Assessing manufacturing SMEs’ readiness to implement service design

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Abstract

This paper presents the initial results of a wider research project that investigates how service design might positively contribute to the development of product-service systems within manufacturing small to medium sized enterprises. The paper presents the results of interviews with three firms that have begun to embrace service design. The analysis of these results is used to produce a conceptual framework with nine dimensions that aims to aid understanding of a company’s potential readiness for servitization through service design.

Keywords: service design; manufacturing; product-service system; PSS

1. Introduction

This paper discusses the potential role of Service Design Strategies within manufacturing firms. This research is part of a wider programme that investigates the levels of readiness of companies that are considering the servitization journey from a customer-centric perspective.

To explore how service design might positively contribute to the development of an effective product-service system (PSS) within manufacturing SMEs, a framework to assess and recognize manufacturers’ readiness is presented as a foundation to implement and offer PSS.

Two of the three firms presented in the paper were previously involved in the Service Design Programme (a Welsh government supported programme to introduce service design to manufacturers). Although a number of toolkits and generic templates are available online; their use is not yet implemented within those organizations due to the lack of understanding of Design and lack of confidence on how to apply them. Therefore external help was needed; the Service Design Programme aimed to train non-designers to outsource design work or to develop in-house capabilities. The readiness framework presented in this paper attempts to understand the underlying conditions that apply to manufacturing firms to adopt a more customer-centric approach that fits into their company and suits their needs.

Designers are devoted to communicate by means such as artifacts, experiences and interactions; the visualization and framing tools show the potential of the design thinking among non-designers.

Taking a user-centric approach (UCD) approach means unlearn or (if already in place) refine the capabilities to sense opportunities through multiple user lenses.

The object of service design [1] is the client-provider interface that materializes an exchange relation. This paper attempts to bridge the previous studies and models offering companies a self-assessment tool based on the service implementation readiness measured along nine dimensions. Extending the service business successfully requires various changes in the organizational structure of manufacturing companies [2].

Being design-driven is more than simply applying design, because it requires substantial organizational shifts and a radically different management mindset [3]. Moreover, the Service Dominant Logic requires much more than an increased emphasis on services since it implies a reframing of the firms’ purpose and its role in value co-creation [4].
This research is new in a way that Service Design from Design Thinking is seen as a way to tackle cultural, organizational and technological aspects that prevent the development of a customer-centric PSS. Moreover, it intends to address the need of integration between disciplines such as Business Management, Engineering and Design; Information Systems [5].

This paper is structured as follows: section 2 the literature review; section 3 the methodology with the gaps identified and the research questions; section 4 the results; section 5 the discussion; and, section 6 the conclusions for further work.

2. Background

The literature provides many examples on how large organizations shifted from good-based production to service-based provision [6-8].

Drivers and barriers related to this phenomenon and the types of value propositions based on the integration of product and service [9, 10] is also discussed [10, 11]. However there has been little exploration of manufacturing SMEs from a service design perspective [12, 13] although this class of company represents the largest section of the economy [14].

Manufacturing firms face major challenges when they start the transition from a purely product-based offering to solutions such as PSS. Manufacturing companies are typically characterized by a product-based heritage that comprises product specification terminology, development processes and practical knowledge. To be competitive they are encouraged to look at the value chain and go towards the customer [15].

In this research the review of the literature is framed as follows:

- The design process in manufacturing and in service providers
- Drivers and barriers in the transition from products to services
- Intrinsic characteristics of SMEs

In the literature new product development and new service development are discussed separately and the level of description of PSS development processes is less detailed than the previous two.

Manufacturing firms that are encouraged to go downstream [15] have to start facing customers from the very front-end of the development process where design-related disciplines are based on user-centered design approach [16].

PSS is generally concerning with moving towards offering greater integration with services (going downstream), moving towards offering greater integration with products (going upstream) [17].

The literature raises a number of questions on how to frame PSS; how product and service components relate to each in the development process and the related skills and capabilities needed at each stage. Companies have been stimulated to start designing services with the same attention as products [18], but this does not imply that the process is the same.

In the transition from product-based to solution-based, manufacturers encounter a number of drivers and barriers [9, 19-21]. Offering services implies a deep understanding of the customers and the way to create value propositions differs from a purely product-based approach.

Numerous authors assert that positive results can come from offering services [8, 22] but a move into services is not a panacea and improvements in profits are not automatic [17]. Some prerequisites are needed, for instance: a better core product platform for a service-based competitive advantage [23]; an evaluation of the internal assets and resources available, the level of readiness to implement services. Certainly, manufacturing companies possess knowledge and the expertise about their products; but deeper knowledge about internal assets and resources is needed [24].

It has been argued that companies that adopt a service-based approach gain more competitive advantage because services are more difficult to imitate due to the higher specialization; and they provide long-term relationships with users [7].

In the literature, the servitization process has been mostly discussed through the lens of large manufacturing companies who have available resources to engage external consultants or can invest in the development of an in-house capability. Moreover, it has been discussed from an organizational lens, leaving a gap in the way the process really occurs from a practical point of view. There is much rhetoric amongst the design community on how design provides practical solutions to complex industrial problems; therefore, it is timely to begin to investigate how design, specifically service design, might play the role of the interface between theory and practice in the implementation of PSS in SMEs.

Within SMEs it is worth noting that best practices, skillsets and assets differ from one company to another. SMEs are regularly recognized as the engine of national economies and are not ‘miniature versions’ of large firms [25]. Focusing on small companies means understanding their attributes related to the context they are inserted in, that is, the underlying social and economic dynamics that influence the day-to-day working activities.

From a design perspective, the new operative paradigm suggested by Morelli [26] looks at the social and human components of the service as services are social constructions; thus, customers should be an active part of the value co-production process. Looking at the benefits of service innovation, Shostack [27] provides guidance on how to design a service and Clatworthy [28] extends this process in the way a brand strategy transforms the customer experiences during the New Service Development (NSD), adding original insights into the transition from brand to concept and describing the transition from product to service as a semantic transformation.

The review of the literature appears to reveal a gap regarding: studies on servitization related specifically to SME manufacturing; and, a lack of studies that explicitly apply a user centered design (UCD) approach and service design thinking.
3. Methodology

This paper describes the first phases of an exploratory research project that will develop multiple case studies via a longitudinal analysis of three manufacturing firms that showed interest in this research project since they are internally driven to grow and to some degree externally pushed to offering services.

The first phase reports the findings of face-to-face semi-structured interviews to senior staff (e.g. CEOs, Managing Directors, and Marketing Director). The questions focused on the internal activities and dynamics within the development team, how decisions were made and how integrated offerings were perceived and developed. Examples of the questions are: What type of offering do you have? Who is involved in the development team? Do you follow a formalised design process? Do you offer services? How do they relate to products? To what extent are you using the service design tools once the programme came to an end?

All the interviews lasted around an hour; they have been recorded, transcribed and analysed using the software NVivo.

During the interviews, to increase the level of interactivity, participants were given a leaflet add image with information on the research on one side and a diagram on the other side with three axes: culture, organization and technology.

This visual support triggered a conversation on the perceived barriers in servitization between the researcher and the participants. The written notes have been scanned and analysed using Nvivo, a software to analyse qualitative data through categorization of the most frequent themes (coding).

The analysis provided insights into service awareness and readiness for servitization, assessing internal capabilities and exploring how service design thinking can play a supportive role in service implementation.

In the second phase of the research a set of 27 questions (3 per dimension) will be asked to staff at strategic and operational levels to create an unbiased picture of the firm.

The iterative nature of the tool is meant to validate the dimensions and the way those dimensions are measured to create the most accurate readiness profile of the manufacturing firm. Following the validation, manufacturers will be provided a set of recommendations on the actions to take towards customers and/or providers.

4. Results

The summary table below show the results from the first interviews.

<table>
<thead>
<tr>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
</tr>
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<tbody>
<tr>
<td>We are a product company. We've been good at being a product company with profit.</td>
<td>We want to set ourselves as a technology manufacturing company.</td>
<td>Every project is a launch.</td>
</tr>
<tr>
<td>The services are developed alongside the products and for the sales people.</td>
<td>The site was a critical problem; they started developing remote control interface.</td>
<td>Time pressure and quality pressure.</td>
</tr>
<tr>
<td>Service design is not just designing a new service. Manufacturing is not just making one thing in one place.</td>
<td>We are trying to make the technology so sophisticated that it makes easier for people to adopt.</td>
<td>We have to imagine what it is going to be: concept it, design it, manufacture it, test it, installed it within a fixed timescale because the customer has launch dates and we do some prototype.</td>
</tr>
<tr>
<td>We employ product designers and selling people. So, our core competence is in product. We are very product-focused.</td>
<td>The best product would be where people contributed as it goes round a number of iterations [...] clearly is not their ownership or this is the best way of doing it.</td>
<td>Group leadership</td>
</tr>
<tr>
<td>Importance of prototypes.</td>
<td></td>
<td>At the end of the day companies are people. Focus on: personal transformation, self-awareness, knowledge, so looking/learning about yourself.</td>
</tr>
</tbody>
</table>

After the first interview, it became clearer that servitization is more than just adding services but require a deep understanding of the motivations and benefits that the companies see. Moreover, Bailey [29] points out that design readiness is one of the factors to embed design within companies.

Preliminary results show that manufacturing companies can benefit from deploying a service design approach, once self-assessed the internal capabilities to be extended to analyse the customer experience and create value propositions beyond the product transaction.

The research questions were refined and focus on the readiness recognition to embrace service design approaches and actions to take to implement it.

Aware of the small but representative set of data at the current stage and the exploratory nature of the study, the authors argue that each firm presents a distinctive configuration informed by a different business journey.

The readiness framework originates from the comparison and merging of two concepts: the design ladder on one hand and the different types of PSS presented by Tukker [30] on the other hand.
Findings from the first phase demonstrate that each company interviewed has a different path, a different configuration of capabilities, a range of products, a network of stakeholders to relate to and an aptitude to react to environmental changes.

In this complex panorama, a shared understanding is that service design does not necessarily only imply the addition of services, but also the support on making decisions along the development process to build an end-to-end experience.

From the analysis of the interviews, service design is seen as a potential foundation to build a UCD approach to their offering. However, a formalisation of a service design process had yet to emerge.

The insights from the analysis of the interviews are grouped as follows: identity and legacy on making; service awareness; and service design making.

4.1 Identity and legacy on making

Manufacturing companies routinely develop, perceiving changes and using previous iterations as guidelines to experiment and advance the prototype until the final result. The service component of the product establishes a relationship with the client (e.g. trials) and extends the lifespan of the product (e.g. contracts). Although some of the revenues come from time-based pricing, the offering is still product-oriented.

4.2 Service awareness

Manufacturing companies recognize as engagement with customers as valuable and involve them in the early phases of the development process (e.g. first prototype early market). In one of the companies, the technological knowledge applied to the product and translated into an interface encouraged and enabled their clients to control the performance of the product. At the same time, manufacturers are encouraged to develop reliable products to build a PSS value proposition.

4.3 Service design making

The Companies see service design thinking as an interface between pure service and pure product; thus, service design tools are considered as operative tools used at the very front end. Each Company stated that service design is not only designing a new service and, conversely, manufacturing is not just making one thing in one place. In between there is the potential for the development team to implement services in their offering. For instance, the visual component plays a key role for customers in the pre-purchase phase (e.g. software to configure the components of the ventilation system or the walk-through drawing of the water treatment plant).

These preliminary results show that service design is seen as a viable option to get closer to customers, to support the decision-making process in framing their position in the supply chain and their ambition to grow.

This research is concerned with how Service Design might be an appropriate route to servitisation where companies are interested in developing improved value for their customers. Rethinking the value for the customer motivates manufacturers to find their value in the supply chain. In order to evaluate the opportunity to control the channel to the customer, a company can assess their readiness and willingness to deploy a product-service system as an interface between the firm and the customer. At the lowest level, an integrated solution can be developed based on customers' need within the boundaries of the company's vision. Considering a service design approach, a company might then create a new PSS drawing on the existing company's capabilities. Taking a wider view, the company might begin to explore the potential for addressing customer value through a new configuration of products and services developed jointly with other partners in its supply chain.

In this context, the readiness framework is a self-assessment tool that helps manufacturing SMEs to understand how ready they are to take a service design approach. It combines the customer-centricity of the company's development process and explores how this might impact the way services are considered from the manufacturers' point of view. It examines the perception of opportunities and constraints in the transition from product-based to solution-based. In this context, 'readiness' as willingness and awareness is described as the state when firms consider implementing services and starting to take actions.

5. Discussion

The previous section reveals that the implementation of a PSS goes beyond a definition of service design and it reveals to be necessary to take a step back and first assessing the level of willingness and readiness of manufacturing SMEs to be servitized. The conditions that affect companies' readiness to implement services and guidance on how to re-configure their development processes to address these challenges have not yet emerged. The readiness framework is based on two aspects of service design: being and making. The first one comprises the meta-design skills associated with SMEs; while the second relies on the operational tasks needed to implement the value proposition whose product and service ratio depends on the first aspect.

The framework assesses the prerequisites for manufacturing SMEs to make the transition from product-only offering to product-service continuum offering. The user-centred service innovation perspective [16] instils a human perspective in the organisation and recognises individuals' skill set and enables people to accomplish their goals. In fact, when companies start putting themselves into their client's shoes, they start seeing the world from outside in: how clients see the company and why they look for a solution other than just a tangible product.

Making is transforming the insights (observing soft- qualitative and hard-quantitative aspects) into data (finding what the real problem is and formulating new hypotheses) and then into practice (prototyping the touchpoints whether with product or service components). A alignment of the internal activities to make the value proposition relevant to customers is essential.
The readiness framework is intended to highlight which are the changes or organisational developments a firm should consider in order to increase the likelihood of successful service design implementation. In light of the interviews, the focus shifted on the prerequisites to undertake service in value proposition creation.

Drawn from the literature, the framework has been created to align design, management, marketing and engineering in the development process.

Below is the table with the nine dimensions of the readiness framework that will create the company profile and assess its readiness in the servitization journey in terms of capabilities and skillset.

Table 2 The nine dimensions of the readiness framework

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Description</th>
<th>References</th>
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<tbody>
<tr>
<td>Effectiveness</td>
<td>Past achievements as the foundations of the progress and growth of the company including the internal set of performance criteria.</td>
<td>Eisenhardt and Martin, 2000; O’Reilly III and Tushman, 2004; Baldwin, 2003; Tceee, 2007; Löfberg, 2014</td>
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<tr>
<td>Experience</td>
<td>Configuration of capabilities and codification of new practice-based knowledge in the development team over the years.</td>
<td>Parasuraman et al., 1985; Tceee and Pitsano, 1994; Thomson and Koskinen, 2012; Haheez et al., 2002; Junginger, 2007</td>
</tr>
<tr>
<td>Service History</td>
<td>Evolution of the offering from external stimuli to anticipate or respond to customers’ needs.</td>
<td>de Brentani, 1991; Davies, 2004; Kindström and Kowalkowski, 2009; Aylonitis et al., 2013; Paailoa et al., 2013; Baines et al., 2013; Kowalkowski et al., 2013; Dotzel et al., 2013; Löfberg, 2014</td>
</tr>
<tr>
<td>External engagement</td>
<td>How companies relate in supply chain and non-supply chain relationships; the role that actors play in the network and the co-creation opportunities.</td>
<td>Davies, 2004; Prahalad and Ramaswamy, 2004; NESTA, 2007; Payne et al., 2008; Verganat, 2009; Grönaas, 2011; Cheshirew, 2012; Kowalkowski et al., 2013</td>
</tr>
<tr>
<td>Culture and development</td>
<td>Existing staff capabilities and the learning mechanism to expand them further.</td>
<td>Baldwin, 2003; Davies et al., 2006; Gebauer et al., 2010; Martinez et al., 2010; Aylonitis, 2013; Paailoa et al., 2013</td>
</tr>
<tr>
<td>Creativity</td>
<td>Staff motivation; how they explore and test new ideas; the rewards system and the environment the development team is immersed in.</td>
<td>Eisenhardt and Martin, 2000; Tceee, 2007</td>
</tr>
<tr>
<td>Risk propensity</td>
<td>Attitude towards difficulties the firm encounters to meet the requirements of the offering to enter the market.</td>
<td>Kallhemen and Lovallo, 1993; Eisenhardt and Martin, 2000; Aylonitis et al., 2013</td>
</tr>
</tbody>
</table>

Communication
- Flow of information, how it is exchanged within the development team to assist the decision-making process. | References
- Flow of information, how it is exchanged within the development team to assist the decision-making process. | References

Awareness
- Recognition of services as a critical component of the value proposition for the customers to offer. | References
- Recognition of services as a critical component of the value proposition for the customers to offer. | References

In assessing the readiness of manufacturing companies, further examination is needed regarding: motivations and expectations in adopting design and services, the dependence of the size of the firm, their position in the supply chain.

The challenge behind the framework is to train non-service designers to implement ideas, starting from a formalisation of the interactions (channels and touchpoints) between manufacturers, customers and stakeholders where services are seen as the glue [31] between products and experiences that allows transformation.

The framework aims at making firms aware of how to create services by moving away from established product-focused procedures and how to configure operations to deliver an advanced services offering. Thus, the framework presented shows that company decisions regarding development of a bundle of product and service with services as add-ons to existing products; supportive services to increase product sales at the bottom; or the provision of a long-term solution for customers at the top once servitization has been achieved.

6. Conclusion

The results presented in this paper have been used to conceptualize a framework that aims to assist SMEs in assessing their readiness for the implementation of service design with nine dimensions: effectiveness; experience; service history; external engagement; staff development; creativity; risk propensity, communication; and, awareness.

In the next phase of research to assess the dimensions, staff at strategic and operational level will be asked to answer to 27 questions whose answers are based on the following probes: intensity, frequency and, state of adoption. The results of this second part of the research will inform a spider diagram that shows the current company profile and another layer with the prospective extension of some of the dimensions needed to further servitization.

The answers to the questions of the second phase of the research will create a company profile that gives information about how the company is performing based on past and current information, suggesting dimensions to grow when implementing services is the option chosen from the company.

All the dimensions are intertwined and dependent from each other. Understanding the ability of a company to develop one of the options in the types of PSS will help to identify
where a company sits in a conceptual Service Design Readiness Framework. The timeliness of this research is indicated by the gaps found in the extant literature in relation to SMEs, which include:

- How do SMEs recognize service design?
- If SMEs are already offering services, how are they currently developing and selling them (structured and unstructured process)?
- To what extent is manufacturing vocabulary affected by servitization?
- Can service design be assessed as a mechanism to develop PSS?

The framework presented here begins to explore these issues and thus can be considered as an initial step in understanding what benefits service design can bring to SMEs.

References


