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An internal perspective of business model innovation in manufacturing companies

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Abstract— Business model innovation is increasingly being used as a concept in different academic fields, although it is still missing a ground theoretical conceptualization. This work aims at advancing the understanding of business model innovation from an internal perspective in manufacturing companies. It builds on a literature review regarding two main concepts – business model and business architecture – and proposes a set of key areas for internally-driven business model innovation. Six main areas have been identified: i) strategy & business goals; ii) organizational culture; iii) product and service management; iv) technology management; v) operations management; vi) performance management systems. Further research will analyze the innovation processes within each area, based on existing theoretical foundations and empirical studies. Moreover, new empirical studies will be performed to further investigate different potential pathways for business model innovation.

Keywords— *business model, business model innovation, manufacturing, business architecture, tactics*

I. INTRODUCTION

Innovation in manufacturing industry is expecting to become more breakthrough and radical while affecting a wide range of innovation areas, mainly technology and business model innovation [1]. Radical changes within companies are characterized by *modular transformations*, which are focused on concrete subparts of the organization, or *corporate-wide transformations*, which happens through the whole organization and impacts on many features such as business mission and core values, structural reorganization, revised interaction procedures and communication patterns across the company [2].

Business model innovation is a growing concept in several academic fields and is seen as a means for organizational sustainability, resilience and excellence [3]. However, there is still a lack of conceptualization of the core elements and relevant organizational capabilities [4] as well as a lack of research on the process of business model innovation [5]. Closely connected concepts are strategy, innovation,

technology management and entrepreneurship, as well as novelty in customer value proposition and respective logical framing and structural reconfiguration of firms [6]. Origins for business model innovation can be caused by two types of situations – companies being forced to innovate their business model and companies innovating to capture an opportunity – and it can be distinguished between internal and external sources of innovations [5].

Business models are seen as composed by choices and the consequences of those choices, i.e. different business models will enable different ranges of available tactics which then influence the company's value creation and capture mechanisms [7]. It is then expected that changes in companies' business models will affect their organization design [8] [9] and disrupt their interests and power structures [10]; thus, creating challenges for their existing business architectures [4]. Business architecture concerns the formal representation and active management of business design, comprising a formalized collection of practices, information and tools for business professionals to assess and implement business design and business change [11]. Therefore, it seems adequate to review the concepts of business models and business architecture in order to investigate the range of available tactics determined by different business models and the scope of business model innovations.

This work builds on a literature review across these two concepts – business model and business architecture – in order to propose different approaches to business model innovation within manufacturing companies. This paper contributes to the research on business model innovation conceptualization and implementation process by investigating two approaches for business model innovation, i.e. top-bottom originated by changes in business strategy and bottom-up with initial triggers in internal business areas, and by proposing a set of internal areas for business model innovation as those where tactical choices would be enabled by decisions on business models or innovations originated within those areas. Moreover, connections and relations between the internal areas can be

envisaged which could lead to better understanding the processes for business model innovation. Ultimately, this knowledge could support managerial decisions to canalize efforts within manufacturing companies in order to achieve effectively the implementation of changes within their business models. Implications for practical application are envisaged through the development of a set of tools / methods to guide industrial practitioners during the elaboration of their business model innovation and implementation plans by analyzing the proposed areas in real business settings step by step.

II. REVIEW ON BUSINESS MODEL AND BUSINESS ARCHITECTURE CONCEPTS

A. Business models and their position within companies

Although there is a general agreement on the basic definition of a business model, considered as simply a description of how a company does business [12], there is still not theoretical grounding in economic or business studies about this concept [13]. Similarly, the role of the business model concept is another subject of debate [14], specially its boundaries and interconnections with other business aspects, such as business strategy and business processes [15] [16].

The business model is seen as a multi-purpose concept [16]. In fact, there are many ways in which business models can contribute to business development, according to literature. It is frequently associated with the concept of value, being understood as a construct that mediates the company's value creation process [17] and a design of the value creation, delivery and capture mechanisms [13] [18], both at company and at network level [19] [20] [21]. It is seen as a source of competitive advantage whenever focused on concrete customer needs and difficult to replicate [22] [13]. Furthermore, it could serve as an instrument for strategic and organizational change [23] [9], leading changes towards service-oriented strategies [15] and sustainability-oriented strategies [24].

Regarding the differences and relationship between business strategy and business model it is generally agreed that there is a close linkage although they are not the same thing [22]. On the one hand, business models are seen as dependent on and derived from the business strategy [16], the implementation of the strategy into a conceptual blueprint [8] or the means to complete the description of the business strategy [12]. On the other hand, business models can be considered more generic than the business strategy, including fewer details and showing results of a complete strategy analysis [13]. Magretta [22] states that a business model describes how the pieces of a business fit together while business strategy defines how the firm can do better by being different, considering the strategy as a dimension of competition that is not included in the business model. George and Bock [9] consider that the strategy may be reflexive (i.e., strategy makes changes in the organization that may impact in the strategy itself) and competitor- or environment- centric, while business model is opportunity-centric and non-reflexive.

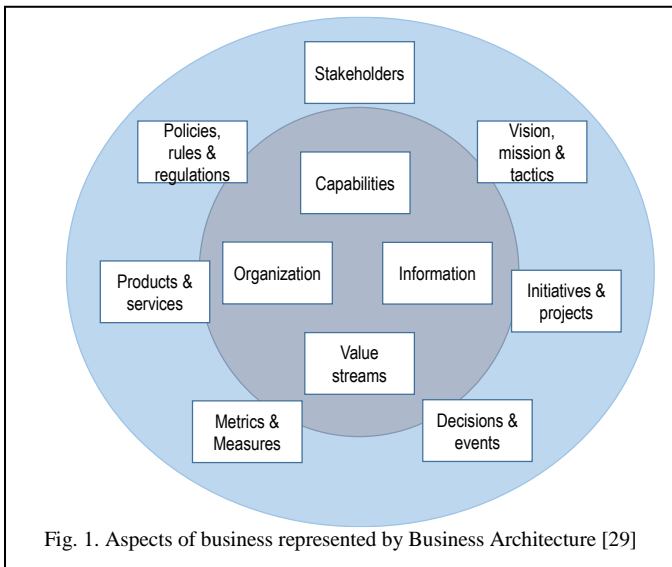
Bask et al. [15] consider that strategy, business models, and processes are closely linked, focusing on the same challenges within the firm, although on different levels. The business model then implies options on which to design the business processes, so it acts as a base for running the operational processes precisely [12]. In this regard, the business model also defines the range of tactical choices available to the company and the determination of these will strongly influence its ability to create and capture value [7]. The selection of tactics to realize a concrete business model is considered as one of the key aspects for successful business model implementation [25].

Although their clear importance for business model implementation, these tactics sets and choices brought by business model selection have not been extensively investigated. One recent work in this respect studies the implementation of Product-Service-Systems (PSS) business models and their links to five sets of tactical practices – contracts, marketing, networks, product and service design and sustainability [25]. Therefore, there is a need for further research on the relations between business models and tactics.

B. Business architectures and their role within companies

The concept of business architecture emerged closely related to information technology. It is seen as a continuously evolving discipline trying to match strategic needs to IT systems in order to close the gap between business and IT [26]. Business strategy as well as business models are then considered inputs to the business architecture [27], which is defined as a blueprint of the enterprise that provides a common understanding of the organization and determines the structure of the enterprise in terms of its governance structure, business processes and business information [28]. It focuses on the essence, structure and overall transparency of the business and aligns strategic objectives and tactical demands [29].

The business architecture is considered a representation of the business fundamental organization [30] and a starting point for the development of functional, information, process and application architectures within the company [27]. It includes diverse views of the company [28]: *Business strategy view*, including tactical and strategic goals and evaluation metrics to achieve them; *Business Capabilities view*, which regards the primary business functions and the business units that perform them; *Value Stream view*, which refers to the set of activities that deliver value to external and internal stakeholders; *Business knowledge view*, which concerns the vocabulary of the organization to communicate and structure the understanding among the different units; *Organizational view*, including the relationships among roles, capabilities and business units, and the internal and external management of these units. High-level domains are represented within the business architecture to form its basic building blocks and are related to each other (inner circle in Fig. 1) while the extended business architecture domains include business aspects that are more frequently changed and offer different ways to extend the business architecture (outer circle in Fig.1) [29].



Another perspective on the concept of business architecture reflect on it as defining the nature of relationships between three dimensions (technology, product and market) where one of them is named as primary and others have subordinated roles, e.g. whenever the product defines the business, technological requirements and markets to be served are determined by product characteristics [31].

The envisaged roles of the business architecture within a company have been mentioned as the following [27] [11]:

- translating the business strategy into other subsequent architectures –business strategy gets better formulated and understood during the creation of the business architecture and this constitutes a better basis than individual statements;
- structuring organizational aspects among the business units and actors, giving a pre-structure (acting as a starting point) to the other architectures within the firm;
- assigning and structuring responsibility over activities, not only at firm level but also at business unit level and supply chain level;

- analyzing key value chains: increasing in this way the ability of the firm to compete and grow in dynamic market conditions and resulting in better bottom line results and customer loyalty,

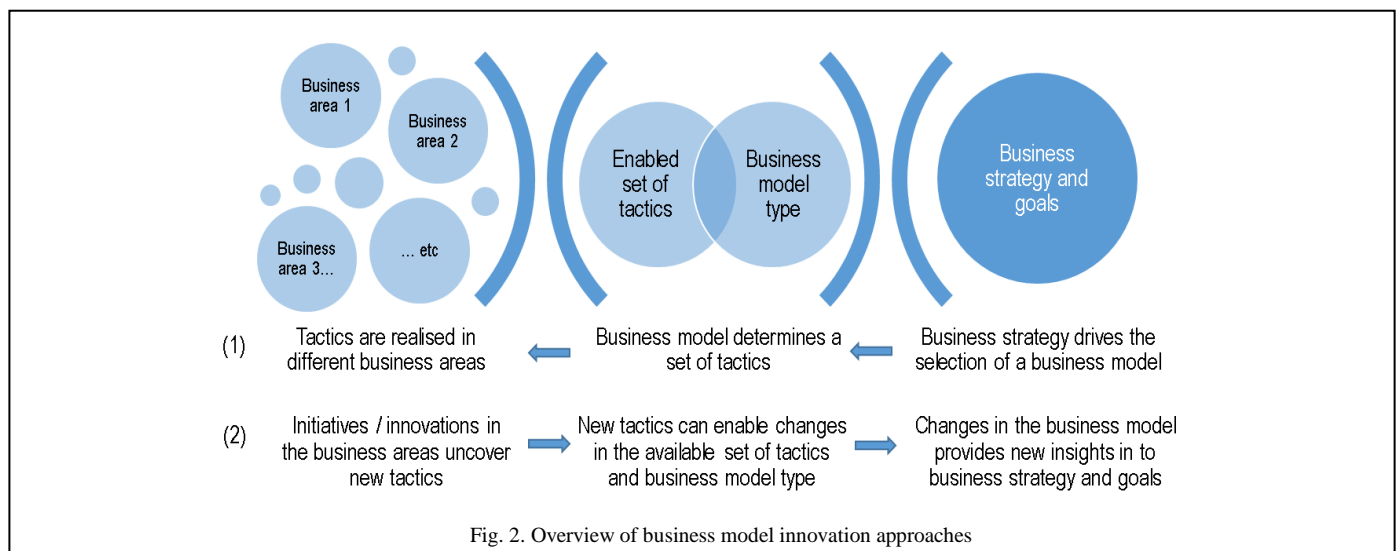
- finding synergies in generic processes: highlighting the business processes and their dependencies, firms can remove duplicate operations, processes and technologies across business units and functions and can redirect resources to focus on key value chains,

- providing the blueprint for business transformation: the business architecture can help firms to analyze and plan how to modify its structure, processes, technology and staff to deal with changes in market and customer requirements.

This overview of the business architecture concept brings up the need to consider the elements within the business architecture as means to identify transformation within companies. Next section proposes a set of internal areas where companies may focus for business model innovation considering the above review and the potential connection between business models and business architectures.

III. INTERNAL PERSPECTIVE OF BUSINESS MODEL INNOVATION

Taking the logic proposed by [7], the selection of a business model is driven by company’s strategy while the business model selected will be linked to a set of tactics at operational level which are key determinants of how much value is created, delivered and captured. Business model innovation will then create a new range of available tactics in different business areas that would be determined by the type of innovation leading to the business model change. On the other hand, other core elements within the companies could lead to business model innovations; this could be, but are not limited to, innovations in products and services offered that influence strongly the value proposition or process innovations that impact the processes used within the company operational model [5]. Fig. 2 illustrates this reasoning.



Informed by the previous literature review, this section introduces a set of areas in which new tactics may appear (1) as a result of a business model innovation led by a change in business strategy or (2) to drive business model innovation.

The tactical choices will have external and internal dimensions. The tactical choices related to internal dimensions within the company can be realized through the business architecture of companies. The proposal of internal areas for business model innovation within a company is then based on the previous literature review. These areas include different aspects highlighted as components of the business architecture due to their claimed transformational potential within companies. It seems important to consider these areas as non-fully isolated spaces where innovations can be originally initiated, instead business model innovations will affect and drive transformations in all areas in different proportions due to their comprehensive character. Fig. 3 shows the six identified areas for business model innovation.



Fig. 3. Internal areas for business model innovation

Strategy & business goals concern the definition of the vision and position of the company as well as the logic of how it does business currently. Business strategy implies two main aspects of a firm: growth, i.e. finding new ways to create value; and position, i.e. configuring resources and activities to provide unique value [32]. Innovations of the business model could be initiated by a change of business strategy driven by investors or company’s owners and motivated by any of the previous aspects, i.e. the pursuit of growth in different ways or the re-position of business in order to gain competitive advantage. These innovations would have a disruptive nature when the company is facing a crisis or its current strategy is clearly inappropriate [33]. The recent trend of servitization in manufacturing industry is an example of a transformation of business models led by a strategic change. Servitization is understood as a conscious and explicit strategic shift with services becoming a main differentiating factor for manufacturing companies [34]. Besides, socially motivated strategies in emerging markets are also increasingly seen as main sources for business model innovations [7]. Social

innovations aim at providing solutions to problems of societal groups which lack resources or capabilities to solve them themselves and range from non-profit but self-sustaining small businesses to multinational companies addressing strategically the future emerging markets such as Unilever and Danone [35].

An example of a business model innovation driven by a change towards a service-based market strategy can be found in [36]: Xerox shifted from being a product based company (selling a photocopier plus maintenance) to providing a service (selling the ability to produce copies). This led to improve customer experience and, at the same time, to enable Xerox to address the minimization of waste throughout the design, make, use and end-of-life stages of their products.

Organizational culture regards the internal communication of company’s vision as well as its norms and values. It is characterized by the degree to which employees are encouraged / expected to behave / emphasize regarding the following aspects: innovation and risk taking, attention to detail, outcome orientation, people orientation, team orientation, aggressiveness, and stability [37]. Innovations of the business model could be initiated by cultural changes internally driven within a company regarding any of these aspects. Business model innovation challenges established companies to the core of their organization and culture [38] and may face rigid resistance related to lack of willingness and/or lack of knowledge [5].

Moreover, organizational culture is revealed in the goals that companies seek and in the means that they use to attain those goals and can be generally dissociated into control-oriented and flexibility-oriented values [39]. These organizational attributes have a significant impact on product innovativeness through knowledge creation and integration, thus, contributing to product innovation [40]. The existence of both control and flexibility values within companies is envisaged to contribute to product innovation independently of market growth [40] and to process innovation leading to improvement of plant performance [41].

Product & service management comprises the design and development of products and / or services that constitutes the company’s offering to the market. Product innovation has been a key area of innovation in manufacturing companies and a central element for business model innovation as an enabler of new value propositions [42] and as a complement for influencing company performance [43]. For example, the enhancement of product durability and longevity at the design or redesign phases generate possibilities for new business models that dissociate from fast product replacement cycles [36]. The design of a business model coupled with the new products developed within a company is crucial to ensure business success [13]. Thus, there should be a tight interconnection between the processes for business model innovation and product innovation activities. For example, the development of the iPod hardware and software and the creation of iTunes, gave Apple the opportunity to include

music distribution as an activity and, thus, innovate radically its business model [44].

Service innovation differs from product innovation in some key elements, such as the dependence on the service delivery personnel and the need of physical presence of the customer [45]. Service innovation has recently gained higher importance as a means for identifying customer-oriented solutions. This has led the emergence of different types of service-oriented business models [46]. An example of service innovation which leads to business model innovations is given by the research carried out by [47] on experiential services. The creation of new service-oriented business models will definitely affect other areas within the company as it will bring challenges to the previous product-oriented culture and to the operations model for service delivery, among others (see a more extended list of challenges in [48]).

Technology management deals with the technologies and technological knowledge within the company. Technology has been associated to the foundations of business innovation [49] [17]. Three types of technological innovations has been proposed in this regard: incremental, i.e. the refinement or improvement of existing technology; architectural, i.e. the new ways of integrating technological components into a system; and radical, i.e. the introduction of a complete new core technology [38]. For any of these three types, there is a need for an appropriate business model to successfully support the commercialization of the emergent innovative technologies [13] [17] [50].

Advances in ICT are seen as an important source for business model innovations [7]. For example, the application of remote monitoring technology to manufacturing equipment provides real-time data regarding equipment conditions, performance, usage and location that enable the provision of advanced services thus, enlarging the value propositions of servitized equipment manufacturers [51]. Leveraging on technology to advance service innovation is seen as a fundamental priority for service science [52].

Advanced manufacturing technologies (AMT) are emerging strategic means to achieve competitiveness and overcome the challenges of new markets for manufacturing industries [53]. Moreover, the implementation of AMT inside a manufacturing plant is an innovation that many manufacturing companies are facing and it could be facilitated or hindered by organizational culture [39]. These examples bring up some interrelations between different internal areas that would be affected by technology-driven changes leading to business model innovations.

The Xerox spin-off ventures analyzed by [17] illustrate the importance of finding the adequate business model that is capable of realizing the value latent in promising technologies. Examples of companies that have successfully carried out the commercialization of their own business technologies are Dow Chemical, Lucent Technologies, and IBM [54].

Operations management considers the capabilities and resources needed for the production and delivery of products and services in an efficient and effective manner. Innovations in this area can come up from a broad set of business functions that operate directly in relation to the planning, processing and managing activities that put the products and / or services into the market. A review of operations management concepts includes business functions such as operation system planning and control, operational capabilities, process management and work design, outsourcing, quality management, inventory management, logistics, etc. [55].

Small-scale changes in the method of production or routine operations are process innovations that contribute to the improvement of manufacturing operations [56]. These changes could serve as initiators that stimulate modifications in other areas, especially whenever the improvements allow to create or sustain long-term competitive advantages of the manufacturing company.

More extended changes that affect the way how operations are performed in the company can be driven by the implementation of frameworks such as lean manufacturing or total quality management (TQM) that integrate operations management into the business culture and system [55]. The extensively studied impact of organizational culture on TQM implementation success [57] can be mentioned as an example of how innovations within companies operations may affect or be affected by other internal areas.

Examples of business model innovations realized by novel ways of delivering existing products are Dell's production-to-order system, Zara's supply chain for fast fashion and Toyota production system [58].

Performance management systems comprises the set of measures used to assess company's performance as well as its incentive scheme. These measures have a strong influence on the behavior and objectives of company personnel as they would concentrate on whatever is measured [59] [60]. Therefore, there is a strong connection with the organizational culture. The connection between organizational culture and company performance has been vastly analyzed in literature and results commonly highlight the importance of culture for reaching better performances [61].

On the other hand, organizational performance has been evolved from the consideration of shareholder theory to stakeholder theory, and from the measurement of economic aspects alone to sustainability (i.e. economic, social and environmental aspects) [62] [63]. This evolution requires new perspectives into the way company performance is measured and it also enables the innovation of their business model. Girotra and Netessine [58] suggested that auditing existing business models to identify the value destroyed by information and incentive misalignment inefficiencies can support the search for business model innovation opportunities.

IV. DISCUSSION AND FURTHER RESEARCH

Business models are systems of interdependent activities [43]. Innovations resulting into a new business model or the transformation of an existing business model could be originated in different areas, as introduced in the previous section. For every business model modification, an assessment of its effects on tactics needs to be considered [7]. Therefore, different types of origins for business model innovation could have different managerial implications. In this regard, this paper introduces two main approaches for business model innovations originated within a company. The first one follows a top-bottom logic and it is driven by changes in business strategy or business goals. The second one is based on a bottom-top logic that considers initiatives in different business areas as initiators of business model innovations. Further research would investigate the differences between business model innovations realized by following each logic.

The growing interest on business model innovation is being strongly driven by industry as reflected in PwC's Global innovation Survey [1]: most top manufacturing innovators are expecting to revisit their business models and half of them anticipate breakthrough or radical changes. This industrial interest brings multiple possibilities to academic research. Many possible research questions arise from industrial needs to better understand how to perform business model innovation in their companies. Two main research aspects have been considered in this work: the conceptualization and the process of business model innovation, from an internal perspective.

Regarding the conceptualization of business model innovation, this work represents a first tentative to integrate the elements of the business architecture into a framework for business model innovation that focuses on the internal perspective of manufacturing companies. The areas for business model innovation proposed here have been developed considering the context of manufacturing industries in general. Further research is needed to deepen the understanding of the key aspects for each of these areas in order to further develop the framework for business model innovation in manufacturing companies. This will follow a multi-sector analysis in the first place that can enlarge the scope of possible initiators of business model innovation. The research could later focus on a concrete sector within manufacturing industry in order to investigate in depth which are the main elements within these areas leading to changes in the companies' business models. Due to its recent start as a research target and consequent lack of mature research, applying a multi-case approach to study business model innovations seems adequate [5].

Regarding the innovation process for business models, the descriptions given for the different internal areas already hints some connections that could conform several pathways for business model innovations. An example of a possible pathway is suggested by the description of the case of FedEx business model innovation explained in [42], that illustrates how the origins of the innovation was a strategic change towards a new unmet customer need and how this was realized by an efficiency improvement in activities and resources so the new service offering (package delivery service) could be delivered in the strategically chosen way to the customers.

A key aspect in business model innovation processes is the selection of tactics that will enhance the value creation for a concrete business model. The link between different business models and the range of tactics made available through innovations originated in the different internal areas will be studied as a first step towards the understanding and identification of pathways for business model innovation.

It is agreed that the business model innovation is a distinct type of innovation. However, empirical findings "*indicate the importance to treat it not as an isolated activity but to align it with the company's innovation and long-term corporate strategy*" [5]. Therefore, the extension of this line of research through the inclusion of empirical studies will be crucial to gain better understanding on the degree of integration that business model innovation activities have with respect to the overall company's innovation strategy. An interesting area of research in this regard is the investigation of the potential links between different open innovation strategies and business model innovation. Huang et al. [10] suggest that there is a positive influence of open innovation on business model innovation processes. According to [64], there is still little research that explicitly links business models to open innovation strategies and investigates the match between business model design choices and different open innovation strategies. Further research in this area could support the analysis on whether business model innovation is facilitated / favored by a concrete selection of an open innovation strategy.

Finally, this work has left intentionally the external dimensions and triggers of business model innovation outside the research boundaries. This allows to concentrate the first steps of research on the areas that will push internally the innovation of a company's business model. The research would later be enlarged by including elements pulling for business model innovation, e.g. the business network, market dynamics or technological breakthrough. It is important to acknowledge that some triggers for innovation can be found both as internal and external elements, such as technological innovations that can act as push or pull approaches for innovation activities. The integration of external elements into the research boundaries will be done at later stages of the research. An external element envisaged to be important for business model innovation is the value network in which the company operates as it could initiate innovations of its business model and, besides, it has been suggested that "*business model innovation often requires the development of a new value network*" [38]. Thus, the value network could both push and pull innovation activities regarding the business models of the companies participating in the network.

The proposed research could be further developed as a set of tools / methods to guide industrial practitioners to develop their business model innovation activities and implementation plans. The understanding of business model innovation processes to be gained during this research will then support: (1) the identification of tactical choices unlocked by different types of innovation triggers; (2) selection of tactics that can enhance the value creation in manufacturing companies and the assessment of their effects on the current business activities and value network.

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