The Interplay Between Product-Services and Social Sustainability: Exploring the Value Along the Lifecycle

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The interplay between product-services and social sustainability: exploring the value along the lifecycle

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Abstract. Our understanding of the interplay between product-services and social sustainability is still very limited. This paper sheds light on interconnections between social sustainability and product-services throughout their life-cycle, and identify a set of common topics and practices to be investigated by experts of Advances in Production Management Systems. In doing so, the paper sets the stage for future efforts aimed at exploiting the opportunities identified and exploring new synergies between product-services and social sustainability.

Keywords: product-service; social sustainability; life-cycle; stakeholders

1   Introduction

Today manufacturers are challenged "to align an understanding of the requirements of competitiveness with those that represent long-term sustainability" [1]. In this respect, increasing interest into two important phenomena is emerging. These are: i) Product-Services (P-Ss), and ii) social sustainability. A P-S is defined as "a system of products, services, supporting networks and infrastructure that is designed to be: competitive, satisfy customer needs and have a lower environmental impact than traditional business models" ([2] p. 239) Recently, the definition has been extended by including all the three facets of sustainability. Accordingly, P-Ss "seek a balance between environmental, economic, and social concerns" [3] . Manufacturers have already understood and started to exploit both the economic and environmental sustainability benefits of P-S systems, however leaving social sustainability outside the P-S system unexplored and unexploited. Social sustainability refers to a company's voluntary contributions to positively influence the relationships with stakeholders [3]. Unfortunately, the two research streams have developed along parallel lines so far. Research on P-Ss has mainly focused on the economic and environmental dimensions of sustainability and overlooked issues related to stakeholder involvement and social aspects [4]. Social sustainability has been considered as add-on to core business and its potential has not been fully recognized and exploited [5]. Investigating how P-Ss and social sustainability interplay appear as a promising research as well as what win-win outcomes may emerge from considering them in a synergic way [4]. This paper moves forward in this direction and aims at

contributing to the current debate by proposing a list of relevant practices and topics at the intersection between P-Ss and social sustainability in order to provide experts of Advances in Production Management Systems with clear insights for their further research and practices.

2 Literature background

2.1 The concept of product-service

Services in manufacturing are not a novelty anymore. Through time services in relation to products, called also product-service (P-Ss), developed under multiple different names. One of the most widely used terms is servitization defined as "market packages or bundles of customer focused combinations of goods, services, support, self-service and knowledge" [6]. As many different terms for P-Ss exist, also does multiple perspectives. The two most relevant for the purpose of this paper are related to: i) the level of integration and relevance of the service in relation to the product within a customer bundle; ii) the interaction between product and service life cycles throughout the three main life cycle phases (i.e. beginning of life - BOL, middle of life - MOL and end of life - EOL).The first perspective of depicting the P-S is through the level of integration and relevance of the service in relation to the product within a customer bundle.

The second perspective is dedicated to depict how the product and service life cycles interact together throughout the three main phases: BOL, MOL and EOL. Moreover, the following elements in this perspective are researched: a) identification of the contact points between the product and service life-cycles, b) the starting and ending time of each cycle, c) their length, d) and the points of their mutual impact. In terms of interactions between the product life-cycle management (PLM) and service life-cycle management (SLM) there are four main relational structures [7]: a) where the PLM impacts the SLM, b) where the SLM impacts the PLM, c) PLM and SLM are equally regulated and impacted, d) where PLM and SLM are managed in an integrative way and the boundaries in terms of management are completely blurred. Nonetheless, according to previous researches, P-Ss are mainly described by the following characteristics:

- **Eco-systemic nature** (e.g. [8]): the cooperation of various actors with product and service related capabilities is needed through the P-S lifecycle.
- **High value of people management** (e.g., [9])**:** to conceive, create and deploy P-Ss, it is crucial to develop and sustain new skills and behaviours.
- **Continuous relation with relevant stakeholders** (e.g., [4])**:** P-Ss enable the connections of workers, customers, suppliers and other actors of the ecosystem.
- **Dynamic adaptation potential** (e.g. [10]): P-Ss allow the possibility of dynamically and seamlessly adapt the P-S functions in the (begin), middle and end of life.

Those characteristics significantly differentiate between P-Ss and pure products. In fact, products a) are usually based on manufacturing hierarchical supply chains rather than ecosystems; b) cannot directly support continuous connections but have to rely on separated services such as maintenance.

These characteristics also distinguish P-Ss from pure services. In fact, services a) require ecosystems that do not encompass manufacturing processes; b) establish relationships with customers and suppliers that are intangible, not anchored to any material good (that may strengthen and maintain vital the connection).

2.2 The concept of social sustainability

Even a cursory review of the literature shows that social sustainability is still a rather blurred concept [5], which, at the company level, partially overlaps and converges on other related topics, such as Social Responsibility (SR) [11]. These notions have evolved in a complex path of theories encompassing stakeholder theory, corporate social responsibility, sustainable development, triple bottom line, etc. [12]. However, common to all of them is the reference to companies' voluntary contributions to positively influence the present and future relationships with stakeholders [3]. Social sustainability activities are usually reported grouping them into main themes, such as Labour Practices and Decent Work, Human Rights, Society and Product Responsibility [11]. However, they can be also classified with reference to the stakeholder group they target. The main stakeholder groups, relating to products and processes, taken into consideration in sustainability standards [11] are:

- **Employees.** Employees are at the core of social sustainability concerns, under the umbrella of Labour Practices and Decent Work.
- **Customers.** Customers are one among the most relevant social groups addressed under the main titles of Customer health and safety, Product and service labelling, Marketing communications, Customer privacy.
- **Suppliers** and **Communities.** In this regard, activities relate to the adoption of procurement practices incorporating social sustainability criteria as well as community involvement and development along the value chain.

Recently, the literature has been also enriched by the new contribution of [13] who describe the concept of "shared value". According to the authors, companies can create economic value for themselves "in a way that also creates value for society by addressing its needs and challenges" [13]. Accordingly, research attention has been progressively shifting from investigating if companies have the responsibility to act sustainably and if it pays to behave in such a way, to how companies can strategically engage stakeholders and integrate their requests into strategies, processes, management systems and outputs to achieve win–win outcomes for industry and society [14].

2.3 Product-service and sustainability

The general relations between P-S and sustainability is a well-known topic. However, when relating to sustainability, the concept of environmental sustainability is usually targeted (e.g. [15]), while societal considerations are often neglected. Nonetheless, quite a few authors already integrated social sustainability into their P-S models. For instance [16] proposes a Sustainable Product and Service Development model, which is the process of making products and/or services in a more sustainable way throughout their entire lifecycle. In practice this means to first test the feasibility of a P-S, while in the second step to optimize it in terms of sustainability, among which are also included

social impacts. The authors even provide strategies to identify opportunities to maximize social performance, such as: a) incorporate employee work conditions along the supply chain, b) opportunities to respect and enhance regional, cultural and material diversity, c) incorporate impacts of company activities on local and global communities etc. However, specific dimensions for social sustainability and especially in relation to PLM and SLM should be additionally identified, in order to enable its usage.

3 Opportunities at the intersection between product-services and social sustainability

Drawing on the literature depicted before, we have identified a set of topics at the interconnection between distinguishing characteristics of P-Ss and social sustainability. We have adopted a perspective on social sustainability, in line with the idea of "shared value" proposed by [13], which acknowledges that manufacturing is embedded in society and implies an integrated perspective on business and social objectives [17]. Furthermore, we have adopted a life-cycle perspective on P-Ss to identify more clearly at what stage the integration of social sustainability and P-S LM provides added-value. In the next paragraphs, the most essential dimensions of social sustainability are discussed in relation to the P-S and its life cycle phases. We have grouped these topics with reference to the main groups of stakeholders considered in the sustainability standards [11]: customers, employees, suppliers and communities.

3.1 Group 1 - Customers related practices

Social culture and information in P-S. Social lifecycle assessment initiatives promote the provision to customers of comprehensive information about the social impacts of products and services to all the actors in the value chain [18]. Standards also set requirements for "Fair marketing, factual and unbiased information and fair contractual practices" [19]. P-S continuous relation with suppliers and customers can enable the development of functions to inform customers about sustainable practices and promote socially sustainable choices. An example may be a washing P-S displaying data showing positive impact on social sustainability in the supply ecosystem.

Design for the sharing economy. The sharing economy improves sustainability by allowing a larger number of people to access goods and their functions. The eco-systemic nature, the continuous connection and the dynamic adaptability of P-S can fit the requirements of the sharing economy calling for robustness and flexibility to satisfy a variety of users. An example can be transportation P-Ss, based on shared vehicles and services for checking availability, booking shared journeys, etc.

Co-creation and customization. It has been indicated as an opportunity to generate win-win solutions for the benefit of firms and customers [20], innovating service offerings and processes [21] in accordance with customers' needs and willingness. Through the provision of personalized and context-aware services, P-S nature may provide a stimulating setting for involving customers and ecosystem actors to further extend customization. Furthermore, P-S continuous connection allow customers to receive feed-

back and recognition in direct relationship with their contribution. Finally, through dynamic adaptation, they may be enabled to directly modify features of the P-S [17], generating a better customer experience.

Incorporation of features for health and well-being, protection of the users. The core subjects and issues addressed by the SR [19] include "Protecting customers health and safety" and "Consumer data protection and privacy". In line with these concepts, exploiting continuous connection, novel P-Ss can be designed to promote, support and protect socially sustainable behaviors and lifestyles. An example may be equipment for preparing meals that guide in the selection, weighing and cooking of ingredients to deliver healthy dishes. The eco-systemic nature can also provide additional dimensions and value to these P-Ss. With reference to the cooking example, services related to specific diets may be provided by nutritionist, trainers, communities, etc. Finally, dynamic adaptation of the P-S might adjust the services to better match the needs and requirements of the individual users.

Customer satisfaction and feedback/sentiment analysis. Social sustainability pursues "Consumer service, support, and complaint and dispute resolutions" including measures to monitor customer satisfaction [11], beyond the correct handling of questions, complaints, the protection of the data and privacy. In several cases, P-Ss through continuous connection can accommodate features to capture and analyse the comments from the customers. Furthermore, characteristics of dynamic adaptation and machine-learning of the P-S during the usage to enhance customers' satisfaction and wellbeing could be explored as an extension of existing research on context-aware adaptable services for smart rooms or other applications ([22]).

In relation to customers, social sustainability has the highest impact during the MOL phase of the P-S. The role of the service, within the P-S bundle, is to provide information to consumers of the sustainable impact. However, the requirements expressing the socially sustainable perspective of the P-S has reflect in the BOL. Finally, in relation to customers, social sustainability can play the role of a trust-reinforcing lever.

3.2   Group 2 - Workers related practices

Stimulating jobs, workers' growth, well-being and satisfaction. Health and safety at work, human development and training, labor practices are among the main concerns of SR [19]. At the same time, P-S requires high capability of people management in order to be successfully exploited. The deployment of practices that imply collaboration with stakeholders and in general an enhanced care for customers and society may contribute to develop new competences and attitudes among workers, as well as more stimulating jobs. According to the Service-Profit chain theory [24], service employee satisfaction impacts on customer satisfaction and loyalty and ultimately on revenue growth and profitability. Enabled also by continuous connection, P-S may be considered as a promising arena to further stimulate and exploit the virtuous cycle that connects the health, wellbeing, satisfaction and personal growth of workers and customers. Furthermore, as the markets for eco-industries will double between 2010 and 2020 [25], increasing attention should be dedicated to workers employed in recycling and remanufacturing processes.

5

Social sustainability can also act as a lever to increase employee satisfaction rate and their loyalty in the BOL as in the MOL phases. In the BOL it is quintessential for employees and ecosystem partners, while in the MOL it is critical on the customer contact points, thus in the so-called front offices of the P-S system.

3.3   Group 3 - Suppliers and communities related practices

Sustainable procurement and promotion of social responsibility in the value chain are among the core themes of social responsibility and sustainability [11]. In the P-S context, the respect of the human and working rights conditions along the supply chain and within the ecosystem that deliver the physical good and the services are particularly significant to support some of the strategies for social culture of the customers.

Human capital and skills development, also becomes a fundamental practice that, given the eco-systemic nature of P-S, should be extended to all the actors and strongly pursued to ensure effective and efficient collaboration in P-S lifecycle. Furthermore, human capital is an essential to boost innovation and to deliver P-S providing high value and quality of experience to customers and users.

Communities involvement and development. In this respect, key business practices encompass donations, voluntarism, promotion social activities and performances to the benefit of communities. Given the eco-systemic nature of the P-S life-cycle, the scope might be extended to encompass other groups of practitioners, start-upper, interested in contributing to create additional social and economic value. For example, collaboration with local communities in the countries in which some parts are manufactured or involvement of communities with interests in particular types of food, in the example of the kitchen equipment P-S, might add value for the users. In fact, through continuous relation and dynamic adaptation consumers could benefit from a wider variety of recipes and be informed about social sustainability in the supply chain.

Due to a wide array of competences needed to provide a P-S, the role of social sustainability has potentially an economic impact on the long term. When dealing with a P-S, this subcategory does not play only a key role on the BOL of the product, but also on the MOL of the P-S. Namely, the service, as part of the P-S, is the element through which the continuous relation and the dynamic adaption are undertaken. Finally, social sustainability in the EOL phase of the P-S can increase indirectly the satisfaction of communities within the P-S manufacturing P-S ecosystem, which makes manufacturing activities even more community friendly.

4   Conclusions

Advancements in our current understanding of the synergies between P-Ss and social sustainability are crucial to progress towards creating "shared value" between industry and society. Unfortunately, the interplay between these two research areas has been largely overlooked. This paper sheds light on different connections between social sustainability and P-S from the design phase to the end of life, and identifies a set of new

common topics to be explored by experts of APMS in their further research and practice. In doing so, the paper sets the stage for the creation of future synergic values based on the exploitation of the opportunities steaming out of the interplay of social sustainability and P-S. One as such, is the role of the service, within a P-S bundle, as on one hand a potential generator of sustainable impact as on the other a lever through which its impact is communicated to relevant stakeholders.

Acknowledgements

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