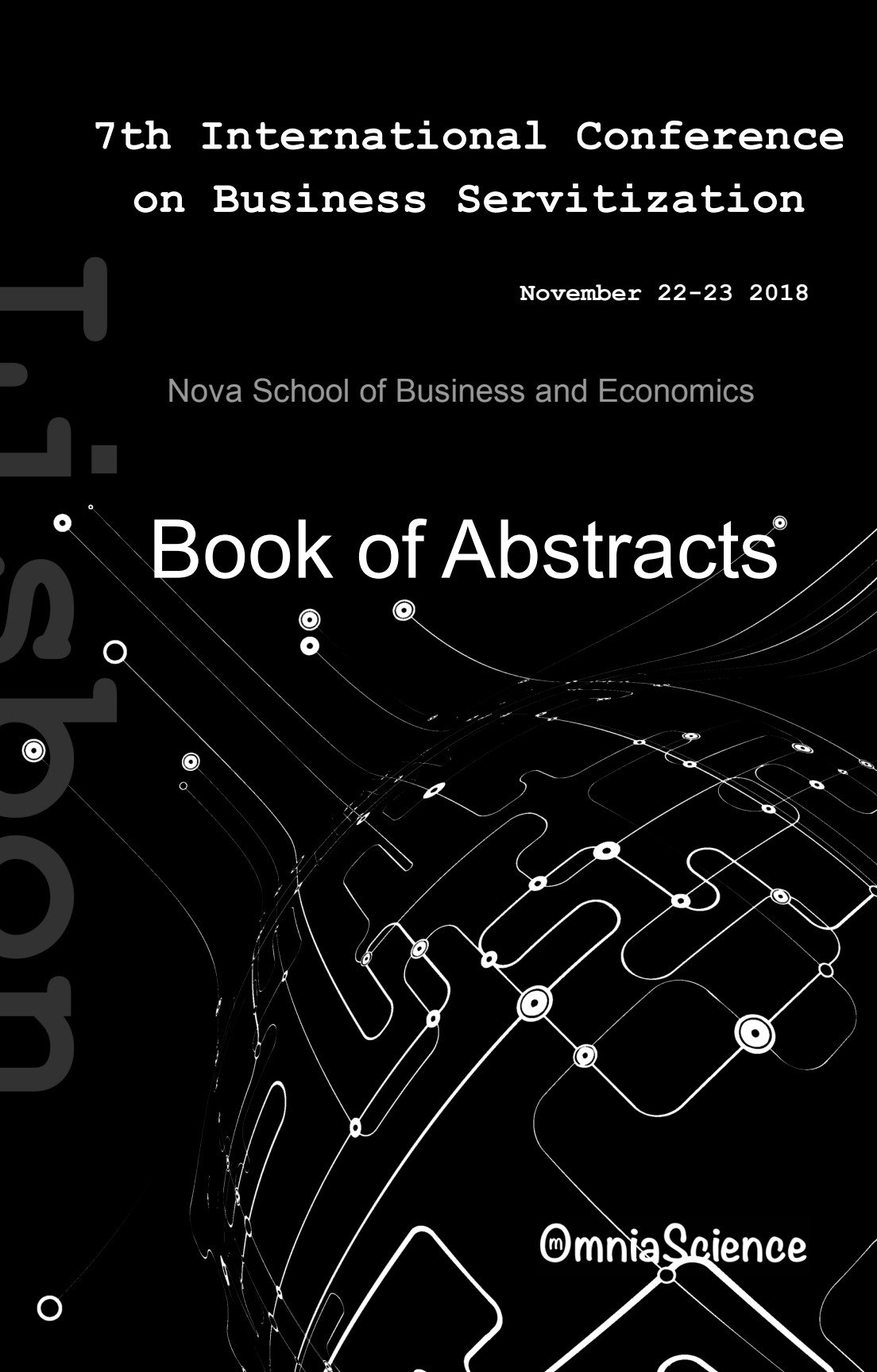
7th International Conference on Business Servitization

November 22-23 2018

Nova School of Business and Economics

Lisbon

Book of Abstracts



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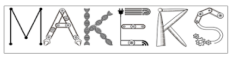

Foreword

Welcome to 7th International Conference on Business Servitization

This book abstracts summarizes the proceedings of the **7th International Conference on Business Servitization (ICBS 2018)**, held at Nova School of Business and Economics, Lisbon, Portugal. On this edition, the conference places a special emphasis on the focal theme: Make, buy or partner: Paradoxes in product service innovation.

A growing number of manufacturers have been adding services into their product offers as a way of enhancing value through innovative integrated product-service systems. However, the ability to servitize and introduce value-adding services into their operations is highly complex and technologically demanding. Therefore, though some manufacturers are able to servitize through internal development, an increasing number of manufacturing firms are having to outsource the servitization to Knowledge Intensive Business Service (KIBS) firms. The reason for this seems to be due to the fact that the integration of services in-house carries considerable risks and requires contradictory capabilities, such as maintaining traditional product-identity while developing a new integrated solutions identity. The need for external development is

further amplified by the complexity involved in the servitization process and by frequent technological disruptions faced by manufacturers operating in high R&D-intensity industries. As a result, manufacturing firms are increasingly having to resort to outsourcing and strategic alliances with KIBS firms. As put by Fumio Sato, Toshiba's former CEO:

> *"It is no longer an era in which a single company can dominate any technology or business by itself. The technology has become so advanced, and the markets so complex, that you simply can't expect to be the best at the whole process any longer"*

It is commonly acknowledged that strategic alliances are popular means for accelerating growth in terms of market development, cost sharing and reduction, knowledge and brand acquisition, quality enhancement, and even product innovation. However, despite some recent efforts, very little is understood about the role of strategic alliances and other types of collaborative methods of development on servitization. Scant evidence from recent studies show that knowledge intensive business service (KIBS) firms are both sources and carriers of knowledge, and are capable of injecting advanced services —i.e., servitization— across new and incumbent manufacturing businesses. Some papers presented in last year's conference shed some light on how collaboration between product and service firms located in the same space enhanced territorial servitization and was conducive to the renaissance of local manufacturing sectors, including traditional manufacturing sectors.

This edition of the International Conference on Business Servitization (ICBS) aims at studying what drivers, processes and actors play a crucial role in enabling and promoting collaborative technological upgrading and product-service innovation. Since servitization and the benefits of knowledge-intensive service provision do not necessarily have to be fully integrated within the

manufacturer's internal value chain, this year's conference aims to enhance our understanding on how the various forms of collaboration like strategic outsourcing, strategic alliances, joint ventures and other types of partnerships not only facilitate the upgrading of existing manufacturing competences, but also offer an opportunity to develop and anchor new technological capabilities across partnering firms, ultimately facilitating growth and long-term competitiveness.

In this 7th edition of the ICBS we have brought together 50 researchers from 28 Universities and Research Institutes located in 14 different countries across Europe and America. In summary, the conference is organized in eleven different parallel sessions that seek to fuel the academic debate around the different aspects of 'paradoxes' in product service innovation. Additionally, this conference welcomes relevant keynote speakers. This year the session has been framed in a point-counterpoint structure. The session starts with Prof. Miguel Pina e Cunha (Nova School of Business and Economics) who delivered and "Introduction to the Paradoxes lenses" and continued with Prof. Marko Kohtamäki, (University of Vaasa) who provided an application of paradoxes lenses on servitization. In the same line the conference offered a Meet the Editors session to support pathways for publication to the community.

Emanuel Gomes
Miguel Pina e Cunha
Ferran Vendrell-Herrero

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PhD Marin Jovanovic, Copenhagen Business School

Index

Parallel session 1

Local-Global Knowledge Relations in Territorial Servitization Trajectories 19

KIBS co-location and product firms' productivity: Testing the value of knowledge dissemination in African cities 23

Tools to Analyze the Consequences of Missing Data on Engineering Servitization Processes 27

Parallel session 2

Servitization of Industrial Enterprises through Acquisitions: A Success Story? 31

European Strategies in Publishing: One Size Fits Most 33

Servitization Strategies and Product Service Sourcing Decisions 34

Parallel session 3

The Differentiating Role of Knowledge-Intensive Business Service Firms on the Economic Contribution of Manufacturing Businesses 41

RIS and Territorial Servitization:
A Quantitative Approach from the KIBS in Spain 47

Territorial Servitization and the Manufacturing Renaissance in Knowledge-based Economies 50

Parallel session 4

Reshoring and Near-Shoring of Manufacturing Firms: Why, How and Where. A perspective from the servitization point of view 63

Advancing Sales for Servitization: Managing Risks when Defining Performance-Based Contracts of Multinational Business-to-Business Manufacturing Companies 68

What Drives Product-Service Integration?
An Empirical Study of Entrepreneurial Explicit Motives and Value Strategies 77

Parallel session 5

Customer Integration and Servitization Level as Enablers for Innovation Capability 89

Gamification to Improve the Design of Services in Companies Servitized under HCD Methodology 95

Using "Avatar Journey Mapping" to Reveal Smart-Service Opportunities along the Product Life-Cycle for Manufacturing Firms 101

Parallel session 6

Examining Structural Design Factors along Companies Servitization Journey:
A Qualitative Approach 109

Understanding Procurement Processes for Digitally Enabled Advanced Services 118

Exploring the Relationship between Access to Qualified Talent and Servitization: An Empirical Analysis on Large Manufacturing Multinational Enterprises (MMNEs) 125

Parallel session 7

Exploring Servitization through the Paradox Lens 133

Parallel session 8

Assessing the commercial chances of machine tool builders to supply advanced services among their industrial clients: A Transaction Cost Economics perspective 141

Business Model Innovation in Travel Services: The Case of Serbia 147

Servitization in the Automotive Industry: From Car Manufacturers to Mobility Service Providers 152

Servitization of Office Lighting in the Context of IoT 162

Parallel session 9

Contextualizing PSI-Performance Relationship 173

Servitization practices in Brazilian SMEs: An Empirical Analysis 177

Ambidextrous Product-Service Innovation of MMNEs: Performance Implications 182

How Servitized Products Sell in International markets?: The Impact of Servitization Level and Different Entry Modes 187

Parallel session 10

Intellectual and Conceptual Structures of Servitization: Evidence from a Bibliometric Analysis 197

Servitization Concept, Origin and Evolution: A co-Word Analysis 201

Unde Venis et Quo Vadis Servitization? Using Dynamic Topic Modelling to Understand the Past and Future Trends of the Field's Chronicle 207

Parallel session 11

The Experiential Servitized Chain 215

Is IoT an Enabler for Smart Servitization? 219

Servitization in the Smart City context 224

Abstracts of Papers

Presented at

7th International Business Servitization conference

Parallel session 1

Territorial servitization I

Chair: Yancy Vaillant

Local-Global Knowledge Relations in Territorial Servitization Trajectories

Marco Bellandi

University of Florence

Silvia Lombardi

Istituto Nazionale di Statistica (ISTAT)

Erica Santini

University of Trento

Claudia Vecciolini

University of Birmingham

Abstract

Service providers are playing an active role in the contemporary industrial transformation based on the diffusion of a new wave of digital technologies. In this transformation, phenomena of servitization are spreading across manufacturing territories and value chains. Specifically, in manufacturing areas, the agglomeration of knowledge intensive business services (KIBSs) is increasing the competitive advantage of embedded manufacturers and triggering manufacturers' attraction to the territory. These new embedded manufacturers are at the same time magnets for new KIBSs. In manufacturing territories characterised by small and medium sized enterprises (SMEs), this loop implies business networks and market relations, which are changing their nature and increasing the

complexity of the same loop. By using a new data source on accounting indicators at the establishment- level for the year 2015, this paper aims at exploring how the renewed networking and market processes related to territorial servitization (TS) trajectories are shaping the local organization of production. Moreover, these processes may involve local or international KIBS providers. Here, local outsourcing of KIBSs and offshoring of KIBSs impact variously on the local manufacturing systems' configuration. The alternative scenarios leave uncertain the distribution of the value added generated by manufacturing SMEs.

Keywords: KIBS co-location, Africa, Territorial Servitization

Research setting and preliminary results

In the developed world the exponential growth of knowledge-intensive services (KIBS) firms is considered one key factor for the consolidation of knowledge-based economies. KIBS are both sources and carriers of knowledge that impact territorial and urban economic functioning. As drivers of knowledge, these firms enhance the competitiveness of local manufacturing businesses by building their service competences and as such implementing value-adding services into their operations (Vendrell-Herrero & Wilson, 2017). This process of *servitization* satisfies an increasingly complex demand in developed economies (Gomes, Bustinza, Tarba, Khan & Ahammad, 2018). In addition to the benefits of manufacturer's internal value chain, there are broader regional benefits, referred to as *Territorial Servitization* (Lafuente et al., 2017).

Whilst the transformation of manufacturing business models in developed countries is widely researched, there is much less attention to less developed countries. To this end, this research aims to map co-location to KIBS co-location in African cities and uncover whether this process of external service knowledge acquisition increases manufacturing firms' productivity. By doing this we respond to recent calls for contextualizing management

research by testing the relevance of established and emerging theories in developing economies (Gomes, Vendrell-Herrero, Mellahi, Angwin & Sousa, 2018).

The relationship between KIBS co-location and productivity is explored in the context of Africa, where firms selling abroad need to satisfy different demands from firms serving only domestic markets and therefore can benefit more from having access to service knowledge. As such, another purpose of the research is to uncover the moderating role of exporting.

The authors draw on the World Bank Enterprise survey to undertake a cross-section analysis that consists of 4,683 African manufacturing firms. The surveys cover the period 2009-2017 and have been undertaken in 35 different countries. Whilst the analysis is performed at firm-level the main measure of KIBS co-location is a variable measured at city-level, providing a framework to assess knowledge sharing and dissemination in urban areas, something notoriously novel for the African context. As a measure of firm productivity, we use both labour and total factor productivity. We run ordinary least squares and introduce a number of fixed effects to control for unobserved heterogeneity.

This paper shows that African exporting manufacturers are significantly different than their non-exporting counterparts in terms of co-location to KIBS. Our preliminary results confirm that access to service knowledge generates productivity gains for exporters, but it has the opposite effect for non-exporters. This result opens an interesting avenue for further research.

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KIBS co-location and product firms' productivity: Testing the value of knowledge dissemination in African cities

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University of Birmingham

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University of Birmingham

Abstract

The study is underpinned on the territorial servitization literature. It extends the literature by constructing a novel measure of KIBS co-location at city level. Another contribution is that it explores the link between KIBS co-location and firm productivity in Africa. To the best of our knowledge this is the first research exploring the effect of service knowledge in African manufacturer's productivity. The study covers the period 2009-2017 and draws on the World Bank Enterprise Surveys. More precisely it uses information for 4,683 African Manufacturers located in 35 countries. The preliminary results conclude that KIBS co-location is important only for exporting firms.

Keywords: KIBS co-location, Africa, Territorial Servitization

Research setting and preliminary results

In the developed world the exponential growth of knowledge-intensive services (KIBS) firms is considered one key factor for the consolidation of knowledge-based economies. KIBS are both sources and carriers of knowledge that impact territorial and urban economic functioning. As drivers of knowledge, these firms enhance the competitiveness of local manufacturing businesses by building their service competences and as such implementing value-adding services into their operations (Vendrell-Herrero & Wilson, 2017). This process of *servitization* satisfies an increasingly complex demand in developed economies (Gomes, Bustinza, Tarba, Khan & Ahammad, 2018). In addition to the benefits of manufacturer's internal value chain, there are broader regional benefits, referred to as *Territorial Servitization* (Lafuente, Vaillant & Vendrell-Herrero, 2017).

Whilst the transformation of manufacturing business models in developed countries is widely researched, there is much less attention to less developed countries. To this end, this research aims to map co-location to KIBS co-location in African cities and uncover whether this process of external service knowledge acquisition increases manufacturing firms' productivity. By doing this we respond to recent calls for contextualizing management research by testing the relevance of established and emerging theories in developing economies (Gomes, Vendrell-Herrero, Mellahi, Angwin & Sousa, 2018).

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This paper shows that African exporting manufacturers are significantly different than their non-exporting counterparts in terms of co-location to KIBS. Our preliminary results confirm that access to service knowledge generates productivity gains for exporters, but it has the opposite effect for non-exporters. This result opens an interesting avenue for further research.

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Tools to Analyze the Consequences of Missing Data on Engineering Servitization Processes

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José Manuel Pavia Miralles

University of Valencia

Encarnación Álvarez Verdejo

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Abstract

Missing data is a common problem in engineering servitization processes, and in general, in many areas such as social sciences. There exist many statistical procedures to manage the problem the missing data, but it is important to analyze the response mechanism before the application of such methods. Note that the response mechanism can be classified as MCAR (missing completely at random), MAR (missing at random), and NMAR (not missing at random). Imputation is one of the most common solutions in the presence of missing data, which consists on replacing the missing data by plausible values with desirable properties. Serious biases and different conclusions can be obtained if the imputation method is not suitable to the problem under study. In this paper, we introduce some relevant issues related to missing data, and various imputation methods and alternative solutions are also presented. In addition, an interactive App is implemented to illustrate empirically the

importance of the response mechanism and its analysis to deal the problem of missing data.

Keywords: imputation method, bias, response mechanism, mean square error.

Parallel session 2

Strategy I: Scale and Structure

Chair: Marin Jovanovic

Servitization of Industrial Enterprises through Acquisitions: A Success Story?

Laura Oberle

AVANTALION Consulting Germany GmbH and University of Mannheim

Abstract

The thesis aims at determining the factors impacting the successful servitization through acquisitions. Based on five expert interviews on past real-life cases, the approach of using external growth measures, such as acquisitions, to move towards service transformation shall be evaluated concerning its appropriateness, qualification and chances of success in the industrial context.

Keywords: M&A, Servitization, Portfolio expansion, PMI

Research setting and research question

Servitization is a very prominent topic in theory and practice. Despite the advantages of servitization, service transformation also bears challenges due to the complexity of the service provision, with which unprepared manufacturers may struggle (Lee et al, 2016). One challenge consists of the development of service-oriented capabilities and resources while keeping product-related core competencies and the strategic alignment in place (Eggert et al, 2011). Besides organic growth and internal development of the required new capabilities and resources, external growth through acquisitions could be a suitable alternative.

So far, research has taken little focus on the use of acquisition in a firm's servitization process. Therefore, some questions remain: is

external growth by acquisition a suitable and promising measure to realize product portfolio expansions through services in the industrial context? Are there certain success factors which lead to above-average outcomes? What are the problem areas when integrating a service provider in an industry-oriented enterprise?

Studies on the integration of a service provider in the product-driven organizational context of a manufacturing company are rare and given the characteristics of services, which diver from physical products in many ways, integrating services can be a challenge for industrial companies. Additionally, the acquisition case puts pressure on the fast but successful integration of already existing services. Each of the two, servitization and PMI, is by itself a challenge; but a combination and simultaneous pursuance of both form a challenge of greater extent.

Striving answers to the paper's rather explorative questions, this qualitative study is based on five expert interviews on the integration success of services and the underlying success factors. The presentation of the preliminary results shall take place on the ICBS in order to discuss the general research approach and the findings.

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European Strategies in Publishing: One Size Fits Most

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Abstract

Servitization is a strategic transition of firms towards the creation of additional value through services. Publishing industry has been adopting servitization over the last decade. Contrary to previous studies, we adopt a data-driven approach. We assume that company activity descriptions are representative of their activity and partly reflect the adopted strategy. We hypothesise that if there is a trend of transitioning from traditional publishing strategies towards servitization, more than one group should emerge from textual analysis of company descriptors. We use clustering methods on proximity matrixes built based word similarity between pairs of firms using their descriptive information. The final clusters are characterised by most commonly used descriptors and profiled using financial and economic data. Relying on data-driven analysis of publicly available company information for Europe (Amadeus by Bureau Van Dijc) we find no significant evidence of strategic diversity. A single group emerges from diverse clustering methods. Our results show that either the publicly available dataset is not representative of the publishing strategy in industry or that there is no real evidence of servitization in the publishing sector. Implications for theory and for industry are discussed.

Servitization Strategies and Product Service Sourcing Decisions

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University of Deusto

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University of Deusto

Abstract

The adoption of servitization by manufacturers present some challenges regarding service design, organization strategy and organization transformation. As such, companies embarked in offering services should decide either delivering them using internal resources or using external firms. Within this context, Saccani (2012) proposed a framework for product services sourcing decisions, that we use in this paper. This framework is structured according to the financial objective of the service offer (cost control vs. profit/revenue generation) and to the customer interaction perspective (transaction-based vs. relationship-based). The article is based on an exploratory approach, so we use a case study to analyze the sourcing decisions of SMEs. The contributions of this paper are twofold: First, we provide a theoretical contribution aiming at developing a framework for understanding product service sourcing decisions, and second, a practical contribution for practitioners in order to help them in the process of servitization.

Keywords: servitization strategies, sourcing decisions, SME, case study

Servitization strategies and sourcing decisions

Manufacturers are experiencing an increasing trend towards the integration of product and service offerings called servitisation (Baines, Lightfoot, Benedettini & Kay, 2009; Vandermerwe & Rada, 1988). A growing number of products are becoming commodities, while customers are looking for solutions rather than products. As a consequence, some companies shift their value proposition from the 'sale of product' to the 'sale of use' (Baines, Lightfoot, Evans, Neely, Greenough, Peppard et al., 2007). Through servitisation, companies manufacturing and selling durable goods enrich their offer with services supporting the product, the customers or even the customers' business processes (Saccani, 2012). Firms extending their offer through the provision of services need to decide whether delivering them with internal resources (insourcing) or resort to external providers (outsourcing).

Several authors have highlighted that outsourcing strategy and the governance of the service supply chain for durable goods are critical decision for servitized companies (Bastl, Johnson & Evans, 2009; Johnson & Mena, 2008). In fact, the provision of services for durable goods, indeed, responds (also) to the need to support a product during several years (depending on its lifetime usage): if this activity is outsourced to third-party providers, the need arises of managing long-term relationship with the network of firms involved in the product-service provision (Cohen, Agrawal & Agrawal, 2006; Johnson & Mena, 2008).

Following Saccani (2012) and using the framework for product services sourcing decisions, we attempt to explore the different strategic approaches to servitization. This framework is defined

according to the financial objective of the service offer (cost control vs. profit/revenue generation) and to the customer interaction perspective (transaction-based vs. relationship-based).

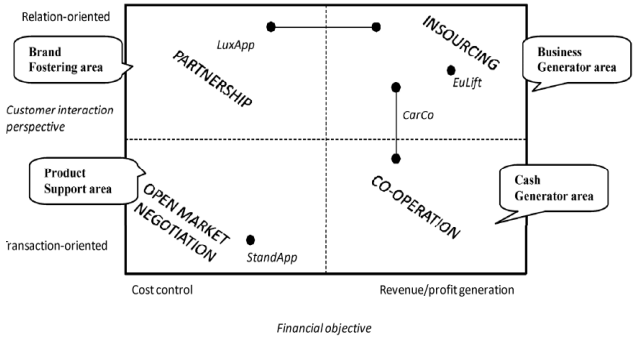

Figure 1. A preliminary framework for product service sourcing decisions (Saccani, 2012)

The main contributions of this paper are as follows: first a theoretical contribution aiming at developing the initial framework proposed by Saccani (2012). Second, a practical contribution for practitioners in order to help them in the process of servitization.

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Parallel session 3

Territorial Servitization II

Chair: Esteban Lafuente

The Differentiating Role of Knowledge-Intensive Business Service Firms on the Economic Contribution of Manufacturing Businesses

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University of Pécs

Esteban Lafuente

Universitat Politècnica de Catalunya

Yancy Vaillant

Toulouse Business School

Abstract

Recent scholarly contributions suggest that the interaction between manufacturing and knowledge-intensive business service (KIBS) businesses may result in positive economic, employment and other social outputs in the focal territory, a process that has been referred to as territorial servitization. The role of KIBS firms in promoting regional performance has been echoed by several supranational organizations and scientific studies; however, not all types of KIBS firms are equally important in facilitating regional manufacturing performance. This study seeks to analyze the potential impact of KIBS businesses—distinguishing between technology-based (t-KIBS) and professional (p-KIBS) KIBS firms—on regional development measured by the economic contribution of manufacturing businesses. Using a dataset built from multiple sources (EUROSTAT, and the Regional Entrepreneurship and

Development Index (REDI) database) we analyze 121 European regions and test potential spatial spillover effects. The most important variables included in our analysis are the average manufacturing gross value-added (GVA) per firm, t-KIBS rate, p-KIBS rate, average size of manufacturers, and the quality of entrepreneurial ecosystem. Our preliminary results reveal that only t-KIBS firms have a positive impact on the contribution of manufacturing firms to the economy at regional level. What is more, what we find is that a higher concentration of p-KIBS firms per se has a negative effect on the average firm-level GVA. The study offers valuable policy implications on how to implement policies to improve regional manufacturing performance.

Keywords: territorial servitization, technology-based knowledge-intensive business services (t-KIBS), professional knowledge-intensive business services (p-KIBS), regional development

Extended abstract

Over the last three decades, knowledge-intensive business service (KIBS) firms have got strongly interwoven with manufacturers via outsourcing, servitization and other interaction processes (Baines & Lightfoot, 2013; Hätönen & Eriksson, 2009). This tendency has been supported by extensive empirical studies that reported numerous firm-level financial- and organizational-related benefits (Gebauer, Fleisch & Friedli, 2005; Visnjic & Van Looy, 2013). Besides, discovering the potential value-creation of increased interactions between manufacturers and KIBS businesses for regional development, Lafuente, Vaillant and Vendrell-Herrero (2017) pointed to the potential territorial benefits of manufacturing-KIBS interactions and referred to them as 'territorial servitization'.

Nevertheless, the embryonic stage of this research stream (see e.g., Arnold, Javorcik, Lipscomb and Mattoo, 2016; Horváth and Rabetino, 2018) leaves several questions unaddressed. The relevance

of KIBS firms for promoting manufacturing performance has been echoed by several studies in the scientific literature (Vendrell-Herrero, Bustinza, Parry & Georgantzis, 2017); however, not all types of KIBS firms are equally important in facilitating regional development. The most popular academic approach by Miles, Kastrinos, Bilderbeek, Den Hertog, Flanagan, Huntink et al. (1995) splits KIBS businesses in two clearly differentiated groups: 1) technology-based knowledge-intensive business services (t-KIBS), such as IT-related services and R&D consulting, and 2) professional knowledge-intensive business services (p-KIBS) which primarily appear in the field of management services or market research.

These two types of KIBS are basically different in their technology and knowledge intensity, and their distinctive innovative capacity may condition their impact on the development of manufacturing businesses. For instance, according to Doloreux and Shearmur (2010), t-KIBS firms offer their clients more tangible products such as computer systems or programs that make them more replicable. Therefore, innovation and distribution play a crucial role in the successful operation of t-KIBS businesses. As they produce complex technologies, it is important that the invested financial capital turns over in the short term. On the contrary, p-KIBS produce less identifiable services such as advice or design, thus they are less forced to engage in technological (product or process) innovation activities.

The aim of this study is to analyze the potentially differentiating effect of t-KIBS and p-KIBS firms on regional development mediated by the economic contribution of manufacturing businesses.

Using a dataset built from multiple sources (EUROSTAT, and the Regional Entrepreneurship and Development Index (REDI) database) we analyze 121 European regions from 24 European countries. Variables used in the analysis refer to average values

between 2012 and 2014. To account for the geographic embeddedness of the analyzed European regions, we run spatial econometric models, more specifically, spatial Durbin (SDM) models. Our preliminary findings confirm that KIBS firms positively influence the regional economic contribution of manufacturing businesses measured by the average gross value-added (GVA) of manufacturing sectors. However, the regional benefits of this relationship can be found only for technology-oriented KIBS businesses, and surprisingly, there is a negative relationship between the regional p-KIBS rate and its average manufacturing GVA.

Our findings have relevant policy implications aligned with the efforts for enhancing the economic contribution of manufacturing businesses in the European Union (European Commission, 2014). Regional manufacturing sectors might profit from the interactions with KIBS, and mainly technology-based KIBS firms. It is also informative that regional specialization in manufacturing negatively affects regional manufacturing GVA. Therefore, rather than merely increasing the number of manufacturers in the region, policy makers should equip manufacturing businesses with customized technology solutions that might be relevant to improve manufacturers' performance. Policy makers will be well advised to build a healthy technology-based KIBS sector and support the networking among KIBS as well as between KIBS and manufacturing businesses.

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RIS and Territorial Servitization: A Quantitative Approach from the KIBS in Spain

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Abstract

Literature recognizes the role of KIBS in servitization and hence the influence of this advanced service sector in innovation and economic growth. Particularly, the growth of KIBS sector can be seen as an indicator of regional modernization and renewal processes (Corrocher & Cusmano, 2014; Horvath & Rabetino, 2018). The scholar debate on servitization has shown that territories materialize the positive effects of a solid KIBS sector (Lafuente, Vaillant & Vendrell-Herrero, 2017), however, the drivers of KIBS foundations at regional level remains uncertain. Against this context, we should highlight some leading contributions that propose the explanatory rol of the innovation system in the development of KIBS (Bohn & Thomi, 2003; Koch & Stahlecker, 2006; Stahlecker, 2014). In this goal, the study follows a quantitative approach for the purpose of exploratory research that takes into consideration determinants of territorial servitization heterogeneity. More in depth, the research question asks to what extent the entry rates and specialization of KIBS sector can be explained by demand factors such as the concentration of high-tech manufactorers or the innovation intensity of the RIS. Statistical data is provided by the Spanish Stastistical Office and the SABI-Informa firm financial

information database. The period of analysis extends between 2000 and 2016. This research aims to contribute to the empirical literature on the study of interrelations between innovation systems and servitization.

Keywords: KIBS, territorial servitization, quantitative analysis

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Territorial Servitization and the Manufacturing Renaissance in Knowledge-based Economies

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Abstract

A theme of growing importance in regional science is how the deployment of knowledge-intensive business service (KIBS) sector in certain territories can rebuild the competitive advantage of the manufacturing fabric, a phenomenon described as territorial servitization. The collection of papers in this issue brings new insights into how institutional-spatial, socio-economic and industry-specific attributes underpin the development of territorial servitization. It explores through a multidisciplinary perspective and a wide variety of frameworks (organizational, place-based, economic geography) the relationships and mechanics behind the development of the KIBS sector and how this is interrelated with the manufacturing and economic development of regions. This

editorial note contains two independent contributions. First, it presents territorial servitization as a local hybrid value chain and argues that effective territorial servitization requires a value adding fit between manufacturers and KIBS. Second, it provides a number of yet unresolved topics that seek scholarly attention.

Keywords: Territorial servitization, KIBS, regional development

The mechanics of Territorial Servitization

Convening territorial servitization

The provision of knowledge-intensive services is widely recognized as one of the key engines for the consolidation of knowledge-based economies (European Commission, 2012). Servitization, defined as the ability of manufacturing firms to introduce value-adding services into their operations (Vandermerwe & Rada, 1988; Cusumano, Kahl & Suarez, 2015), plays a key role in this process as it constitutes a mechanism to develop innovation capabilities by realizing a shift from products to product-service systems. There is an increasing number of manufacturers adding services to their offer, with recent evidence indicating that the proportion reaches up to two thirds of manufacturing firms in developed economies (Crozet & Milet, 2017).

The renaissance of local manufacturing sectors has been found to result in some cases from the presence of a dynamic knowledge-intensive business service (KIBS) sector (Arnold, Javorcik, Lipscomb & Mattoo, 2016). KIBS are both sources and carriers of knowledge that inject advanced services—i.e., servitization—across new and incumbent manufacturing businesses, thus positively impacting territorial by enhancing the value-added of manufacturers' products (Vendrell-Herrero & Wilson, 2017). The local presence of knowledge-intensive services has been shown to help new manufacturers internalize the cost of offering advanced services (Jacobs, Van Rietbergen, Atzema, Van Grunsven & Van

Dongen, 2016), while at the same time contribute to alleviating operational weaknesses linked to their liability of both newness and smallness (Grönroos & Voima, 2013). As such servitization and the benefits of knowledge-intensive service provision do not necessarily have to be fully integrated within the manufacturer's internal value chain. This implies that there are (meso-level) territorial benefits to (micro-level) business servitization.

Territorial servitization takes form from the value-adding benefits of servitization across KIBS and manufacturers of the local hybrid value chain of a specific territory. Territorial servitization is found to contribute to local competitiveness and growth through the virtuous cycle generated when a resilient local manufacturing base attracts or stimulates the creation of complimentary KIBS businesses, which in turn facilitates the creation of new manufacturers (Lafuente, Vaillant & Vendrell-Herrero, 2017). Knowledge-intensive service ventures tend to agglomerate together with new and incumbent manufactures, developing linkages and strategic alliances, and therefore opening a virtuous entrepreneurial circle, which in turn positively influence the renaissance of manufacturing (Vaillant, Lafuente & Serarols, 2012).

The servitization of regions offers an opportunity for local manufacturing economies to resume growth and sustain long-term competitiveness. As such, the renaissance of manufacturing through territorial servitization not only enables the upgrading of existing manufacturing competences, but it offers an opportunity to develop and anchor new technological capabilities within regions. These can potentially support industrial resilience leading towards better distributed and sustainable socio-economic growth and prosperity (Lafuente et al., 2017).

The key for regional economic performance, according to Rocha and Sternberg (2005), does not come from economic territorial specialization or from the pure quantitative agglomeration of firms

in a particular region, but rather from the inter-connections and complementarities that link these together. From this we can extrapolate that territorial servitization, as a meso-level process linking services and industry within a local hybrid value chain, enhances the local impact of manufacturing activity on regional development facilitating local knowledge diffusion.

Within a servitization frame, internal large-scale economies were substituted by external economies related to the existence of skilled workers, specialized suppliers, and an informal system of knowledge diffusion. This path of development using territorial servitization which share a stock of work-related and knowledge-intensive services in local settings with locally interweaving patterns of production and marketing ramifying out from this experience to create a diversified, but related, industrial fabric (Bellandi & Sforzi 2004).

The mechanics behind the Territorial Servitization process and its value-adding character

A region demonstrating territorial servitization is characterized by having a hybrid value chain composed by a network of integrating manufacturers and service providers. As services, and notably knowledge-intensive services, are becoming a strategic priority of manufacturing firms, the local presence of such a hybrid value chain can offer a bundle of total solutions that deliver value to customers over the entire usage life of the manufacturer's product, from purchase to disposal (Goncalves, Hines,& Sterman 2005). Together with complementing the manufacturers offer by allowing them to supply their clients with higher value-added product-service systems, a local hybrid value chain allows these manufacturing firms to servitize throughout their own production process. Firms within a local hybrid value chain continually interact and share information

across all phases of the production process (Lin, Jiang, Liu & Wang, 2014). Effective servitisation requires the co-ordination and active tangible as well as intangible transfers across the different players of the local hybrid value chain.

The mechanics behind territorial servitization can be understood in terms of the theory of organizational fit by Miles and Snow (1984). These authors laid down the basic theoretical premises that later served to understand vertical integration (Harrigan, 1984) and value-chain integration theory (Stonebraker & Liao, 2006), and in turn helps to understand the mechanics behind territorial servitization and its influence over local territorial value-adding improvements.

Miles and Snow (1984) conceptualized four different levels of organizational fit that they associated with organizational performance. From this perspective, territorial servitization is coherent with what Miles and Snow called Early Fit, which we interpret more as Value-adding Fit. From this view, it can be interpreted that it is not sufficient to simply have in a defined territory the presence of manufacturers and KIBS, they must interact and have an adequate level of organizational fit throughout the entire local hybrid value chain. If not, we are faced by a situation described as Minimal Fit among strategy, structure and process across firms of the value chain, resulting in the failure to effectively and efficiently amalgamate for any prolonged period of time. In this scenario, there are no significant interactions between local manufacturers and local service firms. Consequently, resources and knowledge is not effectively circulated throughout the entire local hybrid value chain and the desired territorial servitization benefits are not attained. In such a scenario, manufacturers either internalize their service provision or source them from outside the region. Similarly, KIBS will mostly supply non-local manufacturers or modify their services in order to cater to local consumer markets.

A Tight fit across the firms of a local hybrid value chain is much more desirable. Tight fit is the "underlying causal dynamic producing excellent performance and a strong corporate culture" across a value chain (Miles & Snow, 1984, p. 10). It occurs when the different firms and units of a value chain operate with a sufficient level of fit in terms of strategy, technology, structure and process, that they easily complement each other and can adopt local synergetic interactions without the need for disruptive adaptations of their activities. Tight fit is important for valuable interactions to occur across a local hybrid value chain. Manufacturers can therefore effectively buy, instead of make, their service provision by locally outsourcing their service function, enabling them to offer a higher value product-service system to their clients. This forms an initial level of territorial servitization that may not be sufficient to optimize outcomes.

For optimal territorial servitization, what is required is Value-adding fit. Derived from what Miles and Snow (1984) called Early fit, Value-adding fit occurs when there is some incremental misalignment between the different players at distinctive levels of the local hybrid value chain that force the transmission of knowledge and skills across firms in order to allow for effective territorial servitization. Much like the innovation benefits of Schumpeter's (1934) creative destruction resulting from deviations away from equilibrium, such incremental mismatch provokes the dynamic reinforcing loop that promotes the discovery and articulation of new patterns of strategy, structure, and processes across the local hybrid value chain. A positive bullwhip effect is created where the value-adding benefits of territorial servitization pulls the different agents of the local hybrid value chain to greater levels of knowledge and skill utilization, allowing for the renaissance of incumbent manufacturers, and producing local opportunity for the generation of new KIBS as well as manufacturing ventures. In

this manner, the entire local hybrid value chain, and by extension the local economy of which it forms part, collectively benefits from the generated knowledge-intensive value adding territorial servitization.

There is, however, a forth scenario described as Fragile fit (Miles & Snow, 1984), where the players of the local hybrid value chain fail to evolve at a similar pace and where the bullwhip effect eventually leads to excessive divergence and ultimately to a scenario of Minimal fit. Vulnerability to both shifting external conditions and inadvertent local unraveling may easily set firms upon distinct trajectories, falling victim to deteriorating fit. Fit that was once Tight or even Value-adding then fails to sustain its inter-firm compatibility over time. This is often the case when inter-firm connections and productive networks are artificially stimulated through policy or institutional intervention (Capello & Kroll, 2016).

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Parallel session 4

Strategy II: Outsourcing, Risks and Values

Chairs: Shlomo Tarba & Emanuel Gomes

Reshoring and Near-Shoring of Manufacturing Firms: Why, How and Where. A perspective from the servitization point of view

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Abstract

Delocalization of manufacturing activities has been a trend in many countries due to several reasons, one of them, the lower level of labour costs in other countries such as China, India, Mexico or Morocco. In the last years some companies have started to do some reshoring (Barbieri et al., 2018) and near-shoring (Bals et al., 2016) and this has been linked to the servitization process of the companies (Brenan et al., 2015). The aim of this paper is to analyze the decision to bring back earlier Offshored activities. This decision of bringing back could be to the home country production activities (reshoring) or bring back near the home country production activities (nearshoring). We use a qualitative approach to analyse why, how and where offshoring and subsequent backshoring or nearshoring initiatives are developed in several SMEs. Cases would allow understanding how the motivations (Why) connect with the

governance modes (How), and the location choice (Where) are developed.

Keywords: Reshoring, nearshoring, manufacturing, SMEs, qualitative, servitization

Reshoring and Nearshoring

Location decisions of manufacturing firms are among the most debated topics in the international business (IB) and supply chain management (SCM) fields, as recently showed by Jain et al. (2016). Boosted by opportunities created by increasing globalization, these decisions generally concern offshoring strategies, often coupled with outsourcing decisions (Liesch et al., 2012). While the literature on offshoring has largely focused on the expansion patterns (Jahns et al., 2006) and the characterization, antecedents and performance implications of the phenomenon (Schmeisser, 2013), it has also emphasized that the process is not irreversible (Antelo & Bru, 2010).

Some authors contribute to the debate on backshoring as a "failure" of offshoring, or rather as an evolution/adjustment of a sound competitive strategy (Bals et al., 2016; Foerstl et al., 2016). In this stream of research Di Mauro et al (2018) confirm backshoring as a result of a strategic change more than the correction of a managerial error, thereby supporting non-linear views of internationalization (Fratocchi et al., 2014). Studies have been developed for MNC and also SMEs (Canham & Hamilton, 2013) but still there is much to be done.

Brennan et al (2015) state that trends such as servitization, creation of new production systems, and sustainable supply chains are driving changes in manufacturing and generating new motives for the relocation of manufacturing. So, the aim of this paper is to explore why these companies have changed the manufacturing

facilities to a closer location, what are the key factors of this decision and how this process has been accomplished link to servitization (Baines et al. 2017; Bustinza et al. 2017, Rabetino et al. 2017; Rabetino et al. 2018).

After the literature review we analyse the case of small and medium manufacturing companies that have offshore and reshore (or nearshore) linked to the process of servitization. Following Di Mauro et al. (2018) and Yin (2003) we conduct a multiple case study analysis based on several companies, to search for common patterns in offshoring and subsequent backshoring initiatives (or nearshoring). Our conclusions seek to contribute to the literature on reshoring and nearshoring and servitization.

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Advancing Sales for Servitization: Managing Risks when Defining Performance-Based Contracts of Multinational Business-to-Business Manufacturing Companies

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Abstract

Despite the benefits of servitization, a lot of manufacturing firms still struggle to fully servitize due to ill-defined performance-based contracts (PBCs). One of the main barriers are risk factors that needs to be managed during the definition phase of PBCs. The risk factors prevent effective value creation and value capture opportunities for both the customer and the supplying firm. The sales organization, as the interface between the customer and the supplier, possess a significant role in balancing formal and relational governance of an effective PBC. Despite its significance, little research has been done to address the sales organizations role during the PBC definition phase. To address this gap in the literature, the study aims to investigate how the sales organization should manage risks in the process of defining performance-based contracts to enable the value of advanced services for a

multinational B2B manufacturing firm. A multiple-case study of multinational B2B manufacturing companies currently offering PBC's as well as currently being in transition towards offering PBC's was conducted to adress the research purpose. The study also draws on extant literature on performance-based contracts, servitization and business-to-business marketing. Data from five companies in transition and two companies offering PBC's today reveals that the sales organization play multiple important roles in managing risks during the definition phase of PBC's. The findings suggest that the sales organization could manage risk factors of performance-based contracts by focusing on understanding customer needs, educating the customers on the value of the contract and finally by engaging in the customer post-delivery. In realizing this role, the sales organization needs support in the form of ICT tools, training, process frameworks and a favorable internal configuration of the organization. The findings contribute to the understanding of how the sales organizations role in managing risks when defining performance-based contracts serve as an enabler for servitization.

Keywords: Servitization, Advanced Services, Sales, Risk, Organizational design, Performance-based contracts

Introduction

The terms servitization (Vandermerwe & Rada, 1988), service-dominant logic (Vargo & Lusch, 2004) and product-service systems (Goedkoop et al., 1999) are similar concepts commonly used to conceptualize the idea of manufacturing companies moving towards becoming service providers. These concepts suggest a change towards a service-led competitive strategy (Hendriks, 2014).

Despite the promised benefits of servitization (Cusumano et al., 2015), successful execution and delivery of these services are challenging for many companies (Baines et al., 2017; Neely, 2009). It is commonly agreed that this strategic shift requires a change in the organization (Gebauer et al., 2010) since delivering advanced services demands capabilities that differ from those used during

production (Oliva & Kallenberg, 2003; Gebauer et al., 2005; Datta & Roy, 2010; Ceci & Masini, 2011; Biege et al., 2012).

Further, performance-based contracts as one of the drivers of servitization is still in its infancy and receives calls for further research (Hypko et al., 2011; Kindström & Kowalkowski, 2009; Ng et al., 2009). In particular, the risk dimension of performance-based contract still receives little attention in the literature (Selviaridis & Wynstra, 2015). Ill-defined PBC's could lead to an offering that is either underpriced or promised at performance levels that cannot be delivered profitably (Auguste, Harmon & Pandit 2006; Malleret 2006). The provider's sometimes lack in-house capabilities and internal consistency when negotiating and establishing PBCs (Hou & Neely, 2017; Visnjic et al., 2018). Consequently, they need to rely on partner and suppliers in order to deliver the PBCs effectively and efficiently (Visnjic et al., 2018).

With a great emphasis on value in relationship and risks associated to advanced services, sales organizations' role as the interface between supplier firm and customer in implementing the strategic transition is central (Singh et al., 2017). However, there is evidence that many salespeople are unable or unwilling to meet the new demands that come with the shift towards solution selling (Ulaga & Reinartz, 2011). The role that the salesperson should play in the strategic shift is not always that particularly well-defined as well (Blocker et al., 2012).

Methodology

Against said background, the purpose of this study is to investigate how a sales organization of a multinational B2B manufacturing firms should manage risks in the process of defining performance-based contracts to enable the value of advanced services for multinational B2B manufacturing firms.

The study aims to make an analytical and empirical contribution to the field of servitization, organizational design and performance-based contracts. Though the subjects in isolation are heavily discussed in the literature, investigating the topics in relation to each other leads to new insights that enrich the understanding of the issues. The study contributes to the academic community by addressing the gap in literature on the interplay of sales organization, risk management and its supporting tools in the context of servitization.

Exploratory multiple case study will be used to fulfill the purpose of this study (Yin, 2009). In this study, the context group in contrast are the companies that offer PBCs, and the companies that are in a transitional phase to potentially offer PBCs in the future. The firms are chosen to be in various industries with the intention to generate diverse individual results rather than statistical representativeness. The seven cases present similarities and dissimilarities which allow us to identify empirical patterns (Eisenhardt & Graebner, 2007) and achieve literal replication and theoretical replication (see Figure 1).

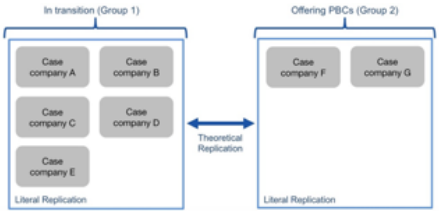

Figure 1. Replication logic for the selected case companies

In this study, the gathering of empirical data was done using a qualitative method consisting of interviews with company representatives of the selected case companies. The duration of the

interviews was on average around one hour. Each interview was audiotaped and transcribed verbatim. Further, different academic databases were used for finding academic literature. The main fields of literature that has been studied are industrial marketing, service research and operations management. Search terms that have been used include: value proposition, value-in-use, servitization, service-dominant logic, product-service systems, hybrid-offerings, solution selling and performance-based contracts.

Findings

There are six identified dimensions of risk in the contract definition process that should be managed by the sales organization. The identified risk factors are disintegration of products and services, disadvantageous installed-base, misidentification of stakeholders, mismatch in view of relationship, unclear scope of responsibility, and under-capture of potential value-in-use.

The identified risks should be managed by the sales organization through their role of educating the customer on the delivered value, understanding the customer needs and have a post-delivery engagement for improvements when defining PBCs.

The roles are enabled through the organizational support of ICT tools, training and the development of process frameworks as well as through internal configuration of the organization. The ICT tools include customer information sharing tools, value analysis and visualization tools, and quoting and configuration tools.

It is found that the relationship between the identified risks and the role of the sales organization is not a one-to-one relationship. One risk could be managed by multiple roles and vice versa. For example, the risk of an unclear responsibility scope could be managed by both understanding customer needs and educate them about the nature of the value proposition. Likewise, the sales

organization might manage multiple risks through one of their roles. For instance, the role of educating the customers might reduce the risks of mismatch in view of the relationship, unclear scope of responsibility and under-capture of potential value-in-use.

Furthermore, the relationship between the sales organization's role and the identified risks could be seen in a sequential perspective. For example, by taking the role of engaging in the customer post-delivery, the risk of under-capture of potential value-in-use could be reduced over time. In order for that to happen, the role of educating the customer should first be taken into account to minimize the risk of mismatch in the view of the relationship before the sales organization are able to maximize its value capture.

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What Drives Product-Service Integration? An Empirical Study of Entrepreneurial Explicit Motives and Value Strategies

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Abstract

This study contributes to the microfoundations of servitization by looking into the underlying motivations of entrepreneurs. We investigate the relationships between entrepreneurial explicit motives, their firms' value strategies and the role of product-service integration (PSI). For this purpose, we collected and analysed data on 178 entrepreneurs of micro to medium-sized firms. We found that PS leadership as well as customer intimacy are driven mostly by a need for achievement. Contrary to our expectations, the need for dominance discourages entrepreneurs to pursue PS leadership. Also, entrepreneurs integrate products and services mostly for PS leadership and to a lesser extent customer intimacy reasons. We only found tentative evidence that entrepreneurs integrate products and service out of a need for achievement as well as affiliation.

Keywords: Product-service integration, explicit motives, value strategies, SMEs

Introduction

Prior studies have mainly focused on how firms can successfully move towards integrated solutions, for instance by levering unique resources, building distinctive capabilities (Rönnberg Sjödin, Parida & Kohtamäki, 2016; Ulaga & Reinartz, 2011) and co-creating value with customers (Kohtamäki & Partanen, 2016). Remarkably, less is known about the underlying individual motivations of entrepreneurs and managers for servitization (Lenka, Parida, Sjödin & Wincent, 2018). Even though prior research indicates that managers' product-centric attitude hinders service growth (Gebauer, Edvardsson & Bjurko, 2010) and that several cognitive phenomena prevent them from moving towards an integrated product-service approach (Gebauer, Fleish & Friedli, 2005), a clear understanding of what *drives* managers to integrate products and services would help to better understand this transition process. As such, not only firm level but also individual level caveats and stimulators can be

unravelled, as recently suggested by Lenka, Parida, Sjödin & Wincent (2018) and Kowalkowski, Gebauer, Kamp and Parry (2017). This is particularly relevant to know about key-decision makers whose motivations largely define the organization's business goals, especially in small businesses (Hermans, Slabbinck, Vanderstraeten, Brassey, Dejardin et al., 2017).

To respond to the plea for insights into the individual characteristics impacting product-service integration (PSI), we address two overarching research questions: 1) what motivations drive entrepreneurs to integrate products and services, and 2) for what strategic purpose do they integrate products and services? These questions are presented in the conceptual framework in Figure 1.

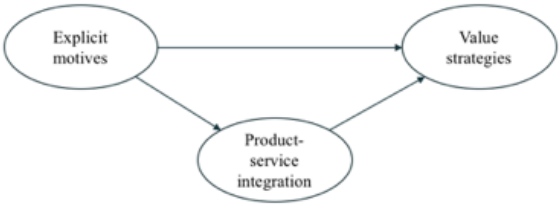

Figure 1. Conceptual framework

In relation to the first question, Ulaga and Loveland (2014) for instance stress the individual differences among the members of the industrial sales force regarding their intrinsic motivations to sell hybrid offerings. They provide evidence that the most successful people enjoy the task of selling hybrid offerings for their own sake; yet, the underlying motive that lies at the basis of this intrinsic motivation remains unclear. Regarding the second question, the integration of products and services has been linked to different strategic purposes, such as strengthening firms' competitive position

by innovating products and services (Kamp & Parry, 2017) and helping customers by providing customized solutions (Kohtamäki & Partanen, 2016). Yet, the relationship between entrepreneurs' deeper motives and their firms' value strategies remains unclear. We expect that differently motivated entrepreneurs integrate products and service for different strategic purposes. For instance, dominance-driven entrepreneurs may integrate products and services to take a dominant position in the market (relative to their competitors), whereas entrepreneurs with a high need for affiliation may do so to better serve customer needs.

Research methodology

The data stems from the Ambition in Entrepreneurship (AiE) project by Antwerp Management School (AMS) in collaboration with UNIZO, the representative organization for Belgian-based small and medium-sized enterprises (SMEs). AiE is a coaching service whereby professional coaches offer strategic and personal advice to entrepreneurs based on several surveys and individual coaching sessions. We use data from two surveys: one focusing on the level of the entrepreneur and one on the firm. Control variables at the firm level were obtained through Graydon, an independent financial information services provider. In total, 238 respondents completed the first survey of which 233 also completed the second survey. Matching those data with the data from Graydon reduced our sample to 178 cases; the remaining data are Missing Completely at Random (MCAR) ($p = .586$).

We analyse the data through OLS regression techniques available in SPSS and the PROCESS custom dialog box for moderation and mediation modelling (Hayes, 2013). Obtaining generalisability of the results requires a ratio of observations to the independent variables of at least five to one, with preferably a ratio of fifteen to one (Hair,

Black, Babin & Anderson, 2009). As we work with a maximum of nine variables (six control and three independent variables), the required number of observations is minimally 45 and preferably 135. The number of cases we obtained is 238 of which 178 cases provide valid information (listwise) on all variables used in our model.

Preliminary findings and discussion

We only report the main results of the models for which the F-statistics are significant (see Table 1). First, we found evidence that the need for achievement is the prime motive that pushes entrepreneurs towards PS leadership ($b = 0.24$, $p < .01$) and customer intimacy ($b = 0.22$, $p < .01$). Contrary to our expectations, we found that the need for dominance discourages entrepreneurs to pursue PS leadership ($b = -0.16$, $p = .04$). The need for affiliation seems to lead entrepreneurs away from PS leadership (negative coefficients) and toward customer intimacy (positive coefficients), but these results are not significant. Second, entrepreneurs integrate products and services for PS leadership reasons ($b = .22$, $p < .01$) and to a lesser extent also for customer intimacy reasons ($b = .09$, $p = .02$). Third, though none of the F-statistics are significant, we saw tentative evidence that entrepreneurs integrate products and services out of a need for achievement ($b = .29$, $p = .02$) and affiliation ($b = .22$, $p = .02$).

	Model 1a	Model 1b	Model 1c	Model 2a	Model 2b	Model 2c
Outcome	**PS leadership**	**Customer intimacy**				
	B	**B**	**B**	**B**	**B**	**B**
Constant	-17.992†	-18.047†	-21.491*	-4.863	-4.830	-1.954
	(9.642)	(9.415)	(9.838)	(7.863)	(7.803)	(7.913)
Control variables						
Gender	-0.20	-13	-0.55	121	124	158
	(122)	(119)	(126)	(99)	(99)	(101)
Age	2	0	2	8	7	8
	(6)	(6)	(6)	(5)	(5)	(5)
Education	71	92	39	38	47	21
	(70)	(69)	(71)	(57)	(57)	(57)
Firm age	0.010*	0.010*	0.012*	4	4	2
	(5)	(5)	(5)	(4)	(4)	(4)
Firm size	93	0.102†	0.112†	0.077†	0.080†	65
	(56)	(55)	(57)	(46)	(46)	(46)
Sector	16	22	9	0.100*	0.103*	0.071†
	(49)	(48)	(49)	(40)	(40)	(39)
Direct effects						
PSI importance	0.179**			0.068†		
	(46)			(37)		
PSI strategy		0.222**			0.090**	
		(45)			(38)	
Need for achievement			0.242**			0.216**
			(91)			(73)
Need for affiliation			-44			54
			(59)			(47)
Need for dominance			-0.158*			12
			(81)			(858)
F-statistic	3.535**	4.861**	2.140*	2.555*	2.934**	2.535**
R square	126	166	100	95	107	116
Adjusted R square	91	132	53	58	71	71
N	179	179	183	179	179	183

Notes: † < .10; * < .05; ** p < .01. Unstandardized coefficients. Standard errors in parentheses. All VIF < or = 1.364. Sample size = 179-183 (listwise).

Table 1. Regression results

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Parallel session 5

Customer Centric Approaches to Servitization

Chair: Oscar F. Bustinza

Customer Integration and Servitization Level as Enablers for Innovation Capability

Alberto De la Calle

University of Deusto

Inmaculada Freije

University of Deusto

Miguel Ángel Larrinaga

University of Deusto

Objective/rationale

The servitization of manufacturing companies has become a topic of growing interest for both the academia and the business world. The rate of publications on services in product-oriented companies has reached about 100 articles per year (Gebauer et al., 2016). Likewise, well-known companies, such as IBM or Rolls-Royce, have made an interesting evolution from being merely industrial companies to obtaining a relevant share of their revenues and results from services.

From the beginning, the concept of service has been related to the incorporation of services and intangibles into products as a way to create value and obtain competitive advantages. Vandermerwe and Rada (1988) defines it as "the increased offering of fuller market packages or `bundles' of customer focused combinations of

goods, services, support, self-service and knowledge in order to add value to core corporate offerings".

The difference between products and services has become blurred over time. Products frequently incorporate services and services, products. The increasing competition that manufacturing companies are confronted with as their sectors mature pushes them to seek new sources of competitive advantage. If we add to this the hard struggle that many companies have been facing with competitors from low-cost countries, the attractiveness is greater. Servicing is presented as a way out of commoditization and loss of margins, as well as an opportunity to change the way to interact with customers and to make it difficult for remote competitors to access the market. Therefore, it is not only a defensive strategy but also an innovation path to improve competitive advantage and increase customer satisfaction (Suarez et al., 2013).

But these opportunities are not without risks and difficulties. As companies move from a more transactional model to a long-term relationship development one (Neely et al., 2011). Consequently, it requires a deep transformation of the business model involving not only the adaptation of structures, development and acquisition of new skills and capabilities, etc., but also the necessary cultural change, including even perhaps the loss of priority of the products in terms of the dedication of investment and management efforts.

In addition to being complex, it is a very time-consuming process (Oliva & Kallenberg, 2003) and not always profitable (De la Calle & Freije, 2016). Servitization is a long-term commitment, which often requires a critical mass to become profitable (Visnjic & Van Looy, 2013). These difficulties in obtaining results from this strategy make up the so-called "paradox of the servitization or service paradox". Gebauer et al. (2016) consider that "one reason for the service paradox is that companies underestimate the

complexity of the service business". (Benedettini et al., 2015) even warn that servitization may endanger the company.

The incorporation of services usually requires profound changes in the company, which usually involves moving from a product-centric organization to a servitized one. Along with internal organizational changes, customer and supplier relationships need to be reconfigured. Core competences and capabilities, outsourcing and level of integration in the supply chain need to be re-identified. To do so, firms should have a proper understanding of customer needs and frequently, a certain level of integration or cooperation is required.

Nevertheless, it does not just work in one direction that is to develop new services. At the same time, as some authors argue, services play an important role in generating market and customer knowledge for manufacturing companies, improving manufacturer's understanding of the customer's broader needs (Kastalli & Van Looy, 2013) and consequently facilitating knowledge transfer and new product innovation (Golara, 2018).

Arguably, working and interacting with customer appear to be a key driver for servitization. So the objective of this work is to study the relationship between the level of servitization and the level of customer integration, and their impact in innovation.

Methods / Results / Findings

According to the previous problem conceptualization, we proposed a research model based on three variables: Customer integration (CI), Servitization level (SL) and Innovation capability (INN).

The research approach aims to demonstrate how CI and SL are related to explain the innovation capability of the firm. In this sense we propose two research questions (RQ):

RQ1. What is the relationship between CI and SL?

RQ2. How they impact on INN?

The ability of companies to integrate customers is very difficult to replicate so it can contribute to the development of a sustainable competitive advantage. In this sense it is interesting to analyse, as a first step (RQ1) the interaction between CI and SL, and therefore how they impact on INN (RQ2).

Two out of the three variables (CI and INN) cannot be measured directly so they have been analysed as constructs. A questionnaire was used as a measurement instrument for getting information about them. Items were all measured using a seven-point Likert scale, and they were adopted from the literature review. On the other hand, Servitization level is measured through the information collected from SABI of those companies that participate in the survey (% of turnover due to services commercialization).

The dataset was built with 100 responses from manufacturing companies of the Basque Country (De la Calle, 2015). After a descriptive analysis of the variables, we use a statistical analysis (descriptive and inferential statistics) and also structural equation modelling (using PLS-Graph) to answer the research questions.

The results will contribute to the literature by adding empirical evidences to the relationship between customer integration, servitization and innovation capabilities. The results will also help companies to understand how customer integration and servitization can interact in order to develop a sustainable competitive advantage based on innovation capability.

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Gamification to Improve the Design of Services in Companies Servitized under HCD Methodology

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Abstract

The aims of this work is the study the viability of using gamification practices to improve the design of services in companies aimed at servitization under the HCD methodology. For it we propose a conceptual model based on the HCD methods defined by Steen, Kuijit-Evers and Klok (2007), who categorized six HCD methods under the cooperation approach between designers and users to

incorporate ideas, to have knowledge of users in the innovation process and thus articulate problems and develop solutions together. Thus, we relate the gamification with these six methods of Human Centered Desing (HCD) for the improvement of the design of services in companies that bet on servitization. In this way, we try to answer the following questions: Is the HCD methodology suitable for the study of service design?; Is gamification, as a technological tool, an adequate technique to improve the design process in services? To answer these questions, we review the literature on HCD methodology, service design and gamification. Future research intends to advance in this line and be able to empirically test the validity of the proposed model.

Keywords: Gamification, service design, human centered design, servitization

Introduction

The design of services allows to offer frameworks of work and practical tools to guide the manufacturing companies in servitization and facilitate the development of intuition in the design process (Iriarte, Justel, Alberdi, Jáuregui & Gonzalez, 2016).

The design of services, can encourage strong connections to improve the functioning of an entire system and optimize the value for all stakeholders. However, the suitability of existing service design tools remains unclear (Sangiorgi & Junginger, 2015).

Additionally, some authors question the practical application of HCD methods justifying that the techniques are insufficient to uncover deeper customer needs (Van Pelt & Hey, 2011).

In view of these deficiencies, it is considered that the application of gamification techniques could improve the service design processes in industrial companies.

Design Services, HCD and Gamification

The ability to understand deeply the experiences of users and the contexts of provision and use of services is at the center of the contributions of service innovation service designers (Meroni & Sangiorgi, 2011).

The provision of services requires principles, organizational structures and processes that are novel for the manufacturer of goods, where the business model goes from being a model of transactions to a model based on relationships. (Oliva & Kallenberg, 2003).

In this sense, the methodology known as Human Centered Design can be an effective alternative to improve the design of services in companies interested in undertaking servitization processes.

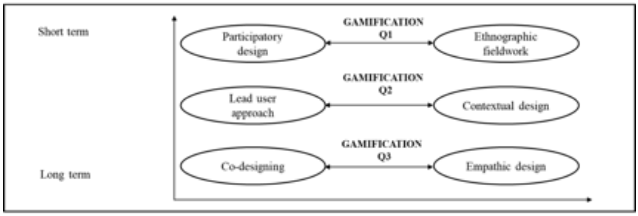
The International Organization for Standardization, in their ISO 13407 states that HCD methods must: 1) involve users to improve and understand their practices, needs and preferences; 2) look for an appropriate assignment of functions between people and technology; 3) organize project iterations to conduct research, generation and evaluation of solutions and 4) create multidisciplinary design teams (Steen, Kuijit-Evers & Klok, 2007).

To achieve these principles, it is necessary to apply techniques that make it possible to empathize with service users and quickly and reliably capture their needs (Iriarte et al., 2016). Thus, gamification could be considered as the technique to be used in the design of services, capable of encouraging the co-creation of value through the participation of the client in the development and design of new products and services (Gebauer, Bravo-Sánchez & Fleisch , 2007; Kaasinen, Koskela-Huotari, Ikonen & Niemeléi, 2013).

Proposal of the analysis model

Our proposal takes as a reference model the one established by Steen, Kuijit-Evers and Klok (2007), who categorized six HCD methods under the cooperation approach between designers and users to incorporate ideas, to have knowledge of users in the innovation process and thus articulate problems and develop solutions together.

Figure 1. Model of analysis



Source: Adapted from Steen, M., Kuijt-Evers, L., & Klok, J. (2007

The principles of gamification have a demonstrable potential to reach a global community of volunteers willing to contribute their time to solving problems (Petridis, Baines, Lightfoot & Shi, 2014). It is an effective tool to encourage participatory design and observe the behavior of users. Therefore, we proposed:

P1: In the short term, gamification is an effective tool to encourage participatory design and guide ethnographic fieldwork towards an improvement in the design of services.

Thanks to gamification practices, the organization obtains information in real time of the needs, tastes and preferences of the users, which allows the organization to orient the design of its services to the demands of the market. Thus, it is proposed:

P2: In the medium term, gamification is an effective tool for the development of ideas and improvement of the services offered.

Gamification is a powerful tool for motivation and commitment (Deterding, 2012). It offers a context of emotion that facilitates the interaction between users and organization, being the users themselves co-designers of the service. Therefore, we propose:

P3: In the long term, gamification promotes co-design and empathic design.

Conclusion

Design Service is recognized as an activity intrinsically linked to human needs and concerns (Hanington, 2003), so we can affirm that the HCD methodology is suitable for the study of the design of services in companies that bet on servitization. Also, gamification can be an adequate technique to improve the design process in services, allows to achieve a change in user behavior aimed at increasing their level of motivation, involvement, autonomy and commitment (Searbon & Fels, 2015), provoking an adequate context for the exchange of information.

It should be noted that this is an incipient work that requires a more exhaustive and rigorous review of the literature that allows selecting the appropriate variables to empirically study the validity of the proposed model. It would also be interesting to adapt the proposed model to the reality of a servitized company.

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Using "Avatar Journey Mapping" to Reveal Smart-Service Opportunities along the Product Life-Cycle for Manufacturing Firms

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Abstract

Product service systems (PSS) consist of two elements brought into a relationship: a tangible commodity to be sold; and an activity (work) done for another with economic value, called a service (Baines et al., 2007). However, the design of PSS increases in complexity compared to traditional product design/development. Since the nature of PSS is to create value in use, designers have to consider the usage of the product (Rapaccini & West, 2017). Baines et al. (2007) added that the design of PSS must be done on a case-by-case basis, requiring firms to shift from "product thinking" to "system thinking" and extend their involvement and responsibility through the entire life-cycle of the product. The avatar journey mapping tool was developed within the Data to Action Model (Stoll, 2017). The research from which the tool derived examined three use-cases with the following products (avatars): i) glass-processing

equipment, ii) printers, and iii) aircraft. The tool was used to reveal new service opportunities related to the avatar.

Keywords: Product-service system (PSS), Innovation, Tools, Engineering, Servitization

Research Motivation and theoretical framework

This paper is based on the insights gained from looking at three use-cases of service innovation development in PSS. The insights were obtained during service development projects for three different manufacturing firms. During the service development process, different tools were tested and analysed. Based on the findings of the projects, the aspects important for developing services in PSS were defined. With that, a set of tools was gathered, such as ecosystem mapping (West, Mueller-Csernetzky, Kuenzli, & Huonder, 2018), job to be done (Ulwick, 2017), customer-journey mapping and personas (Stickdorn & Schneider, 2015), avatar (Taylor, Wuest, Hribernik, & Thoben, 2014), and customer value proposition canvas (Osterwalder, Pigneur, & Bernarda, 2014). Some of the tools needed to be adapted to the nature of the business to business (B2B) environments studied, where the products were capital products within complex engineered systems with many actors.

The avatar model for the product within the complex systems studied provided in effect a 'machine persona' that allowed the interactions with other actors to be identified. In the cases studied, the other actors can be other machines (with additional avatars) or people (with additional personas). The avatar model is shown in Figure 1 and is supported with the process mapping tool SIPOC (e.g. supplier, input, process, output, consumer) (Pascual, West, & Stoll, 2017). In use, the model has been found to provide new insights and to be a simple visual representation of the situation.

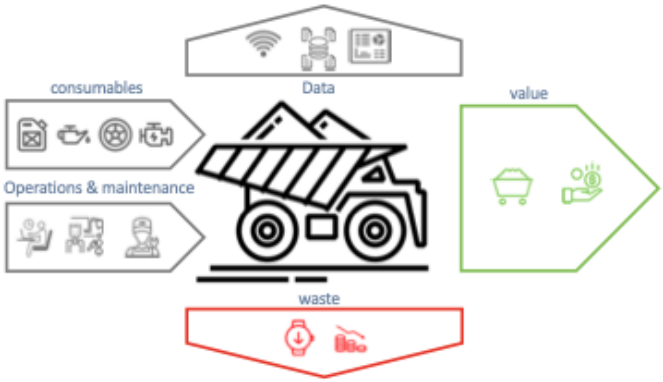

Figure 1. The Avatar model for a large dumper truck showing the inputs and the outputs

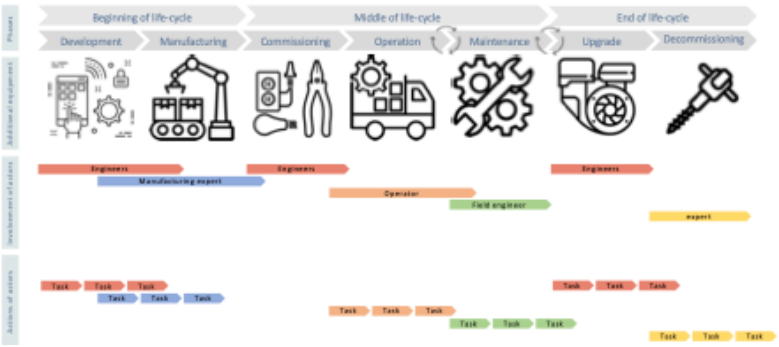

Figure 2. The avatar-journey map overlaying the PLM cycle

Using the customer journey map provides the possibility to visualise structured user-experiences (Stickdorn & Schneider, 2015). Normally, this is used to map out the customer touch-points, however in these three studies it has been used to provide insights from the equipment. With this in mind, the customer-journey mapping was redesigned to fit the needs of PSS in the B2B

environment by placing the avatar in the focus of the analysis. This resulted in the avatar-journey map shown in the Figure 2, in this case based on the key product life-cycle management (PLM) phases, although it could be based on the cradle-to-grave asset life cycle, or simply map a single transaction or operating process.

Contribution to the Theory and Practice

The use of the avatar model provides deep insights into products that would not have been seen otherwise. For instance, the model supports the data production capabilities of the machine and identifies the wastes that it produces. Mapping of the data produced with the information needs of the actors within the system supports the sharing of information within the ecosystem. Clarification with the inputs and the outputs from the avatar supports the integration with other equipment within the owner's processes.

Integrating the avatar into the customer journey mapping provided a framework that identified who was involved with the support of the equipment, why, when, and what role they fulfilled. Considering the products within the system as avatars provided a more detailed understanding of the touchpoints for each transaction within both the PLM phases, in particular the MOL phase. It also provided additional information to the cradle-to-grave life cycle.

By using the avatar model, it is possible to identify: what is needed to operate the equipment; who operates it; and the tasks performed to keep it operational. This therefore provides improvement to practice by providing greater insights though what is in essence a simple model that is the counterpart to the actor's persona.

Conclusions and recommendations

The avatar model provides a counterpart to the persona, and in doing so provides deeper insights to the process that the machine fulfils. The model is a simple approach with similarities to the persona that allows a common perspective of the machines to be developed in a relatively short time.

Creating an avatar journey, as opposed to a customer journey, further increases the insights and can help manufacturers identify the actors who are important around the machine at each phase in its life. This can be on the PLM life cycle phases, or can be on the basis of an individual operational or maintenance task depending on the granularity that is required.

It is recommended that more avatars are created for different products in different situations to test the concept more fully. In doing so, new avatar journeys (and blue prints) should be created to test the concept more fully.

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Parallel session 6

Organizational Structure and Procurement

Chair: Vinit Parida

Examining Structural Design Factors along Companies Servitization Journey: A Qualitative Approach

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Abstract

This study focuses on servitization related organizational development and seeks to give first implications on organizational design and related organizational identity in order to pursue a more holistic and sustainable servitization journey. Organizational design was studied by looking at the classical design factors centralization, specialization, standardization, formalization and configuration. Additionally, organizational identity theory was examined to extent existing knowledge on the "glue" that helps companies to act as a whole with all employees, managers and relevant stakeholders. A qualitative study has been conducted interviewing 34 employees and managers of companies representing three ideal type positions along the product-service-continuum. Although all factors being important, specialization has been identified as one of the most crucial factors to be equally displayed internally and externally. In contrast, formalization's and standardization's outside perception has to be steered more carefully. Although it is important to show adherence to regulated procedures, it might lead to a too cumbersome image that contradicts the growing customer oriented and dynamic market demands if performed too prominently.

Keywords: Servitization, organizational identity, organizational structure

Motivation and Purpose

The rapid change of economic conditions due to technological breakthroughs and changing customer demands sets up new challenges for industry and plant engineering. To address these challenges, research and practice advocate the evolution of manufacturers towards service suppliers (Vandermerwe & Rada, 1988; Oliva & Kallenberg, 2003). In this context, it is often referred to the so called product-service-continuum, along which manufacturers evolve, offering different kinds of services, ranging from product-oriented basic services to process-oriented solutions (Gebauer, Fleisch & Friedli, 2005; Oliva & Kallenberg, 2003). So far research offers a huge amount of conceptualizations of product-service offerings, business models, trajectories and transition models for companies moving along the continuum, providing useful insights for practitioners to determine their current position and identifying potential future directions (e.g. Brax, 2005; Gebauer et al., 2005; Mathieu, 2001; Matthyssens & Vandenbempt, 2010).

Among all these conceptualizations, drivers, success factors and antecedents for a successful servitization have been identified on the managerial (mind-set, culture (Bjurklo, Edvardsson & Gebauer, 2009)), operational (pricing, marketing (Witell & Löfgren, 2013)), and functional/organizational (structure and configuration (Bustinza, Bigdeli, Baines & Elliot, 2015; Gebauer & Kowalkowski, 2012)) level, yet still offering implications of varying specificity. Especially on the organizational level the need to inter alia reconfigure structure in order to succeed in servitizing has already been mentioned multiple time. However, contributions are often limited to the question of whether designing a dedicated service

unit, integrating or separating service business units (Gebauer & Kowalkowski, 2012; Neu & Brown, 2008; Oliva, Gebauer & Brann, 2012). Other aspects are also examined under the "structure"-label, examining back end and front end design (Raja, Chakkol, Johnson & Beltagui, 2018), customer interfaces (Ambroise, Prim-Allaz, Teyssier & Peillon, 2017) and process design (Biege, Lay & Buschak, 2012), displaying inconsistent treatment about what is viewed as "structure" or "organizational design".

Therefore, this study takes a holistic perspective on efficiently and sustainably transforming companies by examining structure related challenges and particularities of servitizing companies (Nudurupati, Lascelles, Wright & Yip, 2016; Baines, Zieaee Bigdeli, Bustinza, Shi, Baldwin & Ridgway, 2017) in order to draw conclusions on how to embed structural change in a company and support the proposed "paradigm shift" (Barnet, Parry, Saad, Newnes & Goh, 2013).

Approach

Seizing emerging calls for more conceptual development and the use of more theoretical foundations but also using more middle range theories to shed light on the complexity of servitization (Rabetino, Harmsen, Kohtamäki & Sihvonen, 2018; Raja et al., 2018), this study aspires to address both by relating classical organizational design theory (Pugh, Hickson, Hingings & Turner, 1968; James & Jones, 1976; Mintzberg, 1980) to the concept of organizational identity (OI) (Albert & Whetten, 1985; Hatch & Schultz, 2002). By relating OI to organizational design factors, this study seeks to shed more light on how structural configurations are actually perceived internally and externally and could be used for moving along the service-continuum.

Theoretical Background

To identify implications for organizational development, organizational structure was examined regarding its design factors configuration, centralization, specialization, standardization, formalization and (Pugh et al., 1968; Jaakkola & Hallin, 2018). Configuration refers to an organization's role structure and the visible structure in terms of lines and spans of controls and the workflow hierarchy (Pugh et al., 1968; James & Jones, 1976). Centralization more specifically addresses where the decision-making authority is located within this configuration and to which degree employees are autonomous in their decision making or have to consult their managers (Pugh et al., 1968; Mintzberg, 1980). Specialization expresses to which degree an organization divides tasks and assigns specific tasks to individual departments and/or jobs. Standardization describes how specific procedures like workflows, communications etc. but also outcomes are prescribed and have to follow specific rules (Pugh et al., 1968). Formalization often builds on specialization and refers to the degree to which communication, rules, procedures, job descriptions etc. are clearly defined and written down (James & Jones, 1976).

Drawing on one of the most traditional definitions, organizational identity is defined as the unique central, distinctive and enduring nature of an organization (Albert & Whetten, 1985). OI is formed by a dynamic process of interorganizational and external reflections of its stakeholders, whereby culture is the more internal expression of OI and image the more external (Hatch & Schultz, 2002).

Methodology

To answer the research questions a qualitative research approach was chosen and 34 semi-structured interviews were conducted. To

get a comprehensive sample of the servitization process, three idealtype positions on the product-service-continuum ((1) primary product-oriented with only traditional after-sales services, (2) middle position with more elaborated and relation-oriented services, (3) primary service-oriented position, also representing professional service firms) have been defined to serve as references to select companies/interview partners. Interviews lasted about 40 to 60 minutes, were transcribed and evaluated using grounded theory method and qualitative content analysis (Glaser & Stauss, 1967; Mayring, 2008).

Preliminary Findings

Preliminary findings indicate importance for all design factors, regardless the companies' position among the servitization continuum. But, although recognizing their relevance, employees and managers see different importance for the external perception of the factors the more important customer focus and service extension becomes. E.g. specialization is a crucial factor also to show explicitly to customers to express a company's knowledge and professional competence. But although being important too, formalization and standardization are more critical for the internal perception of a well-functioning and high-quality organization. They are wanted to be displayed limitedly externally in order to be perceived as a not to bureaucratic and cumbersome as this would hinder adaption to the increasing dynamic environment and necessity of faster reactions on customer demands and service reactions.

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Understanding Procurement Processes for Digitally Enabled Advanced Services

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Abstract

Digitalization or industry 4.0 holds the potential of providing many benefits to industrial companies. Industrial customers are increasingly focusing on buying digitally enabled advanced services, i.e. integrated solutions that combine products and service functions with digital capabilities. However, traditional procurement processes are not well designed for evaluating and buying digitally enabled advanced services, which inhibits value co-creation between the supplier and customer. Therefore, industrial customers need to transform their procurement processes in order to improve the potential of profiting from digitalization. We use data gathered from multiple case study of 8 large companies in Sweden to develop a procurement process for digitally enabled advanced services. The proposed process consists of 4 phases with key activities at each phase. These are based on a close interaction between the internal actors of customer organization, as well as co-creation logic

between customer and supplier, leading to a win-win relationship and continuous innovation.

Keywords: Procurement, Digitalization, Industry 4.0, Servitization

Introduction

The industrial world is changing at a fast speed due to digitalization or 'industry 4.0' initiatives. Manufacturing has become 'smart' with the use of information technology, intensive data exchange, Internet of Things (IoT), and artificial intelligence. This holds a promise to provide many benefits to industrial companies, which includes improving productivity and uptime, and saving costs, thus increasing profitability. For example, smart connected equipment can provide a signal when they need maintenance before they break, which allows avoiding disruption in production. In order to realize these benefits, industrial customers need to buy innovative digitally enabled products and services. Nevertheless, industrial companies do not necessarily purchase stand-alone products or services. They are increasingly buying integrated solutions that combine products with service functions to deliver certain higher value. This represents servitization of industrial companies and transformation towards 'advanced services', which are *"a complex bundling of products and services, whereby manufacturers offer capabilities and outcomes instead of products alone"* (Bigdely, Baines, Schroeder, Brown, Musson, Shi et al., 2018). Advanced services are particularly relevant in the case of digitalization, where industrial customers do not only want the industrial assets and service functions, but also the digital functions and capabilities, with a guaranteed performance. We refer to these as 'digitally enabled advanced services'.

However, traditional procurement processes are not designed for evaluating and buying complex digital solutions. Procurement of

digitally enabled advanced services requires a radical shift in the business logic for customers, as they need to better understand how to design, customize, evaluate and purchase intangible offerings. It has been emphasized that buying these is considerably different from buying simple goods or services, as specifications are based on the required result (Sjödin, Parida & Lindström, 2017). As digital technologies are rapidly changing, there is an acquit need for continuous improvement and innovation approach. However, current procurement processes are often based on a transactional logic, which limits the potential for close collaboration and co-development between the customer and provider. In addition, the evaluation criteria for the procurement of products are typically not relevant for digitally enabled advanced services, which underlines a need for novel procurement approaches. Thus, we argue that customer organization need to revise their procurement processes for buying digitally enabled advanced services.

Yet, servitization literature provides limited guidance for the transformation of procurement processes. Most prior research has widely focused on providers' perspective, and current knowledge of how customer organization engage in buying digitally enabled advanced services is limited. To address this gap, this study aims to develop a framework that describes the key phases and activities for procuring digitally enabled advanced services.

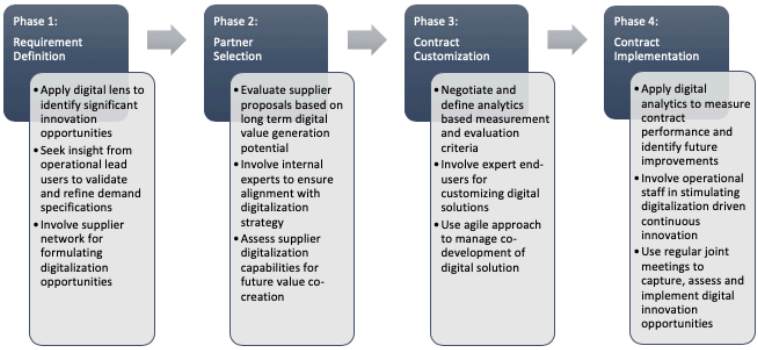
Methods

Explorative multiple case study was used to gain detailed and complementing insights into the internal procurement process of customer companies. The 8 case companies are all large sized (i.e. more than 250 employees) and based in Sweden, representing both customer and provider perspectives. They were chosen because they are leading companies that are actively pursuing procurement of

digitally enabled advanced services, thus can provide novel insights. Furthermore, we had unique access to data and established contacts in these companies due to ongoing research project which enabled rich data collection. In total, 32 interviews were conducted with 17 respondents from customers and 15 from providers within diverse industries such as mining, forestry, heavy automotive, and factories. Interviews were recorded, transcribed, and coded into categories following a thematic analysis approach to find relevant patterns and themes (Braun & Clarke, 2013).

Results

The study found that industrial companies have adapted their procurement processes when buying digitally enabled advanced services. We categorized these processes to go through four phases, and identified key activities that are done at each phase in order to improve the potential of profiting from digital solutions. These are presented in the below figure and next paragraphs.



Phase 1 – Requirement Definition: Procurement process starts with recognizing a need or a problem. Whilst demand specification

should be clear enough, they should not be too specific in a way that hinders innovation. Activities of this phase are:

- Apply digital lens to identify significant innovation opportunities
- Seek insight from operational lead users to validate and refine demand specifications
- Involve supplier network for formulating digitalization opportunities

Phase 2 – Partner Selection: The supplier selected should be able to meet the requirements, but at the same time has the capabilities to continuously improve, and the willingness to commit to a long-term relationship. Activities of this phase are:

- Evaluate supplier proposals based on long term digital value generation potential
- Involve internal experts to ensure alignment with digitalization strategy
- Assess supplier digitalization capabilities for future value co-creation

Phase 3 – Contract Customization: The aim is to reach an agreement of a feasible digital solution, definition of how success is measured, beisdes rights and obligations. Still, the contract should be flexible to incorporate future opportunities. Activities of this phase are:

- Negotiate and define analytics based measurement and evaluation criteria
- Involve expert end-users for customizing digital solutions
- Use agile approach to manage co-development of digital solution

Phase 4 – Contract Implementation: It should be a learning experience for both parties to continue to evaluate and improve, and the decision-making framework for new ideas should be pragmatic. Activities of this phase are:

- Apply digital analytics to measure contract performance and identify future improvements
- Involve operational staff in stimulating digitalization driven continuous innovation
- Use regular joint meetings to capture, assess and implement digital innovation opportunities

Conclusion

The study acknowledges the need for industrial customers to transform their procurement process when buying digitally enabled advanced services. Exploiting new and often uncertain opportunities from digitalization requires a co-creation logic between supplier and customer, as well as close interaction between internal actors of customer's organization, procurement and operations functions. To enable profitable relationship, goals and expectations should be aligned between parties to ensure a win-win relationship. This requires constant communication at all levels, managerial and operational, to ensure discussing new opportunities for improvement and innovation. While flexibility is needed, it is still good to have a guiding process that facilitates the phases of procurement and clarifies the roles and activities.

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Exploring the Relationship between Access to Qualified Talent and Servitization: An Empirical Analysis on Large Manufacturing Multinational Enterprises (MMNEs)

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Abstract

The purpose of this paper is to tests empirically the relationship between access to qualified talent and servitization. The article takes as a point of departure the fact that extant literature on talent management focuses primarily on methods for attracting and retaining talent within organizations, without considering possible

existing effects of "access" to talent in organization's business success. As such, the paper responds to the need for research focused upon the effect of access to talent in itself, as a barrier capable of delimitating the supply of skills and competences demanded in the marketplace, and as a fundamental factor capable of influencing firm´s strategic performance. Particularly, the study focuses on the context of product-service innovation (servitization) in manufacturing industries, a process that demands profound organizational transformation and the development of new roles with a very distinctive set of skills to support firm´s service-centric orientation. To this aim, the study examines 285 servitized MMNEs from seven different industries, located in five different countries. Relevant findings indicate that "access" to talent play a key role on firm`s strategic decisions. Furthermore, our evidence suggests that firms having access to qualified talent for servitization tend to servitize in higher levels.

Keywords: servitization, talent management, access to talent

First Section

Accessing talent focuses on meeting the demand for the right people with the right competencies at that exact point in time when they are needed, with candidates from outside the company (Hills, 2009). It attempts to ensure that qualified talent will join the company to perform in a direction that fits business needs (Collings & Mellahi, 2009). According to Chuai, Preece and Iles (2008) having access to qualified talent means that companies´ are able to upgrade their intellectual capital (knowledge) to operate quickly and more efficiently at the right time. Thus, accessing to key position talented employees plays a key role for driving organization success (Ashton & Morton, 2005). Over the years, a large body of literature has been devoted to describing the benefits of accessing talent, namely: financial (Yapp, 2009), organizational (Tarique & Schuler, 2010), and human resource outcomes (Festing & Schäfer, 2014), validating it as an instrument to reach economic outcomes (Cubas, Ravikumar &

Ventura, 2016). However, over recent years the global economic spectrum is facing a major transition from a predominantly industrial economy to a service economy (Mulder, de Groot & Pfeiffer, 2014). In this context, the irruption of knowledge-based services and products and the growing economic importance of services across industries have driven the need for talent with new competencies and skills to embrace service orientation in once purely manufacturing firms (Vendrell-Herrero, Bustinza, Parry & Georgantzis, 2017; Bustinza, Vendrell-Herrero, Gomes, Lafuente, Opazo-Basáez, Rabetino & Vaillant, 2018).

It is expected that the demand for service-qualified talent will intensify at the pace that firms integrate services into their operations. To date, such proneness has been accentuated, particularly in manufacturing environments, so much that recent studies suggest that, globally, over a third of large manufacturing firms offer services, with the proportion beyond 60% in Western economies (Crozet & Milet, 2017; Lafuente, Vaillant & Vendrell-Herrero, 2017). The growing tendency towards services has definitely come to institute itself as one of the most important drivers of industrial competition nowadays (Opazo-Basáez, Vendrell-Herrero & Bustinza, 2018). Along with it have come new challenges in terms of talent, most of which derive from the adoption of a new strategic logic for goal achievement (Bustinza et al., 2017a; Bustinza, Gomes, Vendrell-Herrero & Baines, 2017) that emphasizes relational over transactional concerns (Vargo & Lusch, 2008; Sánchez-Montesinos, Opazo-Basáez, Arias Aranda & Bustinza, 2018).

Previous studies have indicated the importance of human capital in service contexts (Gotsch, Hipp, Erceg & Weidner, 2014), and their relevance for accomplishing servitization challenges (Baines, Lightfoot, Smart & Fletcher, 2013). However, few studies have assessed the effect of access to qualified talent in servitized firms,

even though lack of talent have been highly regarded as a major issue for companies attempting to provide services (Gebauer, 2007). Hence, the present article is intended to analyze empirically the relationship between accessing to qualified talent and servitization, based on data from 285 servitized MMNEs from seven different industries, located in five different countries.

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Parallel session 7

Point-Counterpoint Session on Paradoxes and Servitization

Chair: Emanuel Gomes

Exploring Servitization through the Paradox Lens

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Abstract

This study analyzes the paradoxes that emerge when a product manufacturer transforms towards servitized business model. Applying the comparative case study methodology (59 interviews in four case companies and an analysis of documentary data), this study contributes to the literature on servitization by increasing our understanding of how organizational paradoxes emerge and influence servitization. This study extends the literature by finding four paradoxes in servitization: 1) effectiveness in customization of solutions vs. efficiency in product manufacturing, 2) exploratory innovation in solutions vs. exploitative innovation in product manufacturing, 3) building a customer orientation vs. maintaining an engineering mindset, and 4) organizing product and service integration vs. separated services and product organizations. As such, identification of these paradoxes enables us to understand the difficulties that manufacturing companies face during servitization processes and, therefore, may even explain to a certain extent the

servitization-deservitization movement among manufacturing companies that some recent studies have identified. The findings help manufacturing companies understand, accept and address the paradoxical challenges and live with the tensions, as not all tensions can be solved. Hence, these challenges are coined as paradoxes.

Keywords: servitization, paradox, coping practices, multiple case study

Introduction

Despite the presented evidence regarding various factors that mitigate servitization and the emerging adaptation of the concepts of paradoxes and tensions in the servitization literature (Brax, 2005; Gebauer, Fleisch & Friedli, 2005), the literature is limited by its focus on widespread and well-known contingency theory (Burns & Stalker, 1961). The servitization literature seem to be missing alternative narratives (Luoto, Brax & Kohtamäki, 2017), such as the application of paradox theory to the analysis of servitization (Gebauer, et al., 2005; Johnstone, Wilkinson & Dainty, 2014; Kohtamäki, Rabetino & Einola, 2018; Visnjic Kastalli & Van Looy, 2013).

We approach servitization through the paradox lens by addressing the following research question: *How do organizational paradoxes emerge and challenge servitization of manufacturing companies?* Applying paradox theory, the rich literature about servitization, and data from four large manufacturing companies, this article contributes to the servitization literature by identifying paradoxes and tensions that may impede, or even prevent, servitization. These paradoxes are highly meaningful for servitization of manufacturing companies and potential reasons for the back-and-forth, servitization-deservitization movement among manufacturing companies that researchers have recently recognized (Böhm, Eggert & Thiesbrummel, 2017; Kowalkowski, Gebauer & Oliva, 2017;

Kowalkowski, Windahl, Kindström & Gebauer, 2015). The paradox approach challenges the economic viability of servitization and calls for rethinking of servitizing manufacturers' daily operations (Rabetino, Kohtamäki & Gebauer, 2017).

Methodology

An exploratory multiple case study approach is utilized to conduct the analysis. This strategy is a suitable approach when studying complex and dynamic organizational phenomena that have not been extensively analyzed. Considering the complexity of servitization and organizational paradoxes, an exploratory multiple case study approach can be considered a sound choice.

Discussion

This study set out to analyze servitization through the lens of paradox theory. As an alternative to the extensive contingency theoretical research, we aimed to extend the servitization literature by shedding light on the paradoxes that appear when four manufacturers servitize their business models. Whereas the contingency theoretical literature suggests that organizations should decide either-or, paradox theory argues that organizations must accept both-and. To extend the previous servitization research, and by building on the existing research utilizing the concept of paradoxes in servitization (Brax, 2005; Gebauer et al., 2005; Johnstone et al., 2014; Kohtamäki et al., 2018; Visnjic Kastalli & Van Looy, 2013), we identified four paradoxes in servitization: 1) effectiveness in customization of solutions vs. efficiency in product manufacturing, 2) exploratory innovation in solutions vs. exploitative innovation in product manufacturing, 3) building customer orientation vs. maintaining engineering mindset, and 4) organizing for product and service integration vs. separated services

and product organizations. The present study extends the paradox theorizing in servitization (Brax, 2005; Gebauer et al., 2005; Johnstone et al., 2014; Visnjic Kastalli, Van Looy & Neely, 2013) and presents a model to shed light on the paradoxes faced in servitization.

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Parallel session 8

Industrial Case Studies

Chair: Glenn Parry

Assessing the commercial chances of machine tool builders to supply advanced services among their industrial clients: A Transaction Cost Economics perspective

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Introduction

The concept of Industry 4.0 (referring to a family of activities and technologies that entail the use and coordination of information, automation, and computation, software, and (remote) sensing technologies (PCAST, 2011)) is gaining an increased interest among manufacturing communities.

The deployment of this concept unlocks new ways to manufacture existing products and to manufacture new products (PCAST, 2011). Similarly, it allows making products and manufacturing processes smarter (Davies, Edgar, Porter, Bernaden & Sarli, 2012). In parallel, it can act as a catalyzer for the design and delivery of knowledge-intensive or advanced services (Acatech, 2015). I.e., when making assets smart and connected by endowing them with sensors, suppliers of goods obtain an improved understanding of the use of their offering by their clients, and which attributes and functionalities they value. This kind of information can be used to come up with new (on-line) support services (Porter & Heppelmann, 2014). Similarly, digital data gathering provides a basis from which firms may move from providing base services that support goods to advanced services

that assist clients in their own value-creating processes. The former can give way, among others, to the following types of smart services: predictive maintenance solutions, corrective intervention and repair mechanisms, life cycle management schemes, productivity/output performance management tools, energy/ material consumption and idle time vigilance.

In comparison to traditional or base services (like repair and spare part delivery), smart services tend to have a stronger (positive) impact on the performance of their users (Porter & Heppelmann, 2014).

At the same time, they tend to have a more pervasive impact on the relationship between the provider and user of such services. I.e., fostering the bonds and inter-dependence between buyers and suppliers as the connectivity between assets and actors induces a stronger mutual orientation among them in regard to value creation processes that span the boundaries of individual firms (Kamp & Parry, 2017).

Whether the subsequent "embeddedness" is experienced as something positive and desirable, particularly on the user side, is debatable and arguably influences suppliers' chances to market advanced services to industrial users of machine tools.

Literature review

In function of the theoretical lens that is adopted, the appreciation of embedded governance arrangements between industrial counterparts will be +/- favourable.

On the positive side one finds the Network and Interaction (N&I) approach (see e.g. Jaakkola & Hakanen, 2013), which aligns fairly well with dominant thoughts among servitization scholars. See for instance Mathieu (2001), who portrays servitization as a distinct

way to conceive inter-firm relationships; more in partnership style and more tending towards long term cooperation.

A more reserved viewpoint on bonding between business-to-business (B2B) partners comes from the school on Transaction Cost Economics (TCE). It exhales a more cautious, or held back, sound with regard to the attitudes of firms in buyer-supplier relationships and their commitment to counterparts (Williamson, 1985). Among others, this is attributed to fear for opportunism on behalf of the counterpart in case one enters into too tight relationships (Williamson, 1985).

Whereas the N&I approach views mutual orientation and partnership development between B2B actors as logical, TCE scholars view such commitment as less natural. When using TCE terminology, a buyer-supplier relationship built on mutual interests would be equivalent to what is called a "network governance arrangement". This arrangement has traditionally been portrayed as second best to the other governance modes that TCE distinguishes: market (purchasing without further involvement of the supplier) or hierarchy (full integration of an external vendor's activities) aka "buy or make" (Bigdeli, Bustinza, Vendrell-Herrero & Baines, 2017). In addition, hybrid governance structures like networks have often been presented as temporary organizational forms that will eventually be replaced by a hierarchy or market arrangements (Williamson, 1985; Powell, 1990).

Since the TCE framework has not yet (or if; highly rarely) been used to explain processes of servitization, and the uptake of advanced services clearly depends on the receptiveness of industrial buyers towards these services, the present proposal explores the suitability of TCE concepts for assessing whether and when industrial buyers are keen to adopt advanced services.

Research methods and framework for analysis

To explore the applicability of TCE concepts for assessing whether goods suppliers can expect to successfully offer advanced services to industrial clients, we focus on a specific sector. The sector of choice is the machine tool industry. Various reasons can be invoked for that choice.

The empirical research context of the present paper is set in the machine tool industry. This choice is invoked by the observation that this industry is witnessing:

A) an increasing demand after flexible and intelligent production lines in order to be fit for the Industry 4.0 era (Acatech & Forschungsunion, 2013).

B) a growing importance of providing services to clients (Acatech & Forschungsunion, 2013; Lay, 2014).

Consequently, we use insights from that sector to operationalize relevant constructs and to mount a corresponding conceptual framework for analysis around the following building blocks (Williamson, 1985; Baker, Gibbons & Murphy, 2002; Brouthers & Nakos, 2004):

- Asset specificity
- Frequency of interactions
- Uncertainty
- Power asymmetry

Results

The paper develops a conceptual framework for analysis and a series of hypotheses. Overall, the paper shows clear ways forward to apply TCE concepts in a servitization context and how they can be used as a toolbox for examining questions around the marketing of advanced services in industrial networks. The paper thus serves to

highlight that many of the factors that influence the roll-out of advanced services can be captured and assessed by appraising the asset specificity, frequency, uncertainty and power asymmetry underpinning the B2B relations in which these services are embedded.

Keywords: Advanced services, servitization, transaction cost economics, Industry 4.0

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Business Model Innovation in Travel Services: The Case of Serbia

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Introduction

It is widely recognized that Internet and innovative technologies represent a powerful tool for development of travel services (Goertz, 2014; Barnett & Standing, 2001; Ogonowska & Torre, 2014). Consequently, there is a growing trend of young travellers that want to book their trip quickly and efficiently (Law, Leung & Wong, 2004; Sun, Law & Luk, 2017). However, for a long time these changes were not recognized by travel agencies in Serbia. In the previous period, while online booking was expanding, the agencies in Serbia relied on the same business model as it was before digitization. It was expected that travellers had time to visit agencies, search printed catalogues, spend time in consultations with a human agent, and ultimately decide on an appropriate trip. Travel agencies usually trade with each other's package holidays in order to spread their offer. This is regulated by a contract between an agent (travel organizer) and a subagent (a broker in sales). So far, this trade in Serbia was done by telephone or e-mail and it was slow and unreliable, sometimes with a risk of overbooking.

This paper is aimed to analyze an innovative collaborative business model developed for travel services in Serbia, provided by a new portal for aggregated offer (https://cofer.travel). The portal was developed in collaborative project including IT experts from PlusPlusNT company and travel and tourism practitioners from several national agencies. This portal automatically pulls data from the CMS and business system of all agencies, processes data to make the search efficient and provides an overview of the entire offer with comparison and online booking.

Methodology

After literature review, we analyzed a case of an innovative business platform developed for travel industry in Serbia. Following a case-study approach the research was directed towards different aspects of the new platform. We conducted interviews with the main actors of the development project, IT experts and travel industry professionals. The aim was to analyze benefits and challenges that an innovative business model provided by the platform (https://cofer.travel) could bring. Benefits and challenges were analyzed from the perspective of travel agencies (B2B business model) and travellers (B2C business model).

Conclusions

Main conclusions are related to the challenges that need to be overcome in order to transfer business to the Internet:

- Unlike hotel reservations, the price calculation for the sale of the package holidays is significantly more complicated because it is necessary to handle many special cases;
- It is necessary to keep parallel records on the capacities, both for the accommodation and for the transport;

- It is necessary to automatically generate all supporting documents, including legal forms, as well as operational documentation;
- It is necessary to enable easy search of the package holidays according to different parameters (type of accommodation, type of transport, etc.);
- It is important to provide an efficient trade model between agencies.

Software developed by PlusPlusNT addresses all these challenges and provides additional opportunities for improving agency performance. The software practically provides networking of agencies in Serbia, making a kind of a tourist services exchange, enabling agencies to trade and sell entire packages via Internet, either on agency websites, or on a website that contains an aggregated offer of all agencies in the system.

Benefits of the new business model were recognized as follows:

1. Internal business of agencies: the new platform provides an efficient way to create an offer, easily generates a pricelist and fully automatically calculates financial obligations in almost all complicated variants that can be found in practice; All accommodation facilities and holiday package data is stored in a single database and available to all employees.
    - Data entered into the agency IT system (descriptions, images, price lists) is used to display the offer on agency websites, which makes the presentation process completely automated and the need for staff maintaining the website is reduced;
    - Reservation is possible through the agency's website;

- Changes in the system (descriptions, images, pricelists) are in almost real time forwarded to websites, whereby potential travellers are informed for a short period of time;
- All the documents required by the law are automatically generated from the IT system;
- All documents required by insurance companies (insurance policies for passengers, etc.) are automatically generated from the IT system.

2. B2B business model: New software allows the agencies to trade directly with each other, which means that one agency books directly into the system of the other agency, with all the necessary data and calculations (if one agency buys from the other, the price of the arrangement must also include the subagent fee, and the passenger must clearly indicate that package was bought through intermediary). Since the process is fully automated, there is no risk of overbooking.
3. B2C business model: The traveller has many benefits via the new model: They can quickly find an adequate package, in various options (for example, two adults and two children with transportation); find a package at the best price, compare different offers; decide which additional services he/she wants to buy (excursions, insurance, ski pass, etc.); have security when shopping and travelling.

Findings and conclusions of this research contribute to the literature of travel industry business models and also to the practitioners in the process of development of innovative platforms for travel agencies.

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Servitization in the Automotive Industry: From Car Manufacturers to Mobility Service Providers

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Abstract

Servitization, as a strategic alternative to product innovation, has gained significant attention from both academics and practitioners, as more manufacturers seek for growth opportunities and differentiation from the competition. In this study, we examine opportunities and challenges of servitization in the automotive industry. We analyse the service portfolio of a traditional car manufacturer to illustrate the servitization process in the industry and highlight the relevance of additional service offerings. Qualitative research reveals closer customer interaction and additional revenue potential as the major opportunities, while the insights also detect significant challenges for traditional manufacturers, and particularly in terms of organizational change and profitability.

Keywords: Servitization, Manufacturing, Automotive, Digitalization

Introduction

The nature of the relationship between manufacturer and buyer has changed fundamentally over the last decades. In the past, the sale was also the end of the conversation between the two. Today, not the exchange of tangible goods, but intangible services like specialized skills, knowledge, and processes are central to customers' value creation (Coreynen, Matthyssens & Van Bockhaven 2017). This is a strategic change in how firms create value, requiring them to continuously learn from and with consumers and remain adaptive to their fast-changing needs to provide not only products, but valuable solutions. New technologies enabled progressive digitalization throughout all industries, facilitating novel services and innovative business models (Gallouj, Weber, Stare & Rubalcaba, 2015). This transformation, named servitization, implies building up long-term customer relationships and thereby growing customer lifetime value (Orton-Jones, 2016). It also imposed the need upon manufacturers to re-think their competitive advantages and differentiation, a highly relevant exercise in automotive industry where new technologies and changing customer needs bring disruption to status quo. Besides this shift in business practice, also the academic community has turned its attention to the servitization phenomenon, highlighted by the growing number of publications in this area. Yet, very few studies have revealed the relevance of this transformation throughout the automotive industry.

We first review the literature on the strategy of servitization in today's digitalized world. Next, we use the model proposed by Gaiardelli et al. (2014) to classify the service offering of a traditional manufacturer BMW and assess the servitization process in the automotive industry over time. In addition, qualitative empirical research enables us to gain deeper insights into opportunities and challenges a manufacturer is facing along this transformation

process, and how and when collaborative methods of developments are likely to occur.

Methodology

Given the objectives of the study, we first collect secondary data on BMW's service portofolio, and apply a classification model to identify its servitization journey over time. Next, we conduct a qualitative research, to gain deeper insights into the perceived opportunities and challenges a traditional car manufacturer is facing in their exploration of becoming a future-proof mobility service provider.

Data Collection and Analysis

We construct BMW's service portfolio by using publicly available information from the company website and brochures. A cross-check with an authorized dealership ensures the reliability of the findings. Gaiardelli et al. used their PSS classification model to analyze a service portfolio of a truck manufacturer, and we apply it for classifying the service offering of a passenger car manufacturer. We collect information on 32 services offered by BMW, year of introduction, whether offered for free, the nature of transaction and offer orientation.

Upon the analysis of the services, we conduct five semi-structured interviews. We selected the interviewees according to the industry structure; two with sales managers from a well-established BMW dealership, and three interviews with BMW mobility service experts, two on the corporate side, and one working for DriveNow, BMW's European carsharing brand. In addition to the five semi-structured interviews, one short interview was done with a BMW engineer to get some insights on technical requirements. All

interviews (Table 1) were conducted via phone and transcribed in German by a co-author of this paper.

We apply a directed approach content analysis to analyze the interviews (Hsieh and Shannon 2015). Using the existing theory, we identified initial coding categories and used them to group relevant interview questions. All transcripts were reviewed carefully, highlighting the text that appeared to describe opportunities or challenges related to servitization. The highlighted text was coded using the predetermined categories, wherever possible. The key findings were clustered and sorted in a matrix constructed to provide a holistic overview.

Shortcut	Respondent	Company	Date of Interview	Length of Interview
BMW1	Mobility Service Manager	BMW AG	20-11-17	47 minutes
BMW2	Mobility Service Manager	BMW AG	3-12-17	49 minutes
Drive1	Operations Manager	DriveNow GmbH	20-11-17	43 minutes
Eng1	Engineer Car Concept	BMW AG	21-11-17	10 minutes
Dealer1	Marketing Manager	BMW Euler Group	25-11-17	38 minutes
Dealer2	Sales Manager	BMW Euler Group	2-12-17	51 minutes

Table 1. List of the interviews and interview details

Findings

Our study shows that BMW's service portfolio mainly consists of product-oriented services for after-sales revenue generation. About 22 of the 32 identified service offerings are product-oriented, representing almost 70% of the total service portfolio (Figure 1). In addition, the majority of these services is transaction-based and it can be inferred that these have a strong product-centricity and a relatively low influence on customer engagement (Figure 3). Nevertheless, over the last years, BMW has expanded its use-

oriented services now accounting for about 25% of the service portfolio (Figure 2). New innovative business models namely DriveNow, ReachNow and ParkNow are providing customer value without a switch in product ownership and the respective downsides. Also, use-oriented services exclusively for electric vehicles shall compensate for disadvantages of the new engines like their limited reach. Furthermore, the study shows that BMW is investing in result-oriented services like carpooling and ridesharing. As discussed earlier the evolving technology and changing customer demands are forcing but also enabling OEMs to think beyond product innovation and use servitization as a strategic option to stay relevant in customers' lives as well as competitive in the market. Nevertheless, traditional after-sales services focusing on the reliability and availability of the products still represent a major source of revenue for the manufacturers and particularly their dealers. Based on the findings at BMW, Figure 4 is visualizing the servitization journey traditional car manufacturers are going through. Historically, they have grown out of a product-focused business expanding value creation through ongoing product innovations. Over time, car manufacturers have added product-oriented after-sales services to increase customer value and generate further revenue after purchase. The after-sales services enable the manufacturers to stay closer to the customers over the product lifecycle, represent a significant revenue source, and need to be expanded to appropriate the product value. The third stage of the journey is the offering of mobility services where value-in-use is generated without any switch in ownership. These represent an opportunity for providers to establish strong customer relationships with a more constant interaction. This third step embodies the biggest and most challenging one of the journey - a game changer demanding entirely new business models in the automotive industry.

The findings of the opportunities and the challenges are presented in Figure 5, and the changes in the customer's journey in Figure 6.

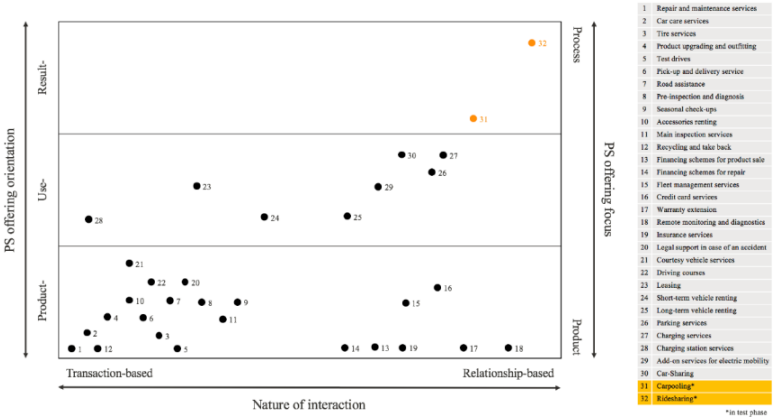

Figure 1. BMW services classification, using PSS classification model by Gaiardelli et al. (2014)

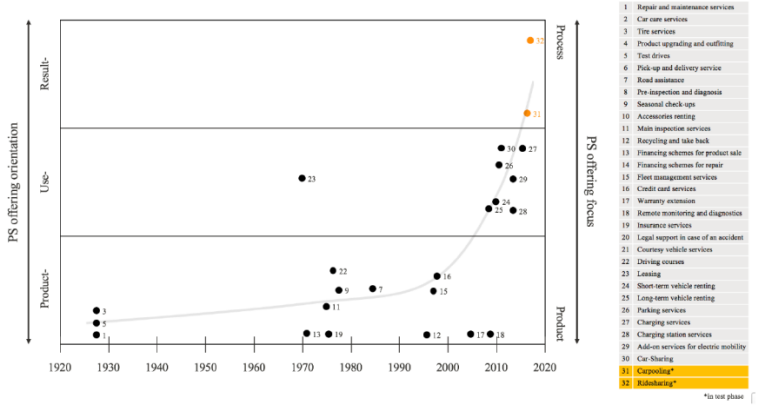

Figure 2. BMW's services orientation over time. Note that only 24 service are included, for which we were able to identify the year of introduction

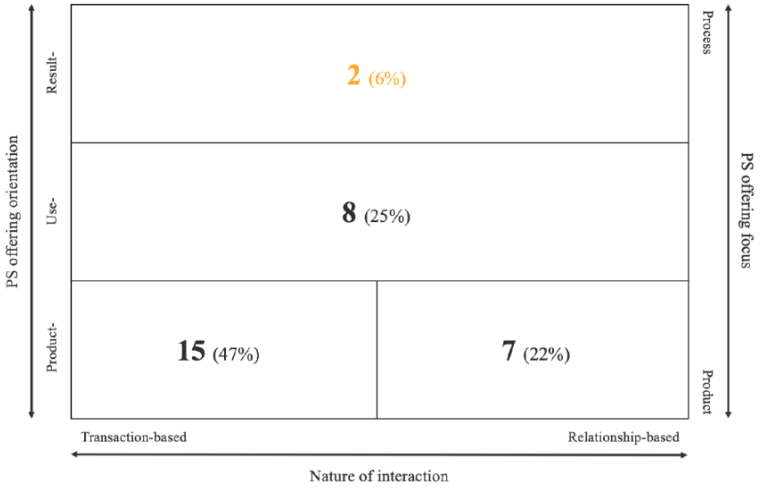

Figure 3. Frequency distribution (and percentage) of BMW's services over classes

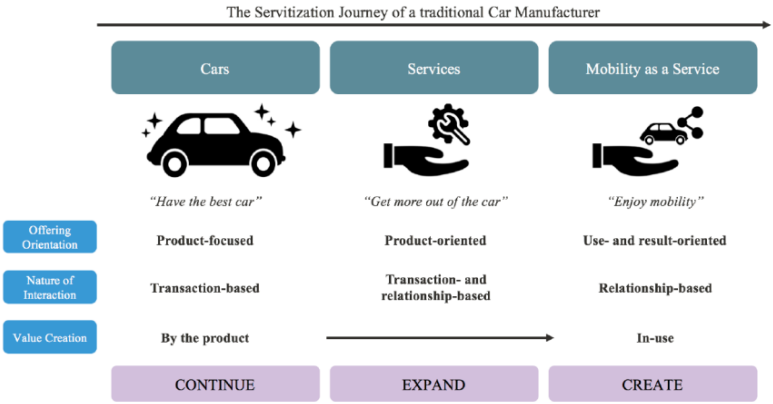

Figure 4. The Servitization Journey of a traditional Car Manufacturer

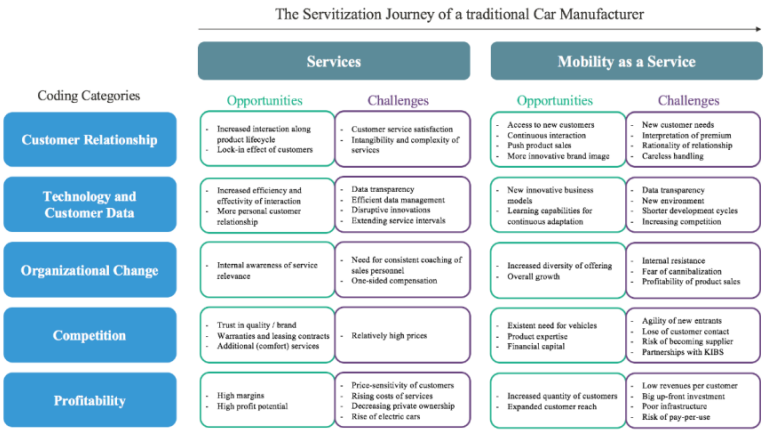

Figure 5. Findings matrix.

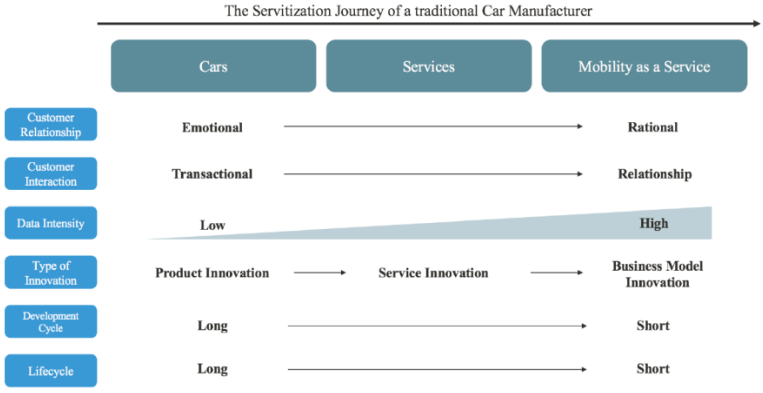

Figure 6. Major changes to be expected along the servitization journey in automotive industry.

Conclusions

The paper offers insights on the servitization process of a traditional car manufacturer, and the opportunities and challenges it is facing along the way. We show the servitization trends that develop towards more complex result-oriented relationships with customers over time. As new offerings go beyond core competencies of the manufacturer, complex collaborative arrangements are often the preferred market strategy. The manufacturer perceives service business is considered much more complex and characterized by more uncertainty compared to the hardware business. While allowing generating additional revenue between product purchases, mobility services are also opening entirely new customer groups that were previously out of the product business reach. Progressive digitalization is considered as the enabler of the development, but it is in fact shifting the technology from the periphery, business-enabler, to the core of the business. On the flip side, the servitization in the industry lowers entry barriers and forces traditional OEMs to rethink their way of doing business. The new reality implies learning to operate in an environment with high fluctuation and unpredictable demand. Even though the sale of the product still generates most of the manufacturer's revenue, there is a clear understanding of the need to invest in new business models and collaborative efforts required to stay relevant in customers' lives as well as competitive in the market.

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Servitization of Office Lighting in the Context of IoT

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Abstract

The purpose of this paper is to describe the process and provide a guide for the development of new IoT services for manufacturing firms enabled by digital technologies. There is growing interest in the digital transformation of industrial firms experiencing a shift toward service business. This trend is evident in the lighting industry where the Internet of Light is being applied. This paper describes a process to support firms in their digital service transformation through understanding the business ecosystem and converting the identified value propositions into service blueprints. Creating service blueprints supports the development of new Business Models through the identification of required digital capabilities. This framework helps to develop customer value propositions, determine required digital capabilities and support the creation of new IoT-based Business Models.

Keywords: Servitization, lighting, Internet of Things, value creation

Introduction

This paper describes a process and provides a guide for the development of new Internet of Things (IoT) services for manufacturing firms enabled through digital technologies by investigating the office lighting industry. Lighting systems in offices are becoming an infrastructure to connect people, devices and systems, creating the Internet of Lighting (IoL) (Werff, Essen & Eggen, 2017). Advancements in smart building technology show that the IoT paradigm is brought closer to office lighting due to: LED technology; advanced digital lighting controls; and network technology (Giusto, Iera, Morabito & Atzori, 2010). As office design and the use of buildings change, the organizations involved with the business of office lighting need to reconsider their value propositions. This provides an opportunity to integrate the IoT into the lighting, as this can bring many advantages to all stakeholders involved and have a disruptive impact on the value chain (Werff et al., 2017). The IoL allows the lighting systems to be transformed from a product to a service. This can be achieved by focusing on enabling new forms of value co-creation in product-centric firms by the introduction of new and advanced technologies (West, Gaiardelli & Rapaccini, 2018).

Research methodology

The research was built upon four main phases, shown in Figure 1. The first step concerned a literature review to understand and identify the relevant theoretical aspects related to this study.

The second step was to understand the ecosystem through discussion with different representatives of departments within the case firm, which is active in the lighting industry. It focused on obtaining direct feedback from a range of different perspectives through internal workshops and discussions. The case firm in this

study was an established middle-size company in the global market, working purely in manufacturing lighting units (called luminaires within the industry).

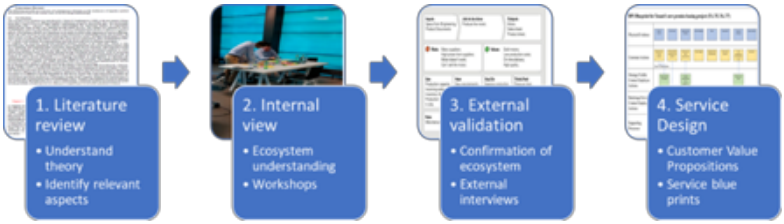

Figure 1. A four step methodology was applied to this study

The third step was external validation with the ecosystem actors to create the building blocks of the business ecosystem and validate the results found in the second step.

The final step of the methodology was to create service blueprints linked to defined value proposition canvases for each of the actors (Osterwalder, Pigneur, Lombriser, Abplanalp, Huber, Kaufman et al., 2014). The objective of building service blueprints was to create a starting point for the creation of new business model canvases for the case firm, and focus on a new service design.

Results and Discussion

The information collected from the literature review was converted to a set of internal workshops performed in the case firm, which provided insights about the structure of the lighting industry, the ecosystem actors and, where possible, the economics of value creation. These data were used to create a lighting industry ecosystem shown in Figure 2.

Each actor in the ecosystem is represented as a circle labelled with the actor's role. The arrows represent the exchange of service/ products in orange, data/information in blue, and cash in green. The results of the external interviews provided details of the Jobs-to-be-Done, pains, gains, and needs, in order to develop the Customer Value Proposition canvases for each of the ecosystem actors. The actors marked in red in Figure 2 were highlighted as the decision makers who have the greatest number of connections within the ecosystem.

Figure 2. Lighting industry ecosystem

The value propositions to pursue in the research shown in Figure 3 were assessed with an emphasis on service aspects and their place in the data, information, knowledge, and wisdom hierarchy plotted

with the level of service infusion, based on the types of services that a manufacturer can offer (Baines & Lightfoot, 2013).

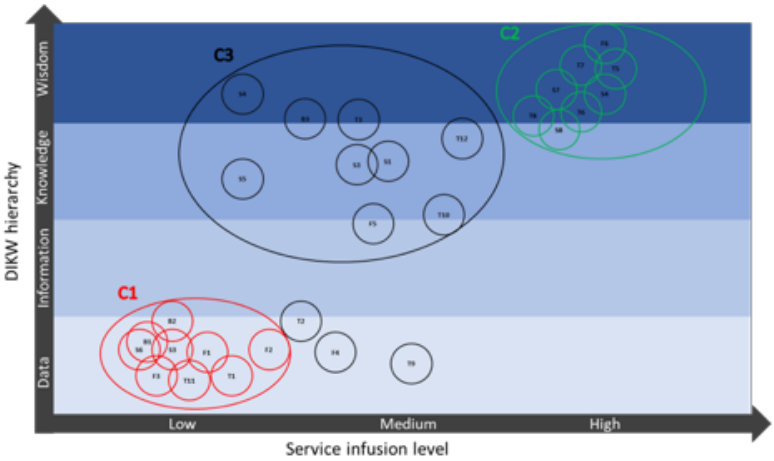

Figure 3. Value proposition area

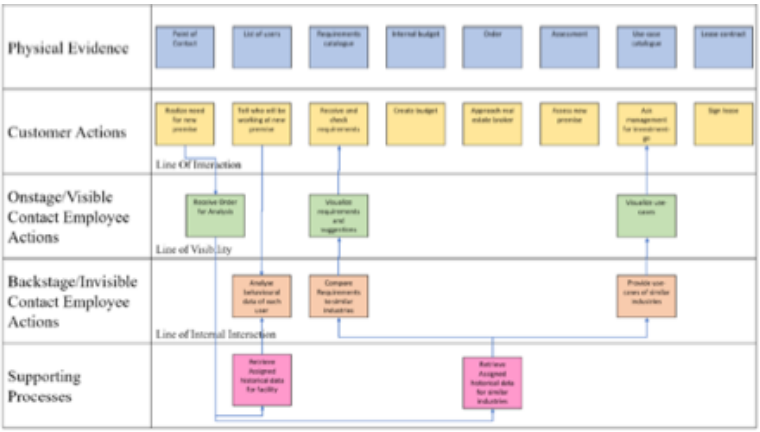

Figure 4. Service blueprint 1 showing actions taken by the actor and the case firm

The clusters in the C1 range have the lowest level of service infusion, however they are considered to have the basic foundations to add more service to their offering. The clusters in the C2 range have the highest level of intangible content, therefore the service infusion level for them is high (Nelly, Benedettini & Visnjic, 2011).

The last step was to compare the capabilities for the implementation of the service blueprints, as seen in Figure 4, with the digital capabilities shown in Table 1.

The comparison was created to determine the capabilities that are the most relevant for implementing digital services in the lighting industry. The most frequent capabilities present in each of the service blueprints were: asset identification, asset localization, usage intensity assessment, prediction and optimization. Time-stamping and autonomy were present in four of the five service blueprints.

Capability/Service	Service blueprint 1	Service blueprint 2	Service blueprint 3	Service blueprint 4	Service blueprint 5	Key measure
User identification	x	x				User position
Asset identification	x	x	x	x	x	User position
Asset localization	x	x	x	x	x	Asset use
Time-stamping	x	x	x		x	Asset use location
Usage intensity assessment	x	x	x	x	x	Access to real-time data
Condition monitoring	x	x	x		x	Monitor usage
Usage monitoring		x				Observe performance
Prediction	x	x	x	x	x	Predict user behaviour
Adaptive control		x			x	Increase user experience
Optimization	x	x	x	x	x	Improving performance
Autonomy	x	x	x	x		Increasing autonomy

Table 1. Digital capabilities of service blueprints adapted from Ardolino, Rapaccini, Saccani, Gaiardelli, Crespi & Ruggeri (2017)

The results show that user position, asset use, real-time data, predictive user behavior and improving performance are the key measures active in each of the service blueprints. This result is in

line with Ardolino, Saccani, Gaiardelli and Rapaccini (2016) where IoT is considered important for asset identification, asset localization, intensity assessment and optimization. What is contrary is the prediction capability, which is not considered important yet is present in each of the service blueprints.

The findings are in line with those of West et al. (2018) that to provide smart/digital services in a product service system it is necessary to understand the service ecosystem. The smartest digital services include close integration with more conventional product service systems to improve actor engagement and support critical outcomes of the equipment, whereas less smart services concentrate on simple transactions between the supplier and the customer.

Conclusions

This paper contributes by confirming that understanding customer value is important in designing new industrial services. It reinforces the need to understand the key actors within the business ecosystem and determine the value exchange between them. Furthermore, this research supports the fact that digital capabilities are crucial for the development of IoT-based services, and the assessment of which capabilities are established and which need to be created is important to successfully integrate digital services.

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Parallel session 9

Servitization and Firm Performance

Chair: Ferran Vendrell-Herrero

Contextualizing PSI-Performance Relationship

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Abstract

The purpose of this paper is to unpack the complexities existing on the relationship between product-service innovation (servitization) and performance. Literature is unconcise about the positive effects of this type of innovation on general performance and we clarify the importance of contextualization. By reviewing the principal papers that have analysed PSI-performance relationship, the main methodological approaches taken, the novel constructs validated, and the role of mediators/moderators found in the servitization literature, we unpack the different PSI-performance relationship according to the context. This review opens interesting avenues of research as it helps to choose between different methods and variables to evaluate PSI-performance relationship, and discover unexplored fields to better ground this relationship. Finally, a call to include solid configurational theories, appropriate fit between theory and measurement techniques, and new sampling strategies for

performing longitudinal studies gives a final look to the future in the PSI-performance relationship.

Keywords: Product-service innovation, servitization, performance

First Section

Product-Service Innovation (PSI) –or *servitization*– has become a critical innovation strategy that is forcing firms to readjust their competitive edges and reconfigure their organizational boundaries. Since late 1980s, companies realized the importance of including services to their goods offerings in order to capture additional revenue streams at the end of the value chain (Wise & Baumgartner, 1999). Furthermore, some manufacturers as IBM escaped to cost strategies by shifting from a pure product firm to practically a pure service firm, while other as Roll-Royce changed from selling goods to selling solutions. These firms were looking after the value generated during the entire life cycle of the product through developing technology-enabled services business models to achieve a superior competitive advantage (Bustinza, Vendrell-Herrero & Baines, 2017; Vendrell-Herrero, Gomes, Bustinza & Mellahi, 2018). Even when PSI has been mainly analysed on manufacturing contexts, industrial marketing, and operations management lens, other industries as creatives and retailers have been affected by this innovation (Vendrell-Herrero, Bustinza, Parry & Georgantzis, 2017).

PSI is a specific kind of innovation and, from this point of view, "is conceived as a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment" (Damapour, 1996, pp. 694). Hence, as any innovation, it is aimed at creating market driven products or services, either acting as a response to external environmental pressures or to facility new market strategies

(Rabetino, Kohtamäki & Gebauer, 2017). Therefore, PSI affects, in general terms, to producers, not only manufacturing firms, but also other industries that offers fuller market packages of customer-oriented goods and services with the objective to recover or achieve superior performance than competitors (Bustinza, Gomes, Vendrell-Herrero & Baines, 2017). Bearing in mind the different research fields and industry contexts covered by PSI, this paper addresses the need of contextualizing and unpacking the complexities of the relationship between PSI and performance, shedding light about the lack of consensus about the positive effect of this relationship. Methodologically, the paper follows Cardinal, Miller and Palich (2011) approach. It is based on a comparative and critical literature review and provides a series of graphical illustrations on the different types of PSI-performance relationships as well as a number of examples on how this relationship varies depending on the industrial and strategic contextual setting.

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Servitization practices in Brazilian SMEs: An Empirical Analysis

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Abstract

This article aims to examine the factors (practices) influencing the servitization strategy in small and medium enterprises (SMEs) and the impact of this strategy on SME´s performance. The study uses data from 176 Brazilian SMEs and use the structural equation modeling technique to test a set of research hypotheses. The results provide new insights about the relationship between servitization and performance in SMEs. They support for the hypothesized positive relationship between servitization strategy and performance (financial and non-financial).

Keywords: Servitization; small and medium enterprises; SMEs practices, financial performance; non-financial performance

Introduction

Servitization is as a competitive strategy for manufacturing companies, contributing to increase their competitiveness, turnover and market power (Kowalkowski, Gebauer, Kamp & Parry, 2017). To varying degrees, servitization might involve the reconfiguration of a company's business model (Baines, Ziaee Bigdeli, Bustinza, Shi, Baldwin & Ridgway, 2017; Fliess & Lexutt, 2017), demanding the redefinition of strategic orientation and culture (Ambroise, Prim-Allaz, Teyssier & Peillon, 2018), the creation of separated organizational structures (Oliva & Kallenberg, 2003) and modification in the current processes, resources and capabilities (Paiola, Saccani, Perona & Gebauer, 2013; Valtakoski & Witell, 2018). Moreover, new forms of relationships with clients and providers are required (Fliess & Lexutt, 2017; Vendrell-Herrero, Bustinza, Parry & Georgantzis, 2017).

The existing literature has concentrated on servitization in large-sized companies (Baines et al., 2017) and, hence, it is not easy to transfer their findings to small and medium enterprises (SMEs), which generally have limited resources and capabilities (Ambroise et al., 2018; Valtakoski & Witell, 2018). Moreover, only a few studies have investigated the adoption of servitization in SMEs, and, specially, on the impact of servitization on SME´s performance (Ambroise et al., 2018; Kohtamaki, Partanen, Parida & Wincent, 2013; Kohtamaki, Hakala, Partanen, Parida & Wincent, 2015; Valtakoski & Witell, 2018). While it is an accepted idea that servitization brings strategic and competitive benefits (Baines et al., 2017; Gebauer, Fleisch & Friedli, 2005; Kowalkowski et al., 2017), its financial benefits are far from a simple issue.

Recognizing that SME is an important topic in the servitization literature (Oliveira, Mendes, Albuquerque & Rozenfeld, 2015), this article aims to examine practices (factors) influencing the servitization in SMEs and the impact of servitization on a

company's performance. A comprehensive conceptual model (including constructs of practices regarding strategic orientation, organizational structure and culture, process, resources and capabilities, and external factors) was developed and tested to uncover the servitization-performance relationship in SMEs.

Research Method

Primary data was collected from a survey with 176 Brazilian small and medium-sized manufacturers of capital goods. The empirical analysis pursues the description of the servitization practices implemented by the Brazilian SMEs. The analysis is carried out through a descriptive exploratory research. Furthermore, Partial Least Squares - Structural Equation Modelling (PLS-SEM) was used to analyze the collected data, assess the model and test the hypotheses. The data were collected from January to March 2018.

Findings

The findings demonstrate that the level of servitization implemented by the Brazilian SMEs is still low. In general, they are product-centric companies aggregating services to their portfolio. Several characteristics reinforce the low servitization maturity level: i) service revenues represent less than 20%; ii) provide, mainly, basic services, such as repair and spare part provisions, while other services, such as remote control of machinery and equipment, integration of system, product rentals and management of customer activities, are provided by less than 1/3 of the sample; and, iii) product ownership rights remain with the companies. In fact, SMEs have implemented servitization without promoting major strategic and organizational design changes. SMEs have concentrated on incremental modifications in the servitization practices and have taken advantage of their flexibility and

responsiveness to create competitive advantage. Furthermore, the results s suggest that servitization strategy may yield performance for SMEs in spite of their resources restrictions, size limitation and low level of service revenue. More specifically, servitization can benefit SMEs with financial and non-financial performance improvements.

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Ambidextrous Product-Service Innovation of MMNEs: Performance Implications

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Extended Abstract

Recent studies show how developed countries' manufacturing multinational enterprises (DMMNEs) have turned increasingly to PSI or *servitization*, a business model innovation based on selling integrated products and service bundle solutions (Bustinza, Gomes, Vendrell-Herrero & Baines, 2017a; Bustinza et al., 2013) as a way to compete against emerging market manufacturing multinational enterprises (EMMNEs). The capacity of providing innovative technology integrated into product-service offers enables DMMNEs to differentiate and compete against low-cost EMMNEs (Gomes, Bustinza, Tarba, Ahmad & Khan, 2018; Lafuente, Vaillant & Vendrell-Herrero, 2017). Evidence from previous studies seems to suggest that product firms can obtain higher export performance based on the complementary aspects of sales dynamics between products and services (Bustinza, et al., 2017). Nevertheless, PSI

requires a critical organizational transformation of MMNEs incorporating new services into their traditional product offerings. Combining products with integrated services requires ambidextrous capabilities, as firms must be able to possess not only exploration and exploitation capabilities (Cunha, Fortes, Gomes, Rego & Rodrigues, 2018), but also the capacity to shift the innovation process by performing research and development (R&D) activities simultaneously with service delivery. Through co-creation, service innovation overlaps with the exploratory and exploitative R&D activities (Vendrell-Herrero, Gomes, Bustinza & Mellahi, 2018; Visnjic, Turunen & Neely, 2013). Our study investigates how this form of innovation affects interrelationships between the exploration and exploitation capabilities of MMNEs.

Previous studies have demonstrated that MMNEs must adjust their activity system design and product offerings to respond better to new market needs. Although the international business literature has studied the relationship between international expansion of MMNEs, (Bigdelli, Bustinza, Vendrell-Herrero & Baines, 2018; Vendrell-Herrero et al., 2018), no previous study has investigated the effect of ambidextrous PSI on MMNE performance. Since PSI for new international markets requires redesign of the activity system, it must encompass exploitation (existing processes), exploration (new knowledge), and the simultaneous interplay between exploitation and exploration known as strategic ambidexterity (Cunha et al., 2018).

Our research fills this gap and contributes to the international business, strategic ambidexterity and innovation literatures by analysing the effect of ambidextrous PSI on the performance of both developed and emerging market MMNEs. In doing so, we focus on testing the importance of strategic ambidexterity for product firms implementing service innovation. More specifically, we analyse the precise interplay between exploitation and

exploration in the context of PSI required to ensure the highest firm performance.

We derived the sample through an online questionnaire. The items measured manufacturing practices oriented to PSI strategies involving exploitation and exploration, as well as firm performance. The final sample of regions/countries with sufficient observations for individual analysis was composed of 338 MMNEs with headquarters located in four countries. By adding geographical context as a variable moderating our pathway analysis tested through Structural Equations Modelling, we will better understand heterogeneities in PSI development across regions and contextualise organization of production within different business environments.

The final sample is distributed evenly across the sectors analysed–aerospace and defence, automotive and transportation, commercial and cargo airlines, electronics and high tech equipment, heavy and industrial equipment, medical devices and equipment, and white goods manufacturing.

Contrary to traditional organization of product development, which begins with research and development (Exploration) and is followed by product design and cost-benefit analysis (Exploitation), our results show that the optimal development of service innovation in product firms should start with service design, followed by the necessary technological research on how the service can be implemented. To the best of our knowledge, ours is the first quantitative study to test this process of reverse innovation.

Our results also show that there seems to be an inherent heterogeneity of successful PSI development. Using a unique survey-based sample of MMNEs headquarters in Canada/the US, China, Europe, Japan and the UK, our research shows the different effects of exploration and exploitation to explain firm performance throughout these countries. While most of the countries follow the

sequential ExploitationExplorationPerformance pathway, the sequential path is more important in China than in the other countries/regions. This path dependence is consistent with the fact that emerging economies are in the knowledge-leveraging production phase. Our research suggests that MMNEs from developed countries are in the knowledge-generating production phase (Bustinza et al., 2013) and can specialise in Exploration (US, UK, Canada) or Exploitation (Europe) activities.

Keywords: Strategic ambidexterity, product-service innovation, performance, manufacturing multinational enterprises.

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How Servitized Products Sell in International markets?: The Impact of Servitization Level and Different Entry Modes

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Abstract

The aim of this research is to explain how the levels of servitization bring the best practice to the internationalization strategy. This relationship is calculated by the ability to close the international sale of servitized products, according to the different types of international market entry modes. In this research, we argue that the complexity of servitized products, will negatively affect international sales performance. However, the international entry modes will significantly change the impact of servitization, taking into account the product proximity to the customer. The empirical application employs a logistic regression approach at sales performance and level of servitization. The empirical analysis is drawn from a primary data collection, it is collected in a servitized international firm, involved in High Tech industry. The data contains variables, that describe different levels of servitization, company international sales performance once an initial contact with the customer has been made, different international entry modes and a complementary set of control variables. The results show that the higher level of servitization creates poorer international sales performance. However, results dramatically change, depending on the international entry mode. The results contribute to the literature

on whether higher servitized products are significantly creating competitive advantages the international firms?

Keywords: Servitization, internationalization, entry modes, product proximity

Research motives and questions

Manufacturing firms are increasingly shifting their production focus, from generating pure physical products to offering product-service solutions. This process is defined as servitization (Baines, Ziaee Bigdeli, Bustinza, Shi, Baldwin & Ridgway, 2017; Partanen, Kohtamäki, Parida & Wincent, 2017). Firms servitize their products, seeking to add value to their products in order to avoid competing solely on cost basis (Baines, Lightfood, Benedettini & Kay, 2017; Banies et al., 2009; Neely, 2008). Most importantly, they seek adding value to the physical product and competing in an increasingly globalized market (Turunen & Finne, 2014; Urban & Zucchella, 2011). Servitization literature shows a mixed impact on the performance, when manufacturers implement services in a manufacturing context (Fang, Palmatier & Steenkamp, 2008; Guajardo, Cohen, Kim & Netessine, 2012; Suarez, Cusumano & Kahl, 2013; Visnjic, Neely & Wiengarten, 2012). The majority of servitization research, do research on international firms, focusing on the strategic aspects. For instance, investigating business models in servitized firms (Lafuente, Vaillant & Leiva, 2018; Vendrell-Herrero, et al., 2017), or studying strategic agility, innovation and KIBS (Bustinza, Gomes, Vendrell-Herrero & Tarba, 2018; Gomes, Bustinza, Tarba, Khan & Ahmmad, 2018; Vaillant, Lafuente & Bayon, 2018).

Although the literature pays a decent attention on the territorial impact of servitization (Lafuente, Vaillant & Vendrell-Herrero, 2017; Vendrell-Herrero & Wilson, 2017), the literature neglected the

fact that servitized products may behave differently in different markets, especially when servitized firms start to sell out of the national borders. The differentiation of servitized product behaviors depends on internal and external factors, in which firms can develop better strategies to innovate their servitized products. The previous discussion reveals the gap of how servitized products may affect the performance in international markets. In this study, we are trying to fill the gap by understanding how servitization and its complexity may affect the sales performance in the international market? Furthermore, since we are investigating the servitization in the international markets, distributing such products will imply different entry modes, we argue that different modes of entry will significantly change the impact of servitized product on sales performance.

Data and methodology

According to the novelty in combination of this research, primary data is collected. The data is conducted in a servitized international firm, which is involved in High Tech industry. The data contains variables, that describe different levels of servitization, company international sales performance defined as the ability to close a sale once an initial contact has been made with a potential client, different international entry modes and an additional set of control variables. Servitization will be measured using the different levels of servitized products sold to international customers over the last year. The sales performance variable measures the successfully closed deals in international markets. The entry modes variable describes the different modes, including the foreign direct investments, distribution sales and direct sales from the headquarters. Additionally, we categorize countries in the international market, using the competitiveness index (Sala-i-Martín,

Crotti, Di Battista, Hanouz, Galvan & Geiger, 2015) in order to control the purchasing power of each country.

According to the nature of the data, which includes binary and categorical variables, in both dependents and independent variables, we run Probit and Logit approach, supporting it with the regular linear regression, in order to assure the robustness of the approach. The preliminary analysis shows significant and robust results that bring answers to the set research questions.

Preliminary findings

According to the preliminary data analyses, the primary evidence on the negative impact of the greater levels of servitization of a product on its international sales performance. The higher the level of servitization, the lower sales are successfully closed in the international market. However, after splitting the international sales, according to the entry modes (i.e. Foreign direct investment, Distribution sales, and Direct Sales from the headquarters), the results show an evidence of a positive impact of higher servitized product on international sales performance. This change can be explained by the product complexity and proximity as follows: Higher levels of servitization in a product equates to greater levels of complexity. Such complexity in a product implies the greater need of Face-2-Face communication between potential customer and the seller\support from the company. Accordingly, in the case of Direct international spot sales with the headquarters, greater physical and psychological distance separates the customer and producer due to the absence of a local presence of the producer in the foreign market. However, this distance is less critical when customers deal with local distributes, where customer find local support in their markets. The best scenario of international sales performance for highly servitized products is found in the presence

of Foreign Direct Investment, where international customers find themselves dealing directly with the producer, locally and without any intermediation.

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Parallel session 10

Reflecting on the servitization literature

Chair: Rodrigo Rabetino

Intellectual and Conceptual Structures of Servitization: Evidence from a Bibliometric Analysis

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Abstract

During the last decades, the phenomenon of Servitization has gained the attention of both scholars and practitioners around the world. Recurring this year, the thirtieth anniversary of the birth of the term "servitization", this paper analyses –through the adoption of bibliometric techniques– all the literature devoted to the servitization research field written during the last three decades. In particular, the study adopts the R-package *bibliometrix* for the co-citation and co-word analyses of all the articles published between 1988 and 2017 in journals indexed into Scopus and WoS. Results from the numerous collected and reviewed articles provide both the intellectual and conceptual structures of servitization, together with suggestions for the future development of the research field.

Keywords: Servitization, bibliometric analysis, bibliometrix, intellectual structure, conceptual structure, literature review

Research setting: objectives and methodology

The term "servitization" came to prominence exactly 30 years ago, in 1988, in the paper titled "Servitization of business: adding value by adding services" written by Vandermerwe and Rada. The concept has been used to explain a manufacturing firm's business strategy that consists in the integration between intangible services and tangible products (Baines, Lightfoot & Benedettini, 2009; Bustinza, Bigdeli, Baines & Elliot., 2015; Vandermerwe & Rada, 1988). During the last decades, the phenomenon has gained the attention of both Scholars and practitioners around the world. In fact, a vast amount of academic work has been produced and, due to the large volume and dispersed nature of this prior research, it is difficult to gain a holistic view on what is actually known about servitization. Thus, this seems to be the opportune time to provide a deep and wide overview of the phenomenon.

Therefore, this study develops a bibliometric analysis of the servitization research field. Although two meticulous bibliometric reviews on servitization already exist (i.e., Martín-Peña, Pinills & Reyes, 2017; and Rabetino, Harmsen, Kohtamäki & Sihvonen, 2018), this study is different in terms of purposes, research design, and coverage. In particular, the study adopts the R-package bibliometrix (developed by Aria & Cuccurullo, 2017) for the co-citation and co-word analyses of all the articles published between 1988 and 2017 in journals indexed into Scopus and WoS databases, in order to identify both the intellectual and conceptual structures of the servitization research field.

Preliminary results

This study offers a holistic view of the servitization research field, providing metrics regarding publications that are particularly

useful in order to identify the state-of-the-art and to understand the possible future contributions to the research field.

The results of the analysis allow us to define the intellectual structure of research on servitization. In particular, through the analysis of the co-citation network, the study identifies the most important research and researchers for the servitization research field.

Moreover, the results of the analysis allow us to define also the conceptual structure of servitization research. In particular, through a co-word analysis has been possible to map and cluster the keywords used in the bibliographic collection.

In general, the analysis provided represents a good starting point for understanding the intellectual and conceptual roots as well as the development of theories and concepts utilized in the field, facilitating better positioning future research on the topic.

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Servitization Concept, Origin and Evolution: A co-Word Analysis

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Abstract

Servitization has grown rapidly since its origin as an academic field. Today it is quite diverse: the scope and abundance of literature, the different perspectives and all the vocabulary employed, make servitization as an imprecise "term". Researchers from different scientific communities have adopted different perspectives when defining the servitization topic; there is no consensus on the definition. The aim of this paper is to analyse the origin and evolution of the concept of servitization, through the definition of the different terms in the literature. Co-words analysis has allowed to identify the key conceptual elements of servitization concept and to analyze the evolution of the structure of the concept; the method of the associated words has permitted to establish the strategic diagram, in which the morphology of the servitization research network is presented. The explicit recognition of multiple approaches related to the term will help professionals and researchers to handle through this relevant field.

Keywords: Servitization, co-word analysis, strategic diagram

Introduction

Mintzberg (1987) points out that human nature insists on a definition for every concept. So, in order to understand the essence of any concept, it is necessary to have a clear definition (Ronda-Pupo & Guerras-Martín, 2012). Scholars in the servitization discipline recognize that its emergence as an academic field of research began in 1988 with the publication of Vandermerwe and Rada (1988). Since then, numerous works with a great amount of definitions and/or approaches have emerged.

Servitization has grown rapidly since its origin as an academic field and today it is quite diverse. The scope and abundance of literature, the perspectives variety and the vocabulary employed, make servitization as an imprecise "term". Researchers from different scientific communities (strategic management, marketing, operations, service management…) have adopted different perspectives when defining the topic of servitization. In fact, it sometimes could be found the concept without using the term "servitization" (Kamp & Parry, 2017).

For servitization topic, papers about literature review have been published (Baines, Lightfoot, Benedettini & Kay, 2009; Lightfoot, Baines & Smart, 2013; Brax & Visintin, 2017; Luoto, Brax & Kohtamäki, 2017) and allow to know the of state-of-the- art in servitization. Other publications outline the intellectual structure on this research field (Martín-Peña, Pinillos & Reyes, 2017; Díaz-Garrido, Pinillos, Soriano-Pinar & García-Magro, 2018). In all this papers, it is not possible to identify a general and accepted definition on servitization. Rabetino, Harmsen, Kohtamäki and Sihvonen (2018) point out the necessity of future research on servitization in order to apply sense-making theory or identity theory to investigate the topic of servitization. Eloranta and Turunen (2016) conclude

that there are theoretical shortcomings with regards to construct definition of Servitization.

To advance in this research domain, to try to cover the lack of a consensus definition of servitization and considering that in order to understand the essence of any concept, it is necessary to have a clear definition. The aim of this paper is to analyse the origin and evolution of the concept of servitization, through the definitions of the term used in the literature. The explicit recognition of multiple approaches related to the term will help professionals and researches to handle through this relevant field.

To reach this objective, a quantitative analysis of a broad set of definitions of servitization has been done. Different definitions founded in papers published in WOS and Scopus, from 1988 (as the birth moment of the concept) to 2016 have been considered. Co-words analysis has let to identify the key conceptual elements of servitization concept and to analyse the evolution of the structure of the concept. In addition, to identify research themes associated with the concept of servitization, the method of associated words has been used. It allows to establish the strategic diagram in which the morphology of the servitization research network is presented.

Based on the results obtained, it is feasible to consider two key stages. At the first stage, the concept of Servitization is synonymous with service growth in product firms. At the second stage, it evolves to become a competitive tool relevant for industrial companies, allowing to create value by offering services into the overall strategies of the company. In general terms. It can be observed an absence of consensus in relation to the definition of servitization in both stages. The results point out the existence of different approaches to the concept of servitization. It is expected, as it has already happened in other domains (Ronda-Pupo & Guerras-Martín, 2012) an increase on the consensus level while key terms become stronger than actual definitions. Once this stage will be

reached, the research topic will achieve a consolidated and more advanced stage with a wide range of academics and researchers interested in this field and a clearly identified school of thoughts.

In relation to the research topics resulting from applying the method of associated words, the results show that all scientific communities can be identified in both stages, although in the first stage the core responds more to the Product Service System community, while in the second one, responds more to the "solutions business" community and more tangential to service science. It becomes clear that Servitization is a multidisciplinary phenomenon, and contributions have their roots in different disciplines.

So, all of this has enabled to extract the essential terms of the concept of servitization and can study the relationship among servitization concept and different approaches that intellectual structure has found (Martín-Peña et al., 2017; Díaz-Garrido et al., 2018).

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Unde Venis et Quo Vadis Servitization? Using Dynamic Topic Modelling to Understand the Past and Future Trends of the Field's Chronicle

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Abstract

Servitization-related research constitutes a scholarly domain in search of legitimacy and a unified identity. Not only the concept of servitization but also the narrative behind the concept are far from being static or unique and has resulted from a thirty years' evolution based on concepts from related but different growing research streams. However, there are no conceptual studies providing a detailed explanation on how the dominant servitization metanarrative has emerged, has been evolving during the last three

decades, and may evolve in the future. How might one explicate the past and future development of the servitization narrative? This article strives for answers to this question by relying on the dynamic topic modeling technique (DLDA). This technique not only allows us to show how the evolution of the field nurtured the emergence of new research topics, but also how different concepts and micro-stories have shaped the conceptual scaffolding and the storytelling in servitization during their past development. Thus, this study may help the scientific domain to reach higher consensus and amalgamate multiple perspectives through the development of a well-defined identity.

Keywords: Servitization, narratives, topic modelling, literature review

Introduction

The fast accumulation of servitization research has given rise to a collective overarching grand narrative that amalgamates a big share of the existing research on servitization, which is characterized by a particular set of rhetorical aspects (Luoto, Brax & Kohtamäki, 2017). This grand narrative is far from being static or unique and has resulted from a thirty years evolution based on concepts from related but different growing research streams (Baines, Lightfoot & Kay, 2009). This evolution has materialized not only in the continuous addition of new concepts to the storyline (e.g., de-servitization, business models, digitalization, IOT), but also questioning some principles at the core of the classic servitization narrative such as the linearity of the service continuum (Kowalkowski, Gebauer, Kamp & Parry, 2017). As a result, today's conception of servitization is a very different one than it was twenty years ago (and will be in ten years).

The servitization metanarrative was studied (Luoto et al., 2017) and systematic efforts have been undertaken to bridge different research communities (Rabetino, Harmsen, Kohtamäki & Sihvonen,

2018). However, there are no conceptual studies providing a detailed explanation on how the dominant servitization storyline has emerged, has been evolving during the last three decades, and may evolve in the future. This circumstance is puzzlingly, in particular, when considering the difference between various research streams and the fast development that the servitization research has experienced during the past decades. Thus, there is a need for additional effort to gain a more sophisticated and deeper analysis of the origins and evolution of the servitization chronicle, which may help to understand and integrate different research outcomes.

We suggest that the manner in which researchers socially construct scientific narratives will shape the identity of a scientific domain. Thus, how can we explain the past and future development of the servitization metanarrative? How the evolution of the storyline has shaped the scientific domain? This article strives for answers to these questions by relying first on dynamic topic modeling (Blei & Lafferty, 2006) to show how different vocabularies included in influential and representative articles have informed and shaped the metanarrative of the servitization domain over the last three decades. Thus, this study increases our understanding of the origins and evolution of servitization, which may help to create the needed underlying consensus that enables the domain to amalgamate multiple perspectives through the development of a common narrative while still maintaining its intelligible uniqueness.

Methodology

We apply dynamic topic modeling (DTM), a technique developed based on the generative (hierarchical) probabilistic model of a corpus for searching patterns of words that reflect latent topics in a large collection of pre-selected articles called Latent Dirichlet allocation (LDA) (Blei, Ng & Jordan, 2003). The DTM allows us not

only to show how the evolution of the field nurtured the emergence of a dynamic narrative reflecting latent research topics, but also to identify the articles that contributed to build the servitization metanarrative.

Results

When considering the sample of 550 servitization articles, the DTM identified seven interrelated but different narratives: 1) Strategic fit for profitable service transition, 2) Customer relationships and new service logic in b2b service infusion, 3) Solutions marketing, selling and delivering, 4) Complex solutions in capital goods, 5) Managing performance-based contracting to deliver complex performance, 6) Operations and supply chain management for after-sales industrial services delivery, and 7) Product-centric servitization. Although the narratives appear somehow similar, there are differences when moving the analysis to a micro-level. Not only are the micro-stories different but the vocabularies identified by the DTM as the foundations of these accounts show a particular origin and evolutionary pattern.

Conclusions

As it first contribution, this study explains storytelling in servitization by deconstructing the servitization metanarrative. The article moves progressively from the metanarrative to master vocabularies through the identification and analysis of the narratives and micro stories embedded in latent topics to illustrate how the metanarrative has been socially constructed during the past thirty years of academic development. Storytelling in different servitization streams typically draws on grounds from similar foundational articles, which provide the conceptual underpinnings and result in somehow similar argumentation lines, structures, and

conceptions. Contradictory stories are not frequent in the servitization chronicles from different narratives during the early development of the field, which may explain why Luoto et al. (2017) identified a single generic metanarrative. However, the analysis suggests both an initial dispersion of master vocabularies and a clear convergence among the vocabularies, which resulted in a higher homogenization of the storytelling and the generalized use similar keywords across the different narratives (e.g., servitization and product-service systems). Although servitization was born as a polyphonic domain where the strength and influence of various vocabularies has varied over the time, the process of convergence has led to a more balanced and polyphonic situation than twenty years back, when vocabularies from few narratives (e.g., complex solutions, service transition, and after-sales) had the dominant voices.

The second contribution of this study is methodological, and draws on the use of DTM for identifying alternative themes and influential papers based on the content of the articles. The topic modeling technique help us to avoid some limitations inherent to the use of co-citation techniques. The bibliometric methods are not too effective when looking closer at the evolution of specific latent topics, which typically calls for conducting a qualitative analysis of the content of each article. Bibliometric techniques are biased by the manner that scholars use citations. While other bibliometric methods such as keyword occurrence may help to identify topics, it is probably based on a small amount of data and may not be very accurate if keywords are not precisely specified or intentionally biased.

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Parallel session 11

Smart Servitization in Firms and Cities

Chair: Ganna Pogrebna

The Experiential Servitized Chain

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Abstract

Current Business Management tools, models paradigms like Automation, Robotics, Big Data, Industry 4.0, Internet of Things (IoT) are pushing companies to include servitization services, not only in mature-products' markets but in any market.

Two different elements to consider:

- Global competition, constantly reduced manufacturing costs encourage to differentiate them by providing ongoing, reliable services well beyond the point of sale.
- Hyper-connectivity hype is a potential target for hackers so confidence in the source and usage of the information flow becomes crucial for a good public image for any brand.

Servitization can be seen, however, not only as a strategy that benefits consumers as a source of new product and related service but also a way of ensuring and enhancing reputation and trust.

Some traditional examples of servitization offerings:

- Very Late postponement of the product as customers are involved in the design and /or assembly and final customization of the offered product
- Pay per Use of some services: Xerox, no longer a simple printer manufacturer but a Premium printing services provider
- Preventive Maintenance, Spares Management: Caterpillar with Cat the Cat® Product Link, or Alstom with the TrainLifeServices, tracking services. Robots are a future field for expansion.

Many examples could be added. For an extensive literature review, see Baines, Ziaee Bigdeli, Bustinsa, Shi, Baldwing and Ridgway (2017). In those examples (Rolls Royce, Xerox, Caterpillar, etc.) the relationship between a single company and the end-customer has been considered. But, as Christopher (2011) says companies not compete but supply chains.

The supply chain: a concept in discussion

According to Christopher (2011) a supply chain is "*the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole*" and he also mentions what he calls "4Rs": responsiveness, reliability, resilience and relationships.

So servitization cannot be only analyzed from a single company perspective. The final product and service that a customer demand will be the result of the interactions, managerial decisions of every business involved.

Although the supply chain management is a topic that may be under discussion (Lyall, Pierre & Gstettner, 2018): "*New digital technologies that have the potential to take over supply chain management entirely are disrupting traditional ways of working. Within 5-10 years, the*

supply chain function may be obsolete, replaced by a smoothly running, self-regulating utility that optimally manages end-to-end work flows and requires very little human intervention".

In fact, supply chain management is linked to the responsibility of offering a service or product. Traditional concepts associated with servitization as collaboration, connectivity, control are also related to the supply chain view of a business.

Our view

In this paper we expand that concept as servitization opportunities could appear in many echelon within the same supply chain. So the chain is now a servitized chain, a new flow appears – the services flow besides the physical and financial flow and definitely linked to the information flow, both downstream and upstream (reverse chain). And simultaneously with the customer focused element of the servitization strategy different type of "customers" within a supply chain: the OEM as customer for raw material suppliers, the assembly plants as customer of OEM, the wholesaler, dealers, shops, etc. as customer of those assembly plants and the end customer.

And the final result for the end customer is no longer a product or service but an experience, so we talk about "the experiential servitized chain", somehow different to what Johnson and Mena (2008) describe.

According to what Sakyi-Gyinae and Holmlund (2018), what business customers' value in a servitization context is: System, Infraestructure, Integration, Usage, Relationship and Price.

Methodology

We will adapt their approach to the bicycle supply chain, based primarily on a medium size manufacturing company. We will try to

identify some feasible offerings in many steps since the raw material suppliers to the end customer and backwards. And we finally try to understand ¡ what every different customer in the supply chain value.

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Is IoT an Enabler for Smart Servitization?

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Extended Abstract

Internet of Things (IoT) make a significant reshaping of industry possible, with borders between products and services as well as borders between industrial sectors becoming more blurred than today (Porter & Heppelmann, 2015). This may materialize through: service enhanced products; increased efficiency and transformation in process; tighter relation supplier/buyer; increased buyer power; new business models; and new innovative actors and startups (Friess & Riemenschneider, 2015). Hence, IoT allows for more efficient production and higher customization levels offering promising opportunities of its application in many industries. Indeed, research recognizes the potential of IoT for manufacturers

as they are moving from product-oriented companies to service-oriented ones (de Senzi Zancul, Takey, Bezerra Barquet, Kuwabara, Cauchick Miguel & Rozenfeld, 2018; Georgakopoulos, Jayaraman & Georgakopoulos, 2016). The possibilities of IoT and other digital resources play a big role in the provision of services since manufacturing firms are increasingly trying to create added value by supplementing their core offerings with services also known as servitization (Neely, Benedettini & Visnjic, 2011; Vandermerwe & Rada, 1988).

This research attempts to deepening the understanding of potential benefits and challenges of adopting IoT technologies, in the pursuit of offering value-added services. We seek this aim by assessing industry's readiness to adopt IoT technologies. We depart from the literature in which servitization is viewed as being co-created with customers in which offerings are characterized by a high variety of use, and therefore enabling firms to provide customized offerings through the embedding of digital layers in physical products (Green, Davies & Ng, 2017). The context of this research is confined to small and medium sized enterprises (SMEs). This research responds to calls on further exploring the possibilities of digitization and servitization (Vendrell-Herrero & Wilson, 2017) and the limited consideration of servitization research in the SME domain (Kowalkowski, Windahl, Kindström & Gebauer, 2015).

We are working on a large-scale empirical investigation in SMEs in the Province of Limburg in the Netherlands. As a first step, we designed a questionnaire to investigate to what extent companies are willing and able to use IoT, thereby examining their IoT readiness. This depends on the potential advantages for these companies to use IoT; and on effectively addressing the problems and challenges that these companies face when they want to implement IoT. We constructed four dimensions to assess IoT readiness, which are reported in Table 1 including General Background, Customer

Needs, Growth Opportunities, and Operational Excellence[1]. Items per dimension are measured on a five-point Likert scale.

Dimension	Description
General Background	What perception does the company have regarding IoT?
Customer Needs	Does the customer need IoT?
Growth Opportunities	How does IoT contribute to the growth of the company regarding the value chain position of the company and its partners?
Operational Excellence	Is the company able to provide IoT-based services?

Table 1. Dimensions and its descriptions

In the first step of our research we validated our initial questionnaire on a small initial set of companies. The preliminary result is that the questionnaire is useful however it has to be filled in an interview situation. Furthermore, we recommend that the result is completed by secondary data. We will gather more data by collecting more completed questionnaires and by an extended websurvey. The design of the research is a longitudinal study to understand the IoT readiness of SME in the region over a period of time. The first results are expected Autumn 2018.

[1] Dimensions are based on a review of seven IoT readiness scans from industry partners (among which Cisco, KPN, Fraunhofer Institute, PWC, Netscout and local ones).

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Servitization in the Smart City context

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Abstract

The purpose of this paper is to rethink the definition of servitization translating it from the manufacturing and industry context to smart city context. Using a combination of large-scale publicly available datasets on city services (transport, education, healthcare, etc.) we consider how cities with different characteristics and geolocations are developing or may develop capabilities they need in order to offer public and private services and solutions which add to their traditional spectrum of offerings. Smart cities' servitization is a new direction that many developing and developed cities can implement to address some of the biggest urban living challenges. These include, but are not limited to: air and water pollution, traffic congestion, job creation, social stability and inequality, food security, and urban well-being. Different cities will focus on different objectives. For example, New York City has identified job creation and acoustic noise as its main challenges, whereas the European Union has identified green urban living as its priority. Nonetheless, smart city initiatives have a common ingredient: "Big Data and its Analytics", which primarily exploits a diverse range of data sets to better inform decision making at the government, business, and citizen levels. Whilst the concept of data-driven smart management is not new to individual city departments, the exploitation of combining data across multiple civic departments, businesses, and individuals as well as applying servitization mechanisms in city context is new and challenging. Smart cities are primarily concerned with how large data sets can provide insights and solutions to the big urban challenges cities face today. These challenges have arisen out of both local factors (i.e.,

increased urbanisation and private car usage), as well as national and global factors (i.e., budget cuts, rising price of commodities, and global warming). In short, there is strong agreement across cities, universities, and industry, that data analytics not only provide answers to some of these questions, but also foster: job creation through creating new data-driven economy and city management; better well-being of citizens through reduced pollution and congestion; greater control of city by local government through real-time data; greater control of personal life by citizens through real-time data; sharing data and solutions with other smart cities. With this in mind, we explore how Business Model Canvas could be adapted for cities and whether and to what extent servitization can change smart cities business models.

Keywords: smart city, servitization, business model, Business Model Canvas

This book of abstracts summarizes the proceedings of the **7th International Conference on Business Servitization (ICBS 2018)**, held at the NOVA School of Business and Economics, Lisboa, Portugal.

In this edition the conference's focal theme has been **Make, buy or partner: Paradoxes in product service innovation**. With this theme the event aimed at discussing through what drivers, processes and actors play a crucial role in enabling and promoting collaborative technological upgrading and product-service innovation. Servitization and the benefits of knowledge-intensive service provision do not necessarily have to be fully integrated within the manufacturer's internal value chain, therefore it is important to understand how the various forms of collaboration like strategic outsourcing, strategic alliances, joint ventures and other types of partnerships not only facilitate the upgrading of existing manufacturing competences, but also offer an opportunity to develop and anchor technological and service capabilities across partnering firms.

In this 7th edition of the ICBS we have brought together 50 researchers from 28 Universities and Research Institutes located in 14 countries across Europe and America. In summary, the conference is organized in eleven different parallel sessions that seek to fuel the academic debate around the different aspects of Servitization.

Additionally, this conference welcomes relevant keynote speakers as Prof. Miguel Pina e Cunha (NOVA SBE) and Prof. Marko Kohtamäki (University of Vaasa) providing their views on how paradoxes lenses can be used to increase our understanding of product-service innovation.

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