give credit, and the company need to supply this necessity. The two last barriers are confirmed by literature (CUSUMANO et al., 2015).

In other hand, company enablers were also a variable that affects directly the results presented. To be mentioned first, the team arrangement to care about service structure within the company. As pointed by Gebauer et al. (2010), the importance of services staff is also noteworthy in terms of a manufacturer developing a greater service orientation through its human resource management policies. In second place, the CEO endorsement through innovation was also referenced by interviewees, in accordance with Antioco et al. (2008) that highlighted the importance of senior managers' commitment to growing the services business and leadership in terms of increasing service orientation.

5. Conclusion

This study answered for a call in previous literature with a research question about how manufacturing companies incorporate services on its value proposition and how the transition is disposed. Bearing this in mind, the offering evolution through the servitization trajectory of the case study selected was drew, each release was pointed out as a milestone and patterns between company's motivations and its responses were identified.

As a theoretical contribution, new motivations appeared once compared with already studied trajectories, such as (i) new market entrance; (ii) technological advance; (iii) value exploitation and (iv) customer retention. Other 6 motivations occurred, converging with previous research (CUSUMANO et al., 2015; RADDATS & KOWALKOWSKI, 2014; ULAGA & REINARTZ, 2011). Overall, 20 milestones were pointed out and correlated with 6 different servitization paths (RADDATS et al., 2015; CUSUMANO et al., 2015; TUKKER, 2004) during industry lifecycle phases. The principal pattern identified is the tendency on the last phase of industry lifecycle, where more servitization paths were related with systems of the CoSP category rather than complex products. Three motivations were exclusively correlated with the systems milestones such as emergence of substitutes for products, search for differentiation and value exploitation. Service supporting clients and use oriented-services were servitization paths also correlated exclusively with system.

As management implications, it's important to highlight that many barriers are still preventing some innovation during servitization trajectory. The product development must occur concomitant with service development, this enable service providing and future new sources of revenue to the company. Additionally, any innovation in traditional value offer needs support with cultural changes inside company and it must be reflect in further assistance to customers. It must be emphasized and enhanced the best practices diagnosed, such as the high level leadership support in servitizations initiatives within the company. Moreover, an exclusive organizational service structure is necessary and the promotion of innovation programs among all levels of work team. Standardization strategy was defined as the main driver between transitions phases of the product-centric servitization.

The presented study is limited due to the question research had been addressed only to one case study. Although the sample is composed to several inter-departmental insights about servitization trajectory, it is necessary to extend to a large number of manufacturing companies, in order to reinforce the possibility to generalize the found results. Other limitation to be reported is that data coding was made by only one researcher, what may impact on concordance degree on information nodes, with more people involved in this activity more robust nodes are. At last, for futures researchers, besides more case study collection, it's suggested to enlarge the temporal optic of servitization trajectory, in order to better understand the specific chronology of servitization paths that took place and if there is a simultaneity in two or more of them.

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