

Business Model innovation paths and success in the machine tool industry

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Abstract

Service-oriented business models are regarded as one of the main competitive priority for European machine builders willing to keep their global leadership, menaced by the growth of Asiatic competitors and by the financial crisis. Despite the efforts of the research community and of industrial companies in the direction of servitization, there is empirical evidence that only few companies successfully innovated their business model. In this paper, the results of an European case study research are reported, aimed at the understanding of business model innovation mechanisms and success in the machine tool sector. Companies resulted distributed in different clusters, each of them characterized by different business model innovation levels, strategic consciousness and achieved performance. The clusters suggest the existence of three alternative paths of business model innovation, which are described in the paper, showing specific innovation mechanisms that can be followed.

Keywords

Business model, machine tools, services, service strategy

1 INTRODUCTION

Advanced service business models are an innovative concept in the European machine tool industry, which represents the 44% of the worldwide value of machine tools' production and counts 155,000 employees [1]. In this sector, equipment suppliers are traditionally oriented to the offering of production systems with a limited number of additional product related services (e.g. installation, training, etc.). The relationship between customers and suppliers are mainly limited to the sales operative phase (transaction based relationship) and machine tool builder core competencies are related to the engineering and production of machines [2]. In the past, such an approach allowed European machine tool companies to get and preserve a strong position in their sectors [3]. In recent years, the European industry competitiveness has been strained by the increased turbulence of the business arena, determined by new aggressive competitors from emerging Countries [4].

To cope with this situation, companies should innovate their business models establishing more collaborative long-term relationships with their customers and offering value added services beyond the traditional technical ones [5]. In fact, the technological innovation does not represent anymore a sustainable differentiating strength point which companies can base their offer on. Instead, the integration of value added services with the physical products (i.e. production systems) could guarantee a stable source of revenues, an increasing market demand and a not easily imitable competitive weapon [6]. Furthermore, service offerings incentive the creation of sustainable long-term relationships with customers [7].

Despite the unanimous agreement on the described innovation need, European machine tool companies are still far from reaching this goal [4] [8]. The main reasons have been identified in the lack of specific managerial culture and of operative tools supporting this complex change, which requires market, organizational, financial, and supply chain innovation [2, 9].

Few empirical studies are available on the real diffusion of service oriented business models in the machine tool sector and the innovation mechanisms are not clear [10].

To contribute to the in-depth understanding of the different business model innovation mechanisms that machine tool companies follow to implement advanced service strategies, a case study research was conducted at European level and presented in this paper.

In paragraph 2 available literature is presented and its limits outlined. In paragraph 3 the case study research is explained in terms of methodology and results. Finally, paragraph 4 summarizes the conclusions of the paper and suggests directions for future investigations.

2 STATE OF THE ART

2.1 Literature analysis

Before the new century, the literature related to the industrial equipments industry was traditionally dedicated to the technological innovation needed to cope with the changes of the business context and the relevant manufacturing paradigms. To evolve from the mass production to the mass customization, up to the agile production paradigms, the theories and technologies of dedicated production systems, flexible production systems and reconfigurable production systems have been developed and widely discussed [11-16].

The evolution of the market on one side and the maturity of the sector on the other, made clear in the end of the nineties that technological innovation was not enough to guarantee the competitiveness of leading equipment producers, and that new strategies characterised by advanced cooperation models between customers and suppliers had to be investigated and implemented [15, 17, 18].

This concept was strengthened by the servitization trend of the mature industry sectors with slow market growth, where the potential of technological innovation had been already exploited. Authors started to see unanimously services as the differentiating key competitive asset for

industrial manufacturing companies. Suddenly, taxonomies for industrial services started to be proposed, derived from previous marketing research [19-24]. Concerning industrial services, two broad categories of services have been distinguished: maintenance and repair services on the one hand, and business advisory services on the other [21]. In the field of product related services, one type of classification is based on whether the service is offered before, during, or after the sale [25-29].

Another type of services classification considers them in relation to the product which is contextually offered and to their scope [30]. The distinction is between a service which supports the supplier's product (a typical illustration of such a service is an after-sale service), and a service which supports the client's action in relation to the supplier's product (for example a training service) or in relation to competitor's product. Concerning supplier's goals, the service might facilitate products sales, contribute to supplier's turnover by considering sold products as a vehicle to offer services, or contribute to turnover by leveraging on the customer process, independently from the use of supplier's or competitor's products. This type of classification was adopted by several authors, which refined it and added further elements describing the type of business cooperation between customers and suppliers [31-34]. They distinguish between:

- product oriented services, which add value to products previously sold by a technological upgrade or the increase of its value over time through the provision of maintenance or additional guarantees;
- use-oriented services, when the product is owned by the supplier, who sells functions instead of products by means of modified distribution and payment methods, such as sharing, pooling or leasing;
- result-oriented services, when supplier's revenues are linked to the effective output and performance he provides through the services. Thus, the customer does not pay for the product or the functionality of the product, but for the result of using the product (for example, for machined parts).

By extending the sphere of operation of service providers, other authors distinguish between products focused services, service focused activities and value chain focused activities, affirming that the future trend will consist in the shift from the first to the latter type [35].

In order to give relief to a category of high value added services whose implementation necessitates of deeper cultural and organizational changes in companies, authors proposed other classifications implying a wider business dimension. Mathieu [30] proposes a classification based on two axis: one is the service specificity, which classifies services based on their scopes (customer services, product services, services as a product). The other is organizational intensity, meaning with this the organizational level at which each type of service should be managed (tactical, strategic and cultural). For example, services as a product require a cultural change in manufacturing organizations and can not be considered tactically.

Oliva and Kallenberg [8] classify services along two dimensions: the nature of services (transactional and relationship based) and their orientation (product and customer's process orientation). They argue that in order to advance in service strategies, suppliers have to evolve in order to be able to offer relationship based and customer's process oriented services. Windahl et al. [5] name this type of advanced services "integrated solutions" and describe them as enablers of situations where "customers use the outcome without owning, maintaining

or even operating the equipment". They argue that providing integrated solutions means keeping a close continuous relationship with customers, where the provider becomes part of the customer's on-going operations. Davies [36] refers to these services as "operational services".

In the frame of the above mentioned services taxonomies, the "Product Service System" (PSS) stream took a specific place. Baines et al. [9] argue that the concept of a Product Service System is a special case of servitization. A PSS can be thought of as a market proposition that extends the traditional functionality of a product by incorporating additional services. Here the emphasis is on the sale of use rather than the sale of product. The customer pays for using an asset, rather than its purchase, and so benefits from a restructuring of the risks, responsibilities, and costs traditionally associated with ownership". A differentiating aspect from other service literature is that the concept of a Product Service Systems often embraces the dimension of environmental sustainability.

Besides taxonomies, the emphasis on literature has been on the benefits that service strategies can bring to manufacturing companies. Authors agree with the classification of benefits offered by services along three dimensions: financial, marketing and strategic [4, 8, 30].

From the financial point of view, services offer substantial potential revenue (due to the wide installed base of machines and industrial products) and higher profit margins. Furthermore, services are a more stable source of revenue compared to products, since they can sustain companies turnover in negative economic cycles, when manufacturing customers do not have financial possibilities to invest in machinery. Marketing opportunities consist in one hand in the fact that services allow suppliers to maintain closer relationship with customers over time and put in the privilege condition of identifying and fulfilling changing needs; on the other, they constitute an useful channel supporting the sales of products. Thus, services are a way to increase customer loyalty and brand image [37]. Finally, strategic arguments consist in the acquisition of a sustainable competitive advantage due to the difficulty of imitation, since they are intangible, labour and knowledge dependent [38]. From a strategic point of view, especially in mature markets, services offer a new opportunity to undertake a differentiation strategy, once products do not allow it anymore [37]. Lay and Erceg [39] empirically verified that, compared to other strategic options such as innovation and product technology, service strategies allow product manufacturers to earn the highest potential margins. The enthusiasm around services lead to the famous statement: "The service market is bigger than we ever dreamt" [40].

Despite the growing attention of industrial services of the last years, authors claim that the services strategies are far from having reached their maturity. In one hand, the transformation process is slow, especially for the offering of the most advanced type of services. Mathieu [41] claims that, if product oriented services are spread and quite common, customer services are still very rare. Windahl et al. [5] believe that, in order to offer integrated solutions, companies have to undergo a deep cultural and change management process. Oliva and Kallenberg [8] argue that, due to the challenges that advanced services present to equipment suppliers and the current cultural situation of companies operating in traditional technological industries, advanced service strategies will not appear soon in industrial practice.

On the other hand, companies struggle to take out of services the promised benefits. While from a theoretical

point of view the benefits of service strategies should be proportional to the intensity and specificity of the service manoeuvre [30], Gebauer et al. [4] define the “service paradox”: returns from services are clearly not aligned with the expectations and with the investments companies are doing to develop service strategies. A German-Swiss survey reported that only one third of manufacturing companies earn more than 20 percent of their revenues from service sales [4]. Roughly another third of manufacturers receive between 10 and 20 percent of their revenues from service sales, whilst the rest of the manufacturers generate service sales below 10 percent. Another quantitative study analysed the content of more than 10,000 firm descriptions in the OSIRIS database and concludes that only 30 percent of manufacturers had servitized [42].

Literature proposes a series of explanations to motivate the difficulties of companies in the implementation of service strategies. The most cited are reported below:

- culture: traditional technological and manufacturing culture is in contrast with the needs of services, which require a higher knowledge and relationship orientation [4, 8, 30]. Authors argue that a paradigm shift is necessary, to evolve from the goods-dominant-logic to the service-dominant-logic [43];
- strategy: companies often lack of strategic commitment in the implementation of advanced service strategies. Case study research verified that success in services is always linked to a deliberate decision followed by the definition of a clear strategy to reach service goals [37];
- organization: due to their specificities, services need dedicated departments in companies, where the new service culture can be cultivated, the service business processes can be activated and the service employees concentrated. Furthermore, in order to solve the “service quality erosion” problem, by which the quality of provided services is mined by the limited time of service employees (4), services need the infusion of new multidisciplinary labour force in companies [5, 30];
- marketing management: service strategies and service process development should move from customers needs and should involve customers since the early phase of definition, thus establishing relationship marketing practices [4]. Authors claim that manufacturing companies do marketing and sales of services as they do marketing and sales of products [7, 10]. New methods are needed to understand customers’ service needs, to design new services, to segment and properly target the market for services [5]. Researchers outline also that the problem involves the credibility and brand image of service suppliers, which are not often able to establish a communication suitable for services;
- networking and supply chain: the complexity, multidisciplinary nature and variety of services makes it impossible to supply them through integrated supply chain [5, 8]. Advanced servitizers are called to play a new role of network system integrators and new specific competences are needed for that [36];
- capacity to measure costs, benefits and to manage risks: companies are generally not aware of the costs of services [37]. Furthermore, they tend to underestimate the needed investments and to overestimate the returns [44]. Also specific metrics are missing for advanced service management [45];
- customers: they might be not committed in the process of value co-creation with suppliers [7], neither enthusiastic about ownerless consumption [9]. Nevertheless, some authors argue that customers are often the initiators of service strategies because they ask suppliers to offer new services they were not proposing [4, 8, 36, 41];
- products: it might happen that product technology is not able to support the efficient supply of services, because it does not guarantee stable performances or it does not provide on line status information during utilization [7]. Some authors claim that in order to deliver the best possible solution, an integrated solutions provider could hence be expected to build both on customer relationship and advanced technology [5];
- social system: cultural and cognitive proximity are important aspects determining the success of service strategies [41]. It has been noted for example that Product Service Systems, which started to diffuse in north Europe last decade, have been more readily accepted in the communal societies of Scandinavia, the Netherlands and Switzerland [9]. All economic and social actors should be resource integrators for service creation, thus the concept of value-in-use is potentially extended to a more descriptive “value-in- context” [46]. Summarizing, it can be argued that manufacturers operating in a region where the demand for their products-services is strong and where customers’ culture is ready to accept new service offering have an advantage in respect to competitors [7].

After having outlined the barriers limiting the diffusion of advanced service, literature is prescriptive in the indication of what companies should do to overcome them, such as create separate business divisions, adopt a marketing approach, define a deliberate strategy, use networked supply chains, invest in human resources and new competences, etc. [4].

Some attention has been dedicated also to the type of innovation process of companies. The most accredited theory is the incremental one. Oliva and Kallenberg [8] observe that the transition from products to services companies proceeds gradually following always similar phases in which suppliers add services to their offerings, consolidate skills and experiences and adjust the organizational structure to properly manage services operations. Similarly, other authors [36] [47], [48] and [37] describe incremental multi-step transformations. On the other hand, some researchers contradicts the incremental theory by affirming that advanced service strategies need radical innovation to create new structures suitable to services in traditional companies [5, 7].

2.2 Limits of current literature and research questions

Current literature is fragmented and mainly prescriptive, in the sense that general suggestions are addressed to companies independently from their characteristics and the innovation process phase they are running. Few quantitative analysis are available [4, 42] and, apart rare exceptions [49], no distinction between service innovators strategies and innovation paths are available. Researchers claim that service oriented business model innovation mechanisms have not been studied in-depth until now [10]. Furthermore, literature was focused on traditional product related services and neglected the most advance type of business model innovation, the one implying the offer of operational services in which machine suppliers co-participate actively to customers’ business, having thus a crucial role in customers’ performances increase [5, 36]. Example of advanced service oriented business models in the machine tool sectors are the offer of total cost of ownership or availability guarantee

contracts, of short term full service renting, of lean machines with pre-fixed reconfigurable options, etc. [50].

In order to contribute to research progress in this field, the present paper aimed to answer to the following research questions:

- What is the current situation about advanced service business model innovation in Europe?
- What are the observable innovation paths companies are following?
- What are the advantages that innovators experience from advanced service strategies?

3 CASE STUDY RESEARCH

3.1 Methodology

The sample of interviewed companies was composed with the intent of involving organizations that have the adequate characteristics to understand business model innovation practices, according to the relevant variables outlined in previous literature. In particular, companies have been selected considering:

- size in terms of employees and turnover;
- location;
- type of offered machines in terms of technology, complexity and customization;
- adoption of innovative or traditional business models.

Previous researches failed to involve significant examples of business model innovators, due to their limited number and to the difficulty to identify them [8]. In order to overcome this problem and to involve in the study representative organizations, companies have been identified using the network of experts created in an European Research project in the machine tool sector ("Next - Next Generation Production Systems" FP6 EU Project) and requiring the support of Cecimo, the European Association of the Machine Tool Industries. This privileged bridge between research and machine tool industry was a significant added value for the research. The final sample consisted in the companies reported in Table 1.

Case studies have been elaborated combining multiple sources: face to face interviews, phone interviews, public financial information and reports, products catalogues, fairs information (EMO 2007 – Hannover, EMO 2009 – Milano) and the observation of products and processes where it was possible. Face to face interviews have been conducted with marketing/commercial managers and the entrepreneurs, depending on the dimension of companies.

In some cases, also the research and development manager has been interviewed, together with the service business unit responsible. Besides the formal position occupied in the organization, the interviewees were the persons aware of the strategy and business model of their company and were participating to its definition.

Interviews were semi-standardized and had an average duration of one hour each. The interviewer was supported by a questionnaire with predetermined questions, which has not been shown to the interviewees and which guaranteed to discuss all the relevant aspects. The questionnaire has been preliminary tested with research specialists and industrialists of the network of experts above mentioned. To be able to get additional spontaneous information, interviewees were also free to discuss any other important topic in relation to the argument, as well as their personal positions. In some cases, interviewees were re-contacted by phone after the face to face interview in order to clarify some aspects or provide some more details. When the interviewees agreed, interviews were recorder and transcribed for elaboration.

3.2 Results

The analysis of case studies outlined two important dimensions along which companies can be clustered:

- the innovation level of the business models they currently adopt. It depends on three factors: the innovation level of offered services, as classified in previous literature [8, 36, 41]; the adoption of innovative revenue models linked to services offerings [51]; the adaptation of the supply chain to the offer of advanced services through a wide recourse to networking partnerships [36];
- the strategic commitment of the companies towards the implementation of advanced service business models. It is expressed through the awareness of advanced service strategies options, a deliberate and convinced statement about the service strategy to implement and the top management commitment to its realization, promoting cultural change at all company levels.

Based on these dimensions, companies were grouped as follows (Figure 1):

- **Traditional product companies:** companies adopting a traditional business model with a strict technological focus and a conservative culture. They are often not aware of new service business models options and they do not consider them a potential source of competitive advantage. Some of them have

| Company | Machines | Country | Size |
|---------|--|---------|--------|
| A | High precision grinding and milling machines | England | Medium |
| B | Manual and CNC lathes | England | Large |
| C | High precision sawing, turning and grinding machines | Spain | Medium |
| D | Electroerosion machines | Spain | Medium |
| E | Flexible manufacturing systems | Finland | Medium |
| F | Machines controls and drives | Germany | Large |
| G | Machining centres | Germany | Large |
| H | Machining centres and robots | Italy | Large |
| I | Flexible machining centres | Italy | Medium |
| J | High speed milling centres | Italy | Medium |
| K | Slitting lines, roll feeders, levelling machines | Italy | Small |
| L | Bending and cutting machines | Italy | Small |
| M | Band saw and cutting machines | Italy | Small |
| N | Drawing presses and lines | Italy | Small |

Table 1 – Case study companies

experienced unsuccessful attempts of service offerings after customers' request. New service business models are seen as a different business which is out of their mission, quite far from the design and production of machines on which their competencies are traditionally focused. These companies are mainly small-medium sized, but also a big company belongs to this cluster.

- **Strategically prepared companies:** companies still adopting a traditional product model where machines are directly sold to customers and a small range of technical services are offered, but that show a clear advanced service strategic intent to be realized in the future, derived from a proactive way to cope with market changes and the economic crisis. They are aware of the potential value that innovative business models can bring to their customers and they have a positive attitude towards new kinds of doing business in order to continue improving competitiveness. They have autonomously identified possible solutions to be implemented, have started to deeply study their customers to understand how to create value for them and to design the organizational changes needed to make advanced service models real. In some cases, they recognize they are not able to proceed in the implementation of advanced service strategies with the current endowment of competences and resources. These companies have a medium-large size.
- **Passive innovators:** companies adopting service strategies of intermediate innovation level, pushed by customers having high contractual power. By managing these types of new offerings, their strategic awareness is intermediate, since they are in a certain sense forced to develop a service culture to provide the required services. In parallel to these services experiences, that are often seen as a necessary evil to get orders by big customers, companies continue to compete on a traditional basis. Among them, the ones that are satisfied by the new service contracts start to consider the service business as a potential stable source of revenues and foresee to actively promote it in the future. On the contrary, companies that are unsatisfied of the service experience, declare they will not go on in that direction anymore after the end of open contracts. Passive innovators do not show satisfying performances under the financial point of view: their goal is to close positively the service contracts, but without introducing changes to company organization and supply chain. These companies are medium-big sized.
- **Proactive innovators:** companies strategically committed towards advanced service strategies that are in fact using them as the main pillar for competing in the market. They have a strong market orientation that pushed them to find proactively new ways of bringing value to customers. Business model innovation has been faced as soon as market changes were perceived and the need to differentiate themselves from competitors emerged. A strong commitment of the top management is typically present and it guides the entire company to think strategically, acting as a sponsor in fighting organizational resistance to changes. Technology is not considered the unique part of the offer but rather

the enabling factor for service strategies, as proved by the evidence that these companies own a solid technical background. These companies, which are medium and big sized, report very satisfying performances about service offerings, both on the financial and marketing point of view.

The illustrated clusters of business model innovators suggest that three different paths governing this innovation phenomenon can be identified:

1. The first path is the one through which traditional product companies become proactive advanced innovators after a preliminary phase allowing to achieve a high strategic commitment through a cultural evolution and through the acquisition of the needed methodological competences and resources. Thus, the transformation from products to services is radical in the value proposition change, since companies shift from a traditional product catalogue to a very innovative services offering, but it is put in place after a cultural and methodological maturation time which prepares the company to successfully face the challenge of advanced services.
2. The second innovation path leads traditional product companies to become proactive service innovators passing through and intermediate step of "passive innovation", which is triggered by binding requests of customers having high contractual power. This innovation path is incremental in the sense that traditional companies are forced to enter a service scenario which usually does not consist in a very innovative one. Through this experience, machine builders acquire strategic consciousness and knowledge about service innovation. If this experience is positive, they start promoting actively the service business and they grow in culture and resources until they become advanced proactive innovators. This innovation path has not been fully observed in case studies, since companies passing from passive to proactive innovators have not been found. Nevertheless, the intentions of passive innovators to go towards this direction have been clearly registered.
3. The third innovation path is in fact a non-innovation route, since it represents the failure of service oriented innovation attempts. Similarly to the previous description, machine tool companies are first forced to a passive innovation, but their experience is negative or not enthusiastic. This is due to financial losses with service contracts or to unsatisfying relationships with customers asking for them. As a consequence, companies decide to stop service offerings after the end of their experience of passive innovators, returning thus to their traditional product oriented business model.

Results show that service oriented business model innovation can not be considered as an unique innovation path for all companies. Different ways to innovation are possible, determined mainly from company culture and market orientation, that allows or does not allow organizations to imagine proactively such a transition, and by the external requests of customers, that call suppliers in the arena of services without being prepared.

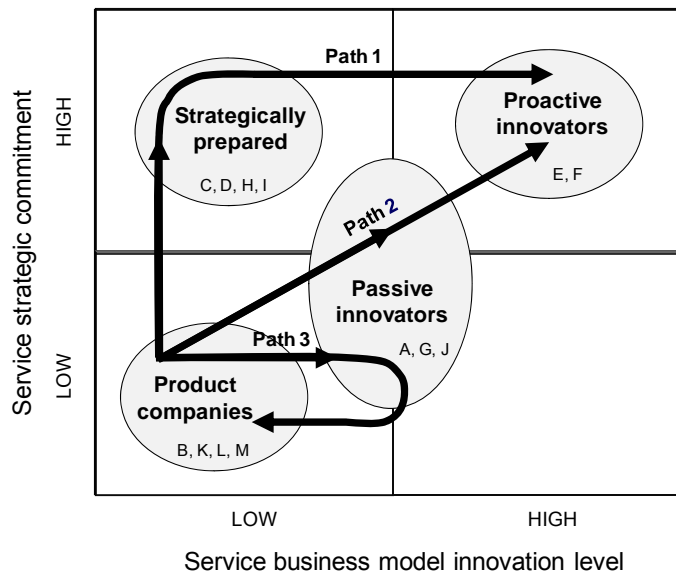


Figure 1: Companies clustering.

The performance of service innovators seem to depend on the innovation path: the service paradox [4] has in fact been observed for passive innovators and it was not for proactive innovators. Many other literature findings about service strategy enablers were confirmed in this case study research. Company culture and market orientation, proactive strategic commitment toward services, networked supply chain and the advance forecast of costs, revenues and risks. In particular, proactive innovators follow all the normative prescription of literature.

Moreover, it has been found that small and medium enterprises are out of the game of service innovation: no small and medium companies could be classified as proactive or a passive innovator. It can be argued that small companies have usually a lower market culture and a more difficult access to all type of resources (financial and human) that are needed to imagine, design and implement proactively the service business model innovation. The lack of small companies in the passive innovators segment can be interpreted on the other hand with the hypothesis that, being big customers aware of the difficulties and challenges that the supply of services imply, they select big suppliers since they imagine they can better sustain such difficulties. The evidence that business model innovators are mainly medium and big companies is worrying, being the majority of European companies small and medium enterprises.

Finally, the proposed clustering and the multiple innovation paths permit to clarify some contradiction in past literature about the incremental or radical nature of the transition from products to services [5, 7, 8, 36, 37, 47, 48]. It can be affirmed that the two type of process can be found in reality. Proactive innovators, in fact, can become radical innovators because they have the opportunity to design the innovation in advance, to develop the right culture and to acquire the needed resources. Passive innovators, on the other hand, are called to supply some intermediate services, which makes them incremental innovators in case they decide to progress in service strategy (path 2 of innovation).

4 CONCLUSIONS AND FUTURE RESEARCH

The results of a case study research in the machine tool sector presented in this paper outline that machinery suppliers are in the middle of the transition from product

companies to advanced service companies. Few of them are already advanced servitizers, offering operational services to their customers on a stable basis and successfully. Other companies show the adoption of intermediate advanced service strategies not for a deliberate decision, but because they are pushed by big customers having a high contractual power. These companies do not generally experience positive performances, since they were not willing to undertake this innovation. The remaining part of companies is still adopting traditional product strategies but, among them, some are strategically thinking the transition from products to services and is currently acquiring the necessary knowledge and competences to start the process.

Based on this situation, three possible innovation paths have been identified: in the first one, companies promote a cultural change, achieve the needed resources and implement a radical innovation to their offering oriented to advanced services. In the second one, companies proceed incrementally pushed by customers, by increasing their capacity to manage service offerings while living service business in real industrial contracts. In the third one, companies renounce to proceed in service business model innovation after having had negative experiences in some attempts triggered by customers.

Literature prescription for service business success have been confirmed, as proactive innovators showed to follow them. The reasons of passive innovators for not following such suggestions, leading to the "service paradox", have been clarified. This allowed a better in-depth understanding of innovation mechanisms.

It has been found that the transformation process can follow both an incremental and radical approach, depending on the innovation paths companies follow. This contributed to harmonize the previous literature results and to motivate existing contradictions.

Finally, it has been understood that only big companies have the potential to activate the first and the second innovation path, leading to successful service oriented business model innovation. This confirms that the potential benefits of advanced services are not within reach of small and medium enterprises yet.

Under the light of these conclusions, the following research directions can be drawn. First, the innovation theories presented in this paper should be generalized and refined through quantitative research. Second, the

early innovation triggers and mechanisms determining the different innovation paths should be understood in-depth through additional qualitative research. Third, methods, instruments and other actions should be identified to involve the small and medium enterprises in these innovation paths, being them the centrepiece of European economy. Finally, the current body of knowledge about enablers of advanced service business model innovation should be referred to the different innovation paths companies may follow, in order to provide more efficacy suggestions in all innovation stages and situations.

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