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Management Control and Performance Measurement Systems: How Servitization Teaches an Old Dog New Tricks

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ABSTRACT

The purpose of the paper is to study how “servitization” affects the management control and performance measurement systems of small and medium sized manufacturing enterprises. This study utilizes a multiple case study approach. Semi structured interviews were carried out with 43 professionals such as owners, managers, and controllers from 31 different manufacturing firms located in Italy. The study’s findings reveal changes associated with the companies’ beliefs systems, boundary systems, diagnostic systems and interactive systems of MC and PM. Additionally, we identified the following challenges faced by MC and PM systems during the “servitization” process: establishing a balance between efficiency and flexibility, balancing control and autonomy, balancing existing and new knowledge, tensions between short and long term strategic goals and, finally, information sharing from stakeholders. Little attention has been put towards the investigation of how the “servitization” strategy does change management control (MC) and performance measurement (PM) of small and medium sized enterprises (SMEs). Moreover, additional empirical evidence of the paradoxes created by the “servitization” strategy from a MC and PM systems perspective is necessary to better understand the “servitization” phenomenon. The study augments prior literature by providing additional empirical evidence of the effects that “servitization” has on MC and PM systems. Moreover, this research utilizes the levers of control (LOC) framework thus empowering future studies to adopt a similar framework to investigate larger corporations with more structured MC and PM systems.

Lo scopo dell'articolo è quello di studiare come la “servitization” influisca sui sistemi di controllo di gestione e di misurazione delle prestazioni delle piccole e medie imprese manifatturiere. Questo studio utilizza un approccio basato su più casi di studio. Sono state condotte interviste semi-strutturate a 43 professionisti tra titolari, manager e controllori di 31 diverse aziende manifatturiere situate in Italia. I risultati dello studio rivelano i cambiamenti associati ai sistemi di credenze delle aziende, ai sistemi di confine, ai sistemi diagnostici e ai sistemi interattivi di MC e PM. Inoltre, abbiamo identificato le seguenti sfide affrontate dai sistemi MC e PM durante il processo di “servitization”: stabilire un equilibrio tra efficienza e flessibilità, bilanciare controllo e autonomia,

bilanciare le conoscenze esistenti e nuove, le tensioni tra obiettivi strategici a breve e lungo termine e, infine, la condivisione delle informazioni da parte degli stakeholder. Poca attenzione è stata posta verso l'indagine su come la strategia di "servitization" modifichi il controllo di gestione (MC) e la misurazione delle performance (PM) delle piccole e medie imprese (PMI). Inoltre, per comprendere meglio il fenomeno della "servitization", è necessaria un'ulteriore evidenza empirica dei paradossi creati dalla strategia di "servitization" dal punto di vista dei sistemi MC e PM. Lo studio amplia la letteratura precedente fornendo ulteriori prove empiriche degli effetti che la "servitization" ha sui sistemi MC e PM. Inoltre, questa ricerca utilizza il framework delle leve di controllo (LOC), consentendo così agli studi futuri di adottare un framework simile per indagare le aziende più grandi con sistemi MC e PM più strutturati.

Keywords: Servitization, Management Control, Performance Measurement, Small and medium sized enterprises, Levers of Control

1 – Introduction and research questions

Manufacturing companies have shifted their ways of doing business in favor of a service led strategy to enhance their offerings, to pursue higher financial performances and remain competitive (Oliva & Kallenberg, 2003; Yeniaras, Di Benedetto & Dayan, 2021). Therefore, manufacturing companies have moved from a product-based offering to a more integrated service-oriented offering (Chaudhary *et al.*, 2022; Kamal *et al.*, 2020; Kowalkowski *et al.*, 2017). This shift in business model and logic has been defined by Vandermerwe and Rada (1988) as servitization. Servitization implies providing bundles of goods, services, knowledge and support to customers in an attempt to increase the value offered by the firm (Chaudhary *et al.*, 2022; Dmitrijeva *et al.*, 2022; Raddats, Naik & Ziaee Bigdeli, 2022). Through such offerings, manufacturers are able to positively influence their profits, reduce the costs associated with knowledge acquisition, improve the overall performance of the firm, as well as increase customer satisfaction (Olivia & Kallenberg, 2003) by offering customizable solutions aimed at meeting the ever-changing clients' needs (Neely, 2008).

Over the last decade, the concept first introduced by Vandermerwe and Rada (1988) has attracted a lot of attention from scholars of different research fields (Chaudhary *et al.*, 2022; Guedes *et al.*, 2022; Kowalkowski *et al.*, 2017; Harrmann, Eggert & Böhm, 2022; Kolagar, Parida & Sjödin, 2022; Li, Pournader & Fahimnia, 2022; Rapaccini *et al.*, 2020; Tan *et al.*, 2019). Therefore, it is evident how important it is to discuss it across a wide range of research communities due to the complexity of servitization and its impact on different areas of a business (Cinquini, Marelli & Tenucci, 2020b; Tenucci and Laine, 2016). Research has underlined the relevance of management accounting practices as enablers of manufacturers' servitization strategy (Laine, Paranko & Suomala, 2012a,b; Leotta, Rizza & Ruggeri, 2020; Lindholm, Laine & Suomala, 2017; Marelli & Tenucci, 2020; Tenucci & Cinquini, 2015). Management accounting is considered to be of importance for the servitization strategy since it sustains business processes and it can be a useful tool when trying to address the problems associated with servitization (Baldvinsdottir, 2021; Cinquini *et al.*, 2020b; Leotta *et al.*, 2020; Lindholm *et al.*, 2017; Marelli & Tenucci, 2020). Transitioning to a servitization strategy forces organizations to face competing and often contradictory paths (Yeniaras *et al.*, 2021; Kastalli *et al.*, 2013). Servitization does change the cost structure and resource consumption, as well as the company's source of revenues (Suarez *et al.*, 2013). Consequently, these competing needs create new challenges and tradeoffs that managers

and controllers have to embrace and balance despite their conflicting elements (Chaudhary *et al.*, 2022; Evans & Tucker, 2015; Mella, 2018; Schreyögg & Sydow, 2010). Those challenges are referred to within the literature as paradoxes that persist over time within firms' worlds (Cunha and Putnam, 2019). To help firms sustain those challenges, management control (MC) and performance measurement (PM) come into play since they are considered to be helpful systems that organizations utilize to implement new strategies and strategic focus (Mella, 2018), improve short- and long-term performance, and promote positive behaviors (Franco-Santos, Lucianetti & Bourne, 2012; Mella, 2023; Micheli & Mura, 2017; Pešalj *et al.*, 2018). Despite their lack of financial and human resources, small and medium sized (SME) enterprises are more flexible and innovative in comparison to larger firms, thus their managerial processes and systems are less formal and structured (Nandan, 2010; Rapaccini *et al.*, 2019). Despite their flexible and innovative nature, SMEs still need to create organizational alignment, foster performance, as well as behaviors that are consistent with the firm's vision, value and scope through the use of control systems (Kaplan & Norton, 2008; Mella, 2016; Pagliarussi & Leme, 2020; Pešalj *et al.*, 2018; Rapaccini *et al.*, 2019). Therefore, SMEs can be used as an ideal sample to investigate how servitization changes their MC and PM systems. Nonetheless, additional empirical evidence is necessary to further investigate the impact that servitization has on the management control aspects of a firm (Cui *et al.*, 2019; Zhang & Banerji, 2017). In an attempt to deepen our current understanding of the interplay between servitization and management control and its performance measurement, we have developed the following research questions:

RQ1: How does the servitization strategy affect the management control and the performance measurement of SMEs?

RQ2: What challenges does management control encounter when pursuing servitization?

To address our research questions, we conducted a qualitative study through the utilization of Gioia, Corley & Hamilton's (2013) method to ensure methodological rigor. Qualitative approaches to research in servitization have been widely adopted mainly in the form of case studies (Davies *et al.*, 2022). Thus, we decided to interview managers, controllers and owners from a multitude of different SMEs while also maintaining a qualitative approach which has been widely recognised within the servitization literature as a valid method to explore different facets of the servitization strategy (Davies *et al.*, 2022). The study is based on the conceptual framework of the levers of control (LOC) which outlines four systems that are considered to be the base of organizational performance management (Simons, 1991; 1995; 2000). In fact, the LOC conceptual framework plays a crucial role within MC and PM management accounting research (Kruis, Speklé & Wiedener, 2016; Mundy, 2010; Pešalj *et al.*, 2018; Speklé, Van Elten & Wiedener, 2017). The findings highlight how MC and PM change when the servitization strategy is implemented. To highlight different dimensions of MC and PM, this study categorizes its findings by dividing it into the four levers of the LOC framework. Nonetheless, it is important to understand that the four levers interact with each other thus making it difficult to simply focus on one specific element of LOC. Additionally, we gather empirical evidence which highlights the main paradoxes manufacturing firms have encountered when shifting their business focus towards the implementation of the servitization strategy. Future studies could investigate how the servitization strategy has changed MC and PM systems of large

corporations since those entities often have more complex and structured systems in place, as well as, a larger team dedicated to said activities.

This research provides the following theoretical contributions. First, it contributes to the literature exploring how MC and PM are transformed or challenged by the implementation of the servitization strategy within SMEs. Second, although several papers have begun to explore the role of servitization and its effect on companies, most have approached the utilization of case studies (Davies *et al.*, 2022). Therefore, by utilizing Gioia's (2013) method we take advantage of multiple experiences thus complementing previous research with data that reinforces and expands existing knowledge. Finally, due to the relevancy of said organizations within the European context (European Commission, 2022), the present study focuses on SMEs perspective on how servitization affects their MC and PM. From a practical perspective, our results can help and guide practitioners to better understand the impact that servitization has on the processes and activities associated with MC and PM. Moreover, the obtained results provide empirical evidence on which internal or external activities can be undertaken to better prepare the personnel to deal with MC and PM post servitization (Pešalj *et al.*, 2018). Finally, our study provides a clear, transparent method to gather and analyze data, thus allowing further research to be developed. This study limitations are associated with its sample, methodology and adopted framework. Moreover, the study does not identify different categories for each stage of companies' adoption of servitization and their phase of evolution of MC and PM. Thus, future research could attempt to identify multiple stages within the servitization adoption process. Finally, future studies should investigate how MC and PM evolved by using different theoretical frameworks.

The paper is structured as follows: First, *Section 2* provides a review of the literature on servitization and illustrates the management control and performance measurement aspects associated with SMEs. *Section 3* presents an overview of the methodological approach implemented, highlighting the technique and reasons why it was chosen. *Section 4* presents the findings as we go through the aggregate dimensions identified. *Section 5* ties the findings to the existing literature and highlights potential divergences and agreements with a discussion. Finally, *Section 5* also concludes the study with its managerial and theoretical implications, as well as limitations and potential new directions for future research.

2 – Literature Review

2.1 – Servitization

Vandermerwe and Rada (1988) have firstly coined the term to identify and explain the transition of manufacturing firms from product centric to product and service oriented. This shift is caused by a continuous rise of external environmental pressures which are pushing firms to synchronize their offering to satisfy the ever-changing customer demands, as well as exploit economies of scale (Baines & Lightfoot, 2015). Thus, firms which adopt the product service systems must shift their strategy and structure to enable the provision of services, training, support and self-service knowledge (Parida *et al.*, 2014; Lee, Yoo & Kim, 2016).

The shift to a business model that integrates manufacturing and service provision carries numerous benefits such as: diversification of offering, improved product reliability and increased customer loyalty (Kastalli & Van Looy, 2013). Moreover, empirical evidence suggests that through servitization, firms have the opportunity to also enhance their financial and

product performance (Rabetino *et al.*, 2018). Nonetheless, the current literature seems to overemphasize the benefits associated with servitization (Chaudhary *et al.*, 2022). This is because firms which do not possess the necessary knowledge and experience about service provision might witness a spike in their costs (Gebauer, Fleisch & Friedli, 2005; Neely, 2008; Yan *et al.*, 2021). As a matter of fact, firms lacking service-related capabilities incur into higher labor costs because of operational and management issues (Kharlamov & Parry, 2021). Additionally, by restructuring, servitized businesses significantly change their cost and profit centers (Korhonen, Stormi, Laine & Liew, 2016; Tenucci & Laine, 2016). Thus, companies have to rethink and redefine their identity since services should not be merely viewed as supporting activities, but rather, as part of an innovative process (Leotta *et al.*, 2020). When reorganizing their business, firms transform their operational systems, resources and capabilities and their strategy to adjust to the servitized business model (Suarez, Cusumano & Kahl, 2013; Visnjic, Neely & Jovanovic, 2018). By doing so, they expose the company to strategic risks and operational risks (Benedettini, Neely & Swink, 2015; Bigdeli *et al.*, 2018; Nordin & Kowalkowski, 2010). The servitization strategy does also expand the definition of supply chain since companies also rely on product sales to ensure the provision of future services (Pistoni & Songini, 2017). Therefore, customer shares are no longer the be all and end all for companies since they need to nurse the loyalty of their most profitable customers to gain revenues through the entire lifecycle phase, from the delivery of products and services maximization (Pistoni & Songini, 2017). Thus, organizations focus is shifted towards customization, intangible aspects of business, flexibility, variety, partnerships and service innovation (Pavione *et al.*, 2020); whereas, traditional manufacturing firms would control and assess efficiency, functions, cost and quality, products and process innovation (Pistoni & Songini, 2017). Failing to address the previously reported changes and concerns, companies might fail to implement the servitization transformation (Valtakoski, 2017), deteriorate the company financial performance (Böhm, Eggert, & Thiesbrummel, 2017) or even incur into bankruptcy (Benedettini, Swink & Neely, 2017).

In conclusion, the existing literature reveals that servitization does challenge various aspects under the MC and PM of firms. This suggests that servitization and firm performance may be more complex than what the literature might suggest (Cui *et al.*, 2019; Eggert *et al.*, 2014; Wang, Lai & Shou, 2018; Zhang & Banerji, 2017).

2.2 – Management Control and Performance Measurement within SMEs

Simons (1991, p.49) defines management control as “*the formalized routines and procedures that use information to maintain or alter patterns in organizational activity*”. Instead, PM has been defined as a formal process aimed at obtaining, analyzing and expressing information about activities, processes or people involved in the various business activities (Evans & Tucker, 2015; Micheli & Mari, 2014). Some researchers believe that PM systems can be included and categorized under the MC umbrella (Koufteros, Verghese & Lucianetti, 2014; Oriot, 2005). Therefore, MC and PM are processes aimed at utilizing information to guide actions and behaviors of all actors involved in the firm (Marelli & Tenucci, 2020; Oriot, 2005; Pešalj *et al.*, 2018). The way in which MC and PM are utilized is important since they can have a positive effect on performance and engagement (Franco-Santos *et al.*, 2012; Pavlov & Bourne, 2011).

SMEs' success is often associated with their flexibility, innovativeness and dynamism (Pešalj *et al.*, 2018). However, SMEs often fail because of their lack of managerial abilities and resources (Saunila, 2016). Thus, SMEs struggle to formulate coherent plans and strategies causing the rise

of reactive mentalities. Moreover, they rely on tacit knowledge which is not often shared amongst the actors involved (Saunila, 2016). The lack of advanced managerial practices is often considered to be a barrier to the business growth and success (Ate *et al.*, 2013). However, empirical evidence suggests that MC and PM systems can support the development of SMEs and their organizational alignment (Pešalj *et al.*, 2018). Therefore, it is evident that MC and PM can play a crucial role in the implementation of the servitization strategy of SMEs. MC and PM can support the pursuit of short- and long-term goals (Franco-Santos *et al.*, 2012; Micheli & Mura, 2017). However, as far as the authors are concerned, there is little to no evidence that investigated how the implementation of the servitization strategy affects MC and PM systems within SMEs' context (Cui *et al.*, 2019; Zhang & Banerji, 2017).

2.3 – LOC Framework

This study utilizes the LOC framework developed by Simons (1991; 1995; 2000) since this framework allows researchers to consider different MC systems jointly (Pešalj *et al.*, 2018). The LOC framework indicates four types of MC systems that work together to benefit a firm. First, there is the belief system which constitutes the mission and vision, and it communicates the company's values that inspire employees to seek opportunities and new solutions. Secondly, boundary systems are necessary since they define the desirable behavior through values, direction and purpose. Moreover, belief systems set the expectations for internal management and other, external, relationships (Simons, 1995). Finally, boundary systems are also utilized to communicate undesirable levels of performance and limits to the pursuit of new opportunities (Pešalj *et al.*, 2018). Thirdly, there are the diagnostic control systems whose aim is to promote the achievement of goals through budget and performance indicators (Simons, 1995). Companies can monitor, assess and get feedback on their level of performance through the utilization of the aforementioned tools (Koufteros *et al.*, 2014). Diagnostic systems act as a mechanistic type of control (Pavlov & Bourne, 2011; Pešalj *et al.*, 2018). Diagnostic control systems perform an essential function; nonetheless they can be discouraging towards managers' attitudes of innovation in their products, services and processes (Henri, 2006). Finally, the literature underlines the importance of interactive control systems that can act as catalysts for strategic dialogues thus enabling change (Pavlov & Bourne, 2011). Thus, activating a feedforward mechanism (Pavlo & Bourne, 2011; Pešalj *et al.*, 2018) allows managers to utilize targets, indicators and plans as interactive instruments involving other actors within the organization to partake in the dialogue and discussion (Simons, 1991).

A more interactive and engaging MC and PM systems can help develop a new strategy (Mundy, 2010; Pavlov & Bourne, 2011). Considering the previously reported empirical findings, the diagnostic control systems which are also interactive systems, when set up with a double loop style (Pešalj *et al.*, 2018), can foster the adoption and successful implementation of the servitization strategy.

Despite being *four separable levers*, literature underlines that LOC has a positive effect on companies' performance when developed and utilized considering all four levers jointly (Speklè *et al.*, 2017). The four levers are intrinsically connected. In fact, one system can positively influence all other three dimensions (Pešalj *et al.*, 2018). For example, empirical evidence highlights that the use of belief systems can positively influence the other three dimensions since belief systems provide broad guidance and help motivate individuals to achieve higher degrees of performance and innovation (Widener, 2007). Furthermore, the four levers need to be

developed and utilized carefully because they can also cause tensions between different aspects of a company, such as tensions between innovative practices and the achievement of company's performance goals (Simons, 1995; Henry, 2006; Kruis *et al.*, 2016). Thus, it is important for managers to find the right balance between the four levers since strategic contextual factors need to be considered in order to decide which lever to prioritize (Kruis *et al.*, 2016; Pešalj *et al.*, 2018).

While insightful, the literature on LOC has focused its efforts on the investigation of how companies can achieve balance between the four levers and how said balance might change when conditions change (Pešalj *et al.*, 2018). Nonetheless, as far as the authors are concerned, the literature has not investigated the effect that a shift in a company's strategy might have on those four levers. Thus, there is empirical evidence to be gathered concerning the effects that the servitization strategy can have on MC and PM by utilizing the LOC framework as a foundational framework.

3 – Methodology

To answer our research questions, we adopted a qualitative methodology. The authors of this manuscript employed a multiple case study methodological approach (Esenhardt, 1989) and engaged in purposeful sampling. The use of a multiple case approach was favored over the single case study since there is growing need for servitization literature to investigate the phenomenon through qualitative data collection and analysis which does not employ single case study approach.

3.1 – Research Sample

Small and medium sized firms from the manufacturing sector located in Piedmont, Italy were selected because of the relevancy of SMEs within the regional context (Ferraris *et al.*, 2017). Moreover, SMEs are essential not only for the regional economy, but also for the growth of the European economy (European Commission, 2022). Using data from the companies' websites and AIDA (Gorini *et al.*, 2021) we were able to filter out those ventures not conforming to our selection criteria. We wanted to gather empirical data from product centric SMEs which transition to the servitization strategy thus changing their business focus, as well as their internal activities and processes. Out of the 117 SMEs contacted, only 31 manufacturing SMEs agreed to partake in this study (Daves *et al.*, 2022). The details concerning the selected firms are listed within Table 1.

3.2 – Data Collection

Data collection spanned between April 2022 to September 2022. We considered manufacturing SMEs that had a product centric approach to business but then have shifted towards the implementation of the servitization strategy. We chose a qualitative research approach to explore how the new strategy would affect the MC and PM management systems. Our study relies on their shared experiences. The actors involved in the semi structured interviews were owners, managers and controllers. We decided to include multiple actors due to the less formal and structured MC and PM systems which characterize SMEs (Nandan, 2010). From the 31 SMEs, we were able to interview 43 participants through semi structured, in depth interviews that focused on gathering evidence to understand how their MC and PM systems have changed

over the transformation of their business strategy. Moreover, we focused on better understanding in what ways the servitization strategy challenges MC and PM systems.

Table 1 – SMEs descriptive information.

Identifier	Number of employees	Turnover FY 2021 (million €)	Sector
1	63	15,1m	Food and beverage
2	104	27,4m	Automotive
3	32	4,2m	Aerospace
4	17	3,7m	Consumer goods
5	84	19,2m	Semiconductors
6	28	3,5m	Technology
7	15	2,1m	Food and beverage
8	231	47m	Automotive
9	31	6m	Automotive
10	88	16,8m	Semiconductors
11	53	11m	Technology
12	77	17,1m	Automotive
13	23	4,4m	Food and beverage
14	61	10,3m	Semiconductors
15	88	23,7m	Automotive
16	48	9m	Home appliances
17	57	8,6m	Food and beverage
18	67	13,6m	Aviation
19	132	22m	Healthcare
20	16	2m	Food and beverage
21	220	42,9m	Automotive
22	92	18,5m	Aerospace
23	21	5m	Food and beverage
24	20	5,4m	Food and beverage
25	12	2,8m	Food and beverage
26	41	4,3m	Technology
27	43	5,2m	Technology
28	161	44,1m	Automotive

29	36	6,1m	Consumer goods
30	99	26,9m	Power equipment
31	27	6m	Food and beverage

3.3 – Data Analysis

Our data analysis process involved three phases. Firstly, we identified the types of inputs that managers, owners and controllers have shared. By reviewing the literature during the early stages of our data analysis we were able to utilize previous bodies of work to assess interviewee inputs and confirm or disconfirm it. After the previously described process, we directed our efforts towards the identification of novel insights emerging from the gathered data to suggest new potential effects of the servitization strategy on the MC and PM systems in an attempt to extend the existing literature.

The analysis of the 43 interviews led to the codification and categorization of the emerging aspects related to the two research questions. One of the authors analyzed the interview transcripts to code the obtained data by dividing them into various relevant concepts and grouping them into categories in an attempt to represent the various contributions provided by the interviewee.

Whereas, other two authors maintained an outsider perspective so as to distance themselves from informants' views, thus retaining the necessary perspective for informed theorizing (Gioia *et al.*, 2013). The final author then acted as a theoretical interpreter to provide focus and closure to the emerging constructs and their link to the extant theory. Nonetheless, continuous debriefing sessions were held amongst the various authors throughout each phase to ensure clarity and maintain focus. Table 2 presents the various categories and examples of inputs that the authors were able to identify during the data analysis process.

Table 2: The definitions are inspired by Simons (1991; 1995; 2000) work.

Categories	Definition
Beliefs Systems	Activities and systems aimed to communicate and strengthen core values and prioritize to different stakeholders in order to achieve financial success
Boundary Systems	Activities and systems aimed at promoting or limiting risks associated with the pursuit of performance levels. Often adopted to set minimum levels of performance and to define constraints.
Diagnostic Systems	Activities and systems aimed at evaluating and monitoring the progress towards the servitization goal. Moreover, those activities are also utilized to identify corrective paths.

Interactive Systems	Activities and Systems utilized to foster discussion and dialogue about performance, challenge assumptions and underpin strategy. These systems allow new strategies to emerge, such as in the case of the servitization strategy.
MC & PM Paradoxes	Barriers and challenges encountered by companies' MC and PM systems when the servitization strategy was implemented.

Thereafter, the authors combined the identified categories into the general categories identified through the use of the LOC framework. Figure 1 depicts our framework and the various outcomes which have been based on the LOC framework systems dimensions.

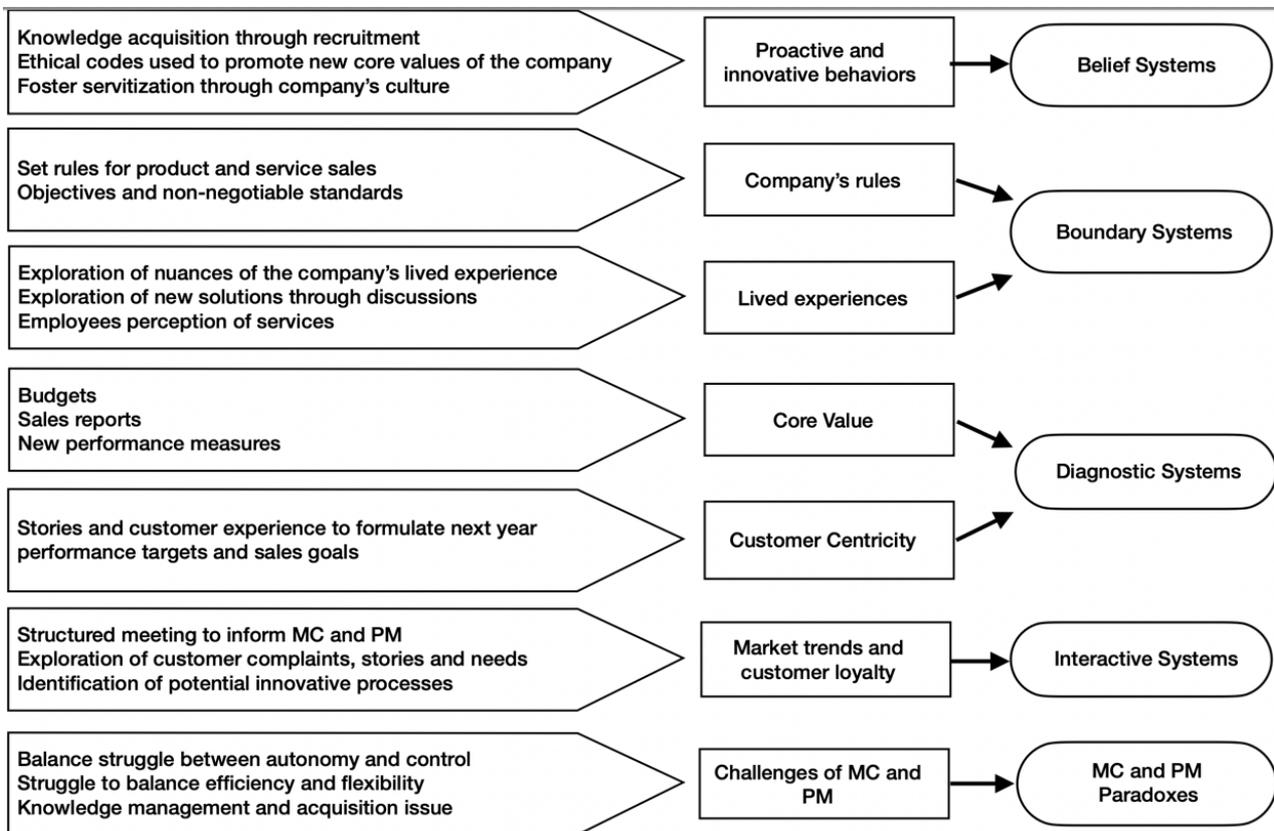


Fig. 1 – Analysis steps through Gioia’s *et al.*, (2013) methodology to maintain rigor (Authors’ elaboration)

4 – Findings

4.1 – Beliefs Systems

Belief systems were modified and tailored to promote proactive and innovative behavior to ensure that the services provided by the business would be competitive and attractive to the customers.

A stronger focus was put onto proactive thinking and innovative approach for our new services. The controller and our firms would still discuss what was proposed. However, propositions and proactiveness were promoted. Any idea had to be considered because we could not rely on pre-existing knowledge concerning the servitization strategy. (Participant 33).

Even the proactive pursuit of new human capital was taken into consideration by some of the manufacturing SMEs.

Our controller suggested that we would pursue people whose skills and experiences would help us foster our servitization strategy, as well as gain new knowledge concerning services and their MC and PM systems. (Participant 39).

Finally, belief systems were utilized to give a fresh new meaning to the companies' core values in an attempt to promote and foster the newly implemented services.

To strengthen our inclusion of services, the company started to emphasize performance objectives to our sales department. By doing so, the organizations had to forcefully include services within their strategic approach to sales because they would get assessed on the performance objectives set. (Participant 6).

Performance objectives were crucial at the start of our journey. It made it easier for people to conform and understand what aspects and performances they had to pursue. (Participant 20).

Performance objectives were useful to set new core values across a wide range of people. (Participant 41).

Despite being inexperienced, the controller and the owner did set some objectives concerning the performances of our services. By doing so, it helped provide a clear path to follow to foster service provision. However, those objectives were not set in stone. They would change over time as the company acquired more knowledge, stories, and experiences concerning service provision and the servitization strategy. (Participant 43).

4.2 – Boundary Systems

Boundary systems were utilized to translate into specific rules for the commercial area and the employees whose task was to sell the company's new services. "Staffing regulations, standard operational procedures and ethical codes were utilized to enforce the introduction of services and promote their integration within the mental catalog of our salespeople" Participant 43. It is crucial for companies to set objectives and regulations for their sales department to introduce and push the integration of their newly implemented services. Moreover, by doing so, they avoid conflicts and different approaches that can lead to an asymmetric approach to the promotion of services.

A stronger emphasis on regulations allowed us to let our people know that services had to be sold and promoted. Having regulations helped us solve some divergence of opinions and conflicts related with the introduction of the servitization strategy. (Participant 2).

The aforementioned approaches were also utilized to challenge the objectives because through the experiences developed companies were able to give meaning to new operational procedures and ethical codes of conduct.

Operational procedures were often changed and further developed over time due to the acquisition of new experiences and knowledge. (Participant 27).

Experiences and knowledge were utilized to reinforce or to critically assess our regulations. (Participant 3).

4.3 – Diagnostic Systems

Diagnostic systems now are utilized by servitized SMEs as tools to underline the need to foster the core value of customer centricity. Budgets and sales reports are now being informed through diagnostic systems. Companies utilize service targets to identify new performance measures which are relevant to the new cost and profit centers.

The company would set a goal and we would try to achieve it. However, the rules and goals set became important for the discovery of new PM indicators. We could look back at it and try to identify which factors held us back. (Participant 22).

Sales reports were crucial to our MC systems because we used it to evaluate services. Yes, they were useful before but now we had to work with every single bit of information that we could get. (Participant 8).

Finally, data collected underlines the importance of employees' stories.

Our employees' continuous commitment towards the integration of services did allow our controller to gather information and knowledge on how to further develop this new offering. (Participant 30).

Others' opinions, experiences and stories are essential to our servitization strategy since they inform our performance measurement systems and indicators. (Participant 5).

4.4 – Interactive Systems

The use of traditional MC and PM tools shifted in order to fulfill companies' new needs. For example, the balanced scorecard became central to the communication and discussion concerning the impact that service offering had on the company.

We would now use our balanced scorecard as a guide to our meeting. It allows us to evaluate multiple aspects associated with our services. (Participant 36).

The balanced scorecard became extremely useful to us in the evaluation and discussion of our services. (Participant 19).

Moreover, MC and PM experience a strong shift towards the exploration of qualitative information and feedback received from clients. Additionally, a stronger focus was put towards the exploration of competitors pricing strategy and service offerings in an attempt to gather knowledge useful to the fostering of servitization.

It is necessary for us and our salespeople to listen to clients, understand their needs and willingness to spend money on services. (Participant 43).

Our customers are central to our business now more than ever. MC has to find ways to improve our services and foster our clients' relationship with us. Our pricing strategy and customization practices are important to use because we believe they have a positive or negative effect on the customer life cycle. (Participant 19).

I (owner) I am willing to invest my human resources to build relationships with clients so that we understand their needs and stories. Their opinion is central to our service provision segment. (Participant 32).

Customers are important to our products too, but services really pushed us to actively engage and communicate with them. Our pricing often comes from a back-and-forth discussion with our clients. MC was not approached in that way before. (Participant 32).

4.5 – Paradoxes of MC and PM

The first issue presented by multiple actors that had been interviewed was the conflicts that arose between formal control to maintain alignment of the organization and autonomy to allow personnel to integrate the newly added services.

It was challenging to find the right balance between the traditional ways of doing control and performance management and the introduction of services. For some time, we had to experiment in an attempt to find the balance that would work for our organizational structure. (Participant 26).

We did not know whether our old control practices would interfere with the implementation of our new business strategy...it became clear quite quickly that we had to be more agile in managing our control systems after the integration of our services. (Participant 13).

Our controllers struggled to let go of some of our performance metrics. They were stuck on our traditional ways of doing control, thus we had to ensure that proper communication and attention was given to ensure that everyone within our firm would understand the new path ahead of us. (Participant 5).

More freedom was necessary for the employees to better understand and brainstorm how to improve our services, service offering and customization process. However, we could not just let them do what they wanted. We had to have some control over it, nonetheless, balancing the two things was not an easy task, especially when you have so many different personalities and ideas. (Participant 43).

Our empirical findings also suggest that companies struggled to move towards a business approach that would not just focus on efficiency but rather flexibility to provide customers with services that could be tailored towards their needs and wants.

It is tough to shift your culture from process efficiency to a flexible approach. (Participant 34).

Moreover, additional empirical evidence highlights that

Management control and performance management was centered around achieving efficiency. However, we soon understood that we could not simply rely on our old ways of doing control. Thus, we had to find a balance between what we were and what we are now. It is extremely important to maintain efficiency and sell our physical products. However, we had to transform our control systems and our feedback systems to promote a dialogue which led to gaining new knowledge on services and customer needs, as well as learning about what changes we had to make to the control systems. (Participant 17).

Another element highlighted by the empirical findings gathered from the different interviewees is the need to gain new knowledge and utility in combination with their old

knowledge in an attempt to foster both products and services, through the evolution of MC and PM systems.

We had to learn so much about managing and controlling services. It was not as easy as we thought. Our services are connected to our products. Nonetheless, it felt like we had to learn everything all over again. (Participant 4).

The balance between our traditional practices such as budgets and key performance indicators (KPIs) is still extremely useful because we do want to sell our products. However, we had to identify new performance measurement systems, new cost centers and drivers and new profit centers to evaluate our service performances and understand what we had to do to improve our offering and its performance. (Participant 21).

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The KPIs of our products were not useful. Services are a different beast. Our controller tried to approach the introduction of services as if we had introduced a product, but it did not work. (Participant 39).

Another challenge highlighted by the data collected was the evolution of knowledge gathering. Previous knowledge obtained from multiple different stakeholders concerning products performance and quality were regarded as useful. Nonetheless, those feedbacks were often scrutinized or disregarded since their focus was the pursuit of higher sales volumes and improved profit margins. However, the introduction of servitization shifted most of the participants' approach since services are customizable. Thus, clients and other stakeholders' comments and knowledge are taken into account in an attempt to elongate their customer life cycle.

We must listen to customers now. It is all about longevity of the service provision. Since our services are complementary to our products, we do get to enjoy economies of scale. Consequently, we want them to be happy with our services and remain with us for as long as possible. (Participant 1).

Servitization has changed the way in which we gain knowledge. MC and PM systems are influenced by what we learn from a multitude of stakeholders. There is so much to learn when it comes down to services. I am a sponge and I want to soak it all up. (Participant 37).

Finally, some actors report that changes within the MC and PM systems created tensions amongst some employees. Tensions arose for pricing strategies and for strategic purposes. Some employees wanted to focus on product sales while others wanted to foster the provision of services. This created tensions between the short- and long-term strategic goals.

I (Firms' owner) and (controller) argued at times. He (controller) believes that services are a waste of resources because we invest a lot of our time to satisfy our customers. Whereas I (owner) think this is something that we have to do because of what other firms are offering. (Participant 2).

It was challenging setting a sale price for our services because we had so many different approaches to it. Some wanted to define the cost and add a margin of profit similar to the margin that we had

per unit of product sold. Others believed that we had to adapt our prices to what other companies were doing. (Participant 24).

At the beginning, the company was not aligned. Part of the staff continued to focus its efforts towards product sales while others moved towards services. However, we had to focus on both to ensure our survival and growth. (Participant 43).

5 – Discussion and Conclusion

This study provides an in-depth discussion of how the servitization strategy affects the MC and PM of manufacturing SMEs operating within Piedmont, Italy. Our research underlines how important it is for companies to change their MC and PM systems in order to successfully achieve servitization (Pagliarussi & Leme, 2020; Rapaccini *et al.*, 2019; Xiong *et al.*, 2019; Zhang *et al.*, 2019). Within all interviewees it is clear that all four LOC levels were interdependent to maximize companies' short- and long-term objectives, creativity and control (Cinquini *et al.*, 2020a; Cinquini *et al.*, 2020b; Laine *et al.*, 2012; Mella, 2023; Marelli & Tenucci, 2020; Pagliarussi & Leme, 2020; Percin, 2006). Firstly, KPIs and budgets were often utilized to better understand which performances and drivers could be implemented to support the servitization strategy (Gebauer *et al.*, 2005; Leotta, Rizza & Ruggeri, 2020). To overcome the lack of servitization experience of managers and controllers, companies would emphasize the use of KPIs and budgetary tools as a familiar system used to evaluate and explore the performances associated with service systems (Bürkland, Zachariassen, & Oliveira, 2019; Conquini *et al.*, 2020a; Pešalj *et al.*, 2018). Whereas, customer feedback, customer monitoring and focus would serve as tools aimed at changing and developing future strategies (Bürkland *et al.*, 2019; Lindholm *et al.*, 2017). This became particularly relevant due to the shift from product centric to product and service strategy (Cinquini *et al.*, 2020a; Cinquini *et al.*, 2020b). With the introduction of services, customers became central to the future development of the company so as to exploit the customer life cycle (Pistoni & Songini, 2017). Thus, servitization has increased companies' efforts towards internal and external factors, core values and service quality targets (Pešalj *et al.*, 2018). A clear focus of MC was directed towards the pursuit of innovation and culture which promotes the pursuit of new innovative services. Due to the initial inexperience of manufacturing SMEs with the provision of services, resources were mobilized towards strengthening the activities concerning controlling of potential deviations from targets (Cinquini *et al.*, 2020b; Mella 2018; Pešalj *et al.*, 2018). Targets became an instrument of experimentation rather than simple performance indicators. The servitization strategy ensured that companies would engage in a double loop of learning to allow the continuous growth of companies' processes and services and the introduction of new offerings (Pešalj *et al.*, 2018).

Belief systems were shifted towards the promotion of proactive and innovative behaviors, as well as, when made possible by the resources of a company, utilized to recruit people who had prior experience of the norms and procedures associated with servitization. Additionally, belief systems were utilized to give a fresh meaning to the new core values of the company in an attempt to foster servitization (Sheng, Liu, & Xu, 2017; Zhang, Chai & Liu, 2019). To do so, a stronger emphasis on the achievement of performance objectives associated with the provision of service was put into place.

Boundary systems were utilized to translate into specific rules for the commercial area and the employees whose task was to sell the company's new services. Moreover, meetings were utilized to challenge the objectives and non-negotiable standards associated with services and

the servitization strategy. Thus, experiences developed over time were utilized to give meaning to new rules and foundation to discussions on services and servitization. Therefore, a stronger focus was put onto the nuances of companies' lived experiences.

Diagnostic systems received a higher degree of attention when it came down to the core value of customer centricity. Diagnostic systems informed budgets and sales reports of the services implemented after the shift towards the servitization strategy. Companies' rules are converted into service targets which are continuously monitored and evaluated in an attempt to discover new performance measures which are relevant to the new cost and profit centers. Moreover, those diagnostic systems were utilized to ensure synergy between the physical products and the service offerings (Sakao *et al.*, 2009; Sakao & Lindahl, 2012). Finally, lived experiences and stories are utilized within discussions amongst employees in an attempt to identify and formulate next year's performance targets of service sales (Bürkland *et al.*, 2019; Rapaccini *et al.*, 2019).

Finally, *interactive systems* were utilized to put a strong emphasis on market trends and customer loyalty (Ashkezari, Albadavi & Ashkezari, 2019). The balanced scorecard is utilized to structure meetings and enable discussions concerning learning and reflecting on the impact of servitization and service offerings (Poureisa, Ahmadgourabi & Efteghar, 2013). Intensive efforts were now being directed towards the exploration of customers complaints as a tool to better identify potential innovation and product improvement trajectories. In fact, sales representatives were now being encouraged to discuss with all customers how the company could improve and support services, as well as new needs in an attempt to promote service innovation (Tenucci and Supino, 2020). Additionally, the stronger focus on the exploration of customers stories was done in an attempt to utilize those experiences as learning opportunities. Finally, after the adoption of servitization, companies emphasized strategic planning and discussions within management meetings.

When it comes down to what challenges MC and PM have faced when implementing servitization, the following empirical evidence was gathered. Firstly, SMEs struggled to balance autonomy and control (Smith and Beretta, 2021). Employees would enjoy autonomy associated with the integration of services, however managers had to exert control to maintain alignment within the organization and achieve the performance goals associated with services (Chaudhary *et al.*, 2022; Mella, 2016). Empirical evidence has recognised this necessity for firms to balance control and autonomy through the paradox of autonomy and control (Brax, 2005; Brax, *et al.*, 2021).

Secondly, SMEs chasing servitization struggled to find the right balance between flexibility and efficiency. Companies which are too efficient might struggle to leverage new opportunities associated with the provision of services (Chaudhary *et al.*, 2022). Manufacturing firms adopting the servitization strategy need to be flexible and improve their responsiveness; however, it becomes more difficult for them to achieve goals (Chaudhary *et al.*, 2022).

Thirdly, manufacturing SMEs struggled to balance existing MC and PM knowledge and the necessity to gather new knowledge associated with the provision of services. During the implementation of servitization, firms moved from a well-established MC and PM system to a more novel approach due to their lack of knowledge and experience with services. Nonetheless, empirical research underlines the importance for firms to leverage both, existing knowledge and newly acquired knowledge, to support the development of service offerings (Dmitrijeva *et al.*, 2022).

Fourthly, manufacturing SMEs were reliant on a formal information sharing process set to improve efficiency. However, it was necessary to ensure the evolution and gathering of new knowledge from customers and other stakeholders, that new informal information channels were built in order to distribute newly acquired knowledge more freely (Gebauer *et al.*, 2005).

Finally, the shift towards the servitization strategy created tensions between efforts directed towards the achievement of short- and long-term outcomes and goals. The MC and PM systems had to set into place mechanisms that would ensure the company competitiveness within the short term while also enabling the innovation and improvement of service offerings to foster long term goals associated with the servitization mindset (Dmitrijeva *et al.*, 2022).

5.1 – Theoretical contributions

Our study makes several contributions to the servitization literature. First, it contributes to the servitization, MC and PM literature strand (Anderson & Dekker, 2005; Laine *et al.*, 2012a; Leotta *et al.*, 2020; Neely, 2008; Trusson, Hislop & Doherty, 2018); we attempt to present empirical evidence on how the servitization process affects manufacturing SMEs' MC and PM systems. To do so, we utilize the LOC framework to use the four identified leverages to structure our findings (Simons, 1991; 1995; 2000). Moreover, we provide additional evidence on the paradoxes encountered by manufacturing SMEs when pursuing the servitization strategy (Chaudhary *et al.*, 2022; Dmitrijeva *et al.*, 2022). Thus, we highlight the conflicts that arise within the MC and PM systems specifically in relation to the shift to the servitization strategy.

Second, we expand the qualitative empirical evidence gathered through the utilization of a multiple case study approach. In this way, our study departs from prior literature exploring MC and PM through a single case study approach (Davies *et al.*, 2022). Thus, we utilize Gioia's (2013) approach to maintain rigor within our research data analysis. By utilizing a multiple case study approach, we are able to gather data from multiple manufacturing companies thus supporting our obtained results through multiple experiences.

Finally, this study lays the foundation for future examination of specific dynamics and interplays between the various levers of the LOC framework. By explicitly exhibiting the MC and PM changes associated with manufacturing SMEs shift towards servitization, the study strengthens the literature and our current understanding of which phenomena take place in that MC and PM shift.

5.2 – Managerial Contributions

This study's findings enable managers, controllers and owners to better understand the various changes that MC and PM might undergo in order to support the servitization strategy. Despite the reported benefits of servitization, indicated within section 2 of the paper, firms must balance the "old ways" of MC and PM with the acquisition and implementation of newly obtained knowledge relating to service offerings. Moreover, we provide additional empirical evidence on the paradoxes encountered by MC and PM systems when seeking to achieve servitization (Chaudhary *et al.*, 2022).

Our empirical findings also help practitioners better understand the impact that servitization has on the processes and activities of MC and PM systems. Thus, companies can assess whether they have the capabilities and organizational structure necessary to pursue the servitization path.

Finally, our study provides a clear and transparent method to identify the four different levers of MC and PM systems allowing further research to be developed.

5.3 – *Limitations and future research directions*

This study's empirical evidence can be considered in light of the following limitations. First, the changes identified have been categorized through the use of the LOC framework which proposes only four leverages. Moreover, the paradoxes associated with MC and PM are not exhaustive; rather, they provide a broad picture of what paradoxes prevail during the servitization shift. Thus, future scholars might want to apply grounded theory to deeply explore paradoxes associated with MC and PM systems servitization. Additionally, future studies might want to investigate changes associated with MC and PM from a different perspective in an attempt to further our current understanding of the role played by MC and PM to the implementation of the servitization strategy.

Second, studies might want to address the stage at which companies or SMEs are within their servitization strategy to identify and categorize different stages. BY doing so, we hope that future research can provide empirical evidence gathered from similar companies at similar evolutionary stages of their servitization journey.

Finally, future studies could investigate how the servitization strategy has changed the MC and PM systems of large corporations since those entities often have more structured and definable MC and PM systems.

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