BUSINESS MODEL INNOVATION IN SMES ENGAGING IN INNOVATION ECOSYSTEMS: A DECOUPLING PERSPECTIVE

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Abstract

Digital technologies have been increasingly affecting our day-to-day activities, drastically reshaping markets and society. The diffusion of new digital technologies—such as social media, cloud computing, mobile computing, 3D printing, and big-data analytics – is posing firms to challenges, creating opportunities to develop radically new business models. However, despite the growing interest towards this issue, the contribute of digitalisation from the perspective of small and medium-sized enterprises (SMEs) is still such an under-investigated topic. SMEs are considered a driving force in most national economies, contributing heavily to employment, innovation and economic growth, but at the same time they often suffer from lack of both financial and human resources. These weaknesses may be compensated by the inflow and outflow of knowledge and capital boosted by technological innovation and participation within innovation ecosystems. The aim of this paper is to understand, through the lens of the institutional theory, how both the relationships established within the ecosystem and the internal organizational capabilities of SMEs impact on business model innovation thanks to the adoption of digital technologies such as Internet of things, big data, and open data. To do so the authors carried out an embedded case study on an Italian Industry 4.0 project which involved several actors (e.g. food SMEs, universities, technology consulting companies, and Piedmont Region). First findings on this ongoing research show that innovation ecosystems could represent a strong driver for developing an innovative business model oriented to value co-creation provided that SMEs already own distinctive dynamic capabilities. Without these capabilities it would be difficult to fully exploit the digital opportunities arising from the relationships among the heterogeneous actors which are part of the project.

Keywords: Business Model Innovation, Small and Medium-sized Enterprises (SMEs), Institutional Logics, Dynamic Capabilities

1. Introduction

The term "Industry 4.0" has become a buzzword with increasing popularity among different communities: manufacturers, governmental institutions and policy makers, as well as academics. Often, firms sceptically watch this future manufacturing vision: in their perspective, Industry 4.0 is mainly concerned with automation systems, information integration, digitalization and - at first sight - it looks like a rebirth of the Computer Integrated Manufacturing (CIM) idea developed in the 1980 (Kolberg and Zühlke, 2015). The fourth industrial revolution has been attracting the attention of government agencies that at national and supranational level developed various initiatives encouraging both large companies and small and medium-size companies (SMEs) in embracing 4.0 technologies. Compared to large companies, SMEs are often characterized by greater flexibility and agility. However, they frequently lack financial resources and have little resilience to change and innovation (Scuotto et al., 2017). Their participation in projects designed to provide them funds and external expertise to adopt 4.0 technologies may be an enabling-element to innovate their business models and ultimately achieve greater performance (Muller, 2018; Rachinger et al., 2018). However, very often, SMEs engage in these initiatives only for financial reasons, with the risk of creating a facade operation that not provide the basis for a process of business model innovation (BMI) and that cannot guarantee long-term competitive advantage. Despite the importance of this issue both for governments and companies, prior empirical research on how SMEs could take advantage of their involvement in innovation ecosystems is still scant. This is also due by the fact that the fourth industrial revolution is a quite recent phenomenon and the lines of research seem to be still fuzzy. Therefore, the authors have decided to analyse an Industry 4.0 project designed by the Piedmont Region (Italy) which, from an ecosystem perspective, involved different kind of partners: food companies, universities and research centres, technology providers and consulting firms. The aim of this research is to investigate the BMI process in SMEs where a high technological and multi-actor perspective is at stake. Qualitative data were collected through interviews, participant observations, and document analysis. They were then analysed through the lenses of the institutional theory (Thornton & Ocasio, 1999) and the dynamic capabilities perspective as extension of the resource-based view of the firm (Barney, 1991). The findings explain how business model innovation in SMEs can be enhanced by specific external and internal factors. The results show that government regulation mainly affect the facade of organizations without, however, an effective impact on the established business model. The effective adaptation and innovation of the business model further requires both normative and cultural-cognitive factors. The former refers to those informal mechanisms of control and participation that can foster the social obligation of SMEs involved in the project. The latter requires companies to develop dynamic capabilities that allow them to interiorize the value of the desired action and to culturally support the change of strategy and business model related to the fully exploitation of 4.0 technologies. This paper provides practical implications for policy makers by analysing which mechanisms act as drivers of BMI within projects aiming at developing 4.0 technologies within SMEs. The governments have in fact called to play a key role in stimulating technological development (Dolfsma and Seo, 2013). The managers of firms can take advantage of this study as well since the work explores the role of specific dynamic capabilities in enabling a shift from a ceremonial adoption of new practices to their effective integration in the business model, creating value from new alliances and partnerships in multi-stakeholder ecosystem. This paper contributes to the institutional theory by analysing the influence of regulative, normative, and cultural-cognitive factors on BMI. Among the organizational changes related to institutional pressures, in fact, BMI still represent an overlooked issue which deserve further studies. The study also extends the literature on SMEs by investigating the combined effect of dynamic capabilities and institutional logics to stimulate innovation and competitive advantage in SMEs participating in 4.0 projects. Finally, the paper also enriches the literature on digital transformation, innovation ecosystem, and BMI, by providing evidence on how these three elements can lead companies to gain a competitive advantage in long-term perspective.

2. Literature review

2.1 Business model innovation

Although research on business model has attracted the attention of a great number of scholars, an unequivocal theoretical definition of this concepts is still lacking. This construct was first used in practice as a way to capture the basic architecture for how a company does business (Foss and Saebi, 2018) and the definitions that have been provided by the literature started from this point. According to the definition given by Teece et al.,

(2010, p.173) a business model "articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value". The business model thus reflects the configuration of the elements that allow companies to realize their strategy (Casadesus-Masanell & Ricart, 2010). The growing uncertainty and complexity caused by several factors such as technological evolution, legal requirements, and changing customer preferences (Rachinger et al., 2018) led scholars to stop considering business models as a given picture. Demil and Lecocq (2010), for instance, have highlighted that business models can be analysed in a dynamic way, capturing innovation and changes in organizations and their business models. The concept of business model innovation (BMI) has not a general agreed definition as the concept of business model as well. However, it can be resume, according to Casadesus-Masanell and Zhu (2013, p. 464) as "the search for new logics of the firm and new ways to create and capture value for its stakeholders". Business model innovation may thus occur in several ways, ranging from "incremental changes in individual components of business models, extension of the existing business model, introduction of parallel business models, right through to disruption of the business model, which may potentially entail replacing the existing model with a fundamentally different one" (Khanagha et al., 2014: 324). Among the factors driving and/or hindering business model innovation few attentions has been paid by scholars to the external ones, except for customer needs (Muller et al., 2017, Weking et al., 2018). Recognizing the scarce attention to the influence of institutional logics on BMI (Vaskelainen and Munzel, 2018), have described which institutional logics moderate both business model development and inhibition in the German carsharing industry. Moreover, the importance of institutional logics as a factor influencing business model innovation has been also highlighted by Foss and Saebi (2017); in their recent review on the business model innovation literature, in fact, the authors suggested institutional forces as an important future research topic.

2.2 Institutional logics

According to the definition given by Thornton and Ocasio (1999: p. 804), institutional logics are seen as "the socially constructed, historical pattern of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality". The construct of institutional logics has been structured by Scott (1995) in three pillars consisting of regulative, normative, and cultural-cognitive elements.

The regulative factors comprise those rules and laws influencing the organisational behaviour by enforcing rewards in case of conformity and punishments in case of non-conformity. The normative factors emphasise those norms and values that are characterized by prescriptive, evaluative, and obligatory meanings (Torkkeli et al., 2019). As highlight by Scott (1995), a normative system does not only imply the definition of goals and objectives, but it also identifies appropriate ways to pursue them. The cognitive factors, instead, refer to the internalization of an external cultural framework in the form of beliefs (Torkkeli et al., 2019). These three pillars represent the necessary ingredients for transitioning (Hoffman, 1997) from the legally enforced to the taken for granted. Institutional theory was traditionally used to explain stability and similarity within a specific population or organizational field and only few studies adopted this theory to explain organizational changes (Palthe, 2014). Actually, all the three pillars of institutional logics can enable changes. The regulative view, that has received attention especially from institutional economists and rational choice political scientists (Scott, 2008), consider organizational change as the result of market forces and regulative elements such as new coercive policies from authorities or governments (Barnett & Carroll, 1993). The normative view, adopted mainly by sociologists, interprets changes as the result of social obligation rather than mere expedience (Palthe, 2014). The cultural-cognitive view (Powell and DiMaggio, 1991) refers to those mental models, conceptual beliefs, and shared meanings enabling significant change. Therefore, the compliance of rules and laws, the normative support, and the cultural alignment provides the foundations for determining which activities are source of legitimization, thus influencing several aspects of organizations, including their business models (Ocasio & Radoynovska,2016).

2.3 Industry 4.0, innovation ecosystem, and dynamic capabilities

The concept of dynamic capability was first defined by Teece et al. (1997) as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". The dynamic capabilities approach extend the resource-based view of the firm by encapsulating the dynamic and

evolutionary nature of resources and competencies as a response to the challenges faced by companies (Teece et al., 1997). The fourth industrial revolution has put pressure on companies to question their current strategies and to explore new business opportunities (Rachinger et al., 2018). Industry 4.0 may offer tremendous opportunities for the creation of new products and services, better ways to serve customers, improved integration across and along the value chain and wholly innovative business models (Bogle, 2017; Jensen and Remmen, 2017; Kiel et al., 2017; Muller et al., 2018; Prause, 2015). Many researches contributed to develop a better understanding of the Industry 4.0 transformative business models (BMs) by considering the key changes in value creation, delivery and capture as well as in enterprise competitivity (Kamp et al., 2017; Kiel et al., 2017; Muller et al., 2018). According to Muller et al. (2018), data-driven products and services enable new BMs characterized by increased customer orientation and service-based approaches enabled by data transparency. At the same time, customer centrality leads to personalize the products and to integrate the marketing phase within design and promotes closer relationships with a stronger customers' involvement in value creation (Yao and Lin, 2016). The development of dynamic capabilities can facilitate at the same time the ability of organizations to identify a potential technological shift and the adaption to change through innovation (Hill and Rothaermel, 2003). In a similar vein, Schweizer (2005, p. 6) argued that a "dynamic capability can be considered as the ability to seize new opportunities and to change the existing business model by reconfiguring the value chain constellation and protecting knowledge assets, competences and (the access to) complementary assets and technologies in order to achieve sustainable competitive advantage." It is the learning-based approach of sensing, seizing, and reconfiguring that allows firms to change their strategies and adapt their business models alike (Teece, 2007). According to Rachinger et al. (2018) the process of sensing specifically refers to the ability of transferring new technologies to new BM ideas and recognize alternative BMs in place among competitors. Seizing can be defined as companies focusing on innovation activities by (re)combining elements including principally technologies, markets, and BM knowledge. Reconfiguring concerns the selection and sourcing of the core competencies and the necessary resources, looking, at the same time, at integrating partners and new networking system. On this vein, Muller et al. (2018), by analysing German SMEs response strategies to Industry 4.0, highlighted how new frontiers for cooperation and value creation innovation with partnering companies and institutions have been opened. They pointed out how governmental and industrial initiatives can incentivize and support SMEs in their efforts, for example, by bringing together companies with complementary capabilities. Digitization of data and analytics from production processes and services leads to the integration of vertical and horizontal value chains. Greater knowledge about the vertical value chain results in a greater company aptitude to thrive in a completely new and competitive market. Barreto et al. (2017) argued that horizontal integration through networks facilitates an internal cooperation, meanwhile vertical integration of subsystems within the company creates a flexible and adaptable manufacturing system.

Actually, even if many studies have addressed the Industry 4.0 topic (Ganzarain and Errasti, 2016; Muller et al. 2018) only few papers have so far focused on how the introduction of 4.0 technologies can lead to effective BMI. Moreover, the growing importance of the concept of innovation ecosystem as enabling driver of innovation phenomenon requires to be further investigated.

3. Methodology

3.1 Research context

Digital technologies have been dramatically influencing business activities, reshaping markets and society (Nambisan et al., 2017; Kraus et al., 2018). The increasing dynamism and complexity of modern business environments, due in part by the digital transformation, open up fascinating innovation opportunities requiring new visions and new organisational models (Carayannis et al, 2006; Yoo et al., 2010; Nambisan, 2017; Ramaswamy and Ozcan, 2018). As a consequence, companies become ever more dependent on their external networks (Järvi & Kortelainen, 2017; Lee et al., 2012; Vargo & Lusch, 2016) and involve in innovation co-creation processes that are based on an ecosystemic approach (Järvi & Kortelainen, 2017; Lee et al., 2012; Vargo & Lusch, 2016). Innovation ecosystems should enable their participants (i.e., companies, government agencies, research institutions, and investors) to effectively interact and maximise the economic impact of their research and innovation. The research setting is a 4.0 project that aims to create a platform which makes available a new model of control of food production and transformation processes based on the paradigms of PAT - Process Analytical Technology - of the Internet of Things, open data, and big data. The project started

in 2017 and ended in 2019, it was funded by the Piedmont Region (Italy). It was composed by 21 actors and headed by a global technology consulting company. The other actors of the project were companies, universities, research organisations, and technology providers. The selection of this project was made for the following reasons: (a) the opportunity of one of the authors to actively participate to the project for its entire duration; (b) the presence within this project of all the actors individuated by the literature as essential for the effectiveness of an innovation ecosystem; (c) an ex ante clear definition of the objectives of the project.

3.2 Research approach and procedure

The study aims to examine how business model innovation can be realized through an innovation ecosystem approach centred on the development of 4.0 technologies. Therefore, an embedded case study, where the SMEs represented the single unit of analysis, was designed to gain theoretical insight on the "how" questions about a contemporary set of events over which the investigator has scant control (Yin, 2013). The authors used multiple sources of evidence in order to triangulate data and to increase the richness of information (Yin, 2013).

First, two of the authors engaged in 803 and 310 hour participant observations, respectively in the three year of project life cycle.

One of them had an active role for the overall duration of the project with the role of scientific responsible of a work package. He was involved in the following activities: (a) participation to all the steering committees, (b) management consultancy (c) collaboration with companies in order to reach together some common organizational and managerial goals related to the adoption, implementation and monitoring over time of new technologies, through processes of co-creation and sharing of knowledge/good practices/organizational solution needed to build more resilient and innovative business models. The participant observation was carried out over three years in order to explore how experiences or processes have unfolded over time. As a second method of data collection, the authors conducted in-depth interviews with at least one key informant for each company. All of them worked in the top management level or were responsible for digitalization and/or BM development of their company (Rachinger et al., 2018). In order to identify any possible inconsistencies, the authors extended the interviews also to other actors in the project. All the key informants were selected following a purposive sampling technique and according to their knowledge and availability (Kumar et al., 1993). Finally, 18 interviews were collected. The data collection ceased when the empirical saturation was judged to be achieved (Tracy, 2010). In order to ensure naturalness, the interviewees were only made aware of overall research purpose, without revealing specific questions and preventing them from coming up with the answers in advance (Easton, 2010). All the interviews were conducted in person by the author who did not make the participant observation. Their duration ranged from 25 to 60 minutes. The credibility of the study was further increased by verifying and triangulating data with secondary sources (e.g. companies periodic report, deliverables).

3.3 Data analysis

The authors have availed of a multiple source of evidence to gain a thorough knowledge and to capture different perspective of the topic. The participant observation had two main objectives. First, it aimed to individuate the obligations, norms, and values in the institutional context that supported the operational change (Scott, 1995). Second, it allowed to directly observe if the process of BMI was really implementing or not. The authors kept both a diary to record actions, talks, and feelings (Delbridge and Kirkpatrick, 1994; Saunders et al., 2007). Observer bias were reduced by comparing the results between the two authors who carried out the participant observation.

The semi-structured interviews, instead, were coded with the support of the software Atlas.ti in order to ensure relevance and comparability between theory and data, as well as reproducibility, accuracy, and rigour (Strauss & Corbin, 1990). Every source has been independently encoded by two of the authors of this paper. Through "open coding", in a first stage, the issue under consideration has been discovered, labelled, and categorised. Consequently, the researchers discussed in order to achieve a shared interpretation of the findings. Using "axial coding" (Bryman & Bell, 2011; Ferraris et al., 2019), data have been reorganised with the aim of finding any link among both the categories and the subcategories established. In the next session the emerging patterns will be discussed.

4. Findings and discussion

The data gathered from the fieldwork and the review of the literature have led the authors to elaborate a three-steps framework analysing how companies successfully implement BMI in a 4.0 technology institutional context (Figure 1).

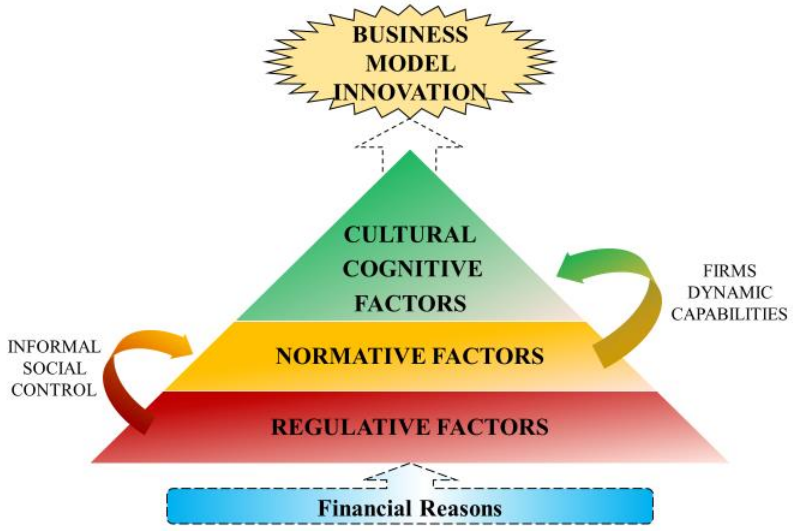

Figure 1. Business model innovation and its association with institutional logics and dynamic capabilities.

First step: join the project

The interviews carried out with the SMEs have revealed some interesting aspects on how companies were concerned and aware of the 4.0 topic before entering the project. Most of the SMEs had a consolidate business model and they did not feel the necessity to either introduce disruptive technologies or rethink their organizational processes. The main motivational factor to join the project was actually the opportunity to receive funds by encouraging investment in new technologies that would not otherwise be available. About this issue, the top manager of the company 2 expressed himself in this way:

> *"We were informally contacted by the professor of a university which was interested in this project and that was looking for SMEs to be included in the network. We were not particularly convinced since we are a small reality and have not enough resources to dedicate to new projects. At the same time, our employees had not enough skills and knowledge to manage 4.0 technologies in their everyday activities. The main pull factor was the incentives provided for companies which would have accepted to join this project".*

The Piedmont Region, as funding body of this project, had established some rules to follow. Further, it had auditor responsible for visiting the leading project company and all the partners for monitoring the consistency of the activities carried out with those planned, as well as the degree of achievement of the objectives. Unfortunately, it was difficult to evaluate, by only visiting companies, if the 4.0 technologies had a real impact on organizational and managerial practices as well as the degree of BMI. As a consequence, some companies adopted a facade approach, aimed to introduce innovative tools just to complies the rules and to receive funds. This is what the top manager of the company 3 said:

> *"We were aware of our limits, but we entered the project with enthusiasm. However, once started we soon realized that, despite the support of the network partners, the process of digital transformation was more difficult than we had thought. If I had to make a final overall assessment I must say the participation to this project did not change so much our business practices especially because we were not so aware of the need to align our industry's life cycle with the activities, milestones and deliverable of the project.".*

Second step: coordination among the network to achieve the results

Most of the partners of the network knew each other before interacting in this project. This favoured the creation of informal social control and, in a broader sense, communication among partners. The steering committees organized during all the duration of the program aimed to create a shared information among partners on the progress of work of the single actors. According to this mechanism, it was possible to verify the success or failure on reaching the targets and to create a sort of social obligation among the actors of the network. The manager of the company 5 charged with attending all the steering committees stated that:

> *"The steering committees were planned to increase transparency within the network and to keep all the partners informed on the progress of work. Seeing that other companies were already in a more advanced state represented on the one side a stimulus to improve our performances, on the other it forced us to stack the deck and to pretend to be aligned with the other companies".*

The sense of duty resulting from the informal interaction and control mechanisms within the network could potentially have driven an effective change. However, as reported above, some companies were more concerned by the social judgement of the other actors than by the opportunity to effectively put in place BMI.

Third step: an effective business model innovation

The first two steps have shown their weaknesses and fragilities in enabling an effective process of BMI. The institutional context can in fact enable deep organizational and managerial changes as long as companies are able to internalize and value the desired practices. They need to own specific capabilities that have been labelled by the literature as dynamic (Teece et al., 1997) and that lead to an organizational culture characterized by long-term vision, learning-driven approach and openness to external collaboration and innovation. The top manager of the company 1 well highlighted this concept:

> *"The participation to this project allowed us to adapt and innovate our business model by adopting new technologies which have provided us with new ways of creating and capturing value. For example, the application of a satellite tracking base on the QR code technology achieving two goals: (i) increasing transparency and trust in consumers which have more detailed information on the products and their traceability; (ii) allowing a remote control of the conditions of use of the lots transported along the supply chain. This is influencing our business model especially concerning the offer to the market".*

The participation of companies with specific dynamic capabilities such as openness to innovation and ability to seize opportunities from the external environment, have given rise to virtuous circles. This aspect has been addressed by the head of a consulting company involved in the project who said:

> *"With respect to the decisions agreed upon initially, new paths have been discovered for those companies willing to really innovate their own business. They engaged in fact in wider innovation ecosystems, developing relationships with other external partners and applying for other international and national projects".*

In summary, an effective process of BMI within an innovation ecosystem calls into question all the three pillars of institutions: regulative, normative, and cultural cognitive (Scott, 2014). Companies are in fact called to simultaneously deal with rules and incentives, values and norm, and beliefs and taken-for-granted elements. However, rules and incentives do not avoid companies to engage in superficial behaviours with the only aim to receive funds. Values and norms can, instead, lead people to accept some innovative practices through informal social control, but it does not necessarily mean that they increase their awareness and change their effective behaviour. The elements that have stronger influence on BMI are the cultural-cognitive ones. However, they will be effective only if companies have specific dynamic capabilities that make them able to seize opportunities and incorporate them in their business model. This means that institutions can enhance BMI unless they already own a long-term vision and a flexible and open-minded approach.

5. Conclusions

Being part of an innovation ecosystem allow companies, especially SMEs, to access technical, financial, and human resources that otherwise would have not been at their disposal. However, many SMEs are not yet able to capture the potential competitive advantage stemming from their participation in specific networks. The

authors decided to carry out an embedded case study on a 4.0 technology-centred project to understand which factors hinder and/or enable BMI processes. To do so, the institutional theory and the dynamic capabilities perspective have been integrated to provide an explanation of how BMI come to life in SMEs. There are some limitations and some possible further developments to this study. First, we consider only one project. The transferability of the research could have reinforced by developing an embedded multiple case study. However, the methods employed for the data gathering required a great effort in terms of time and resources so that it was not possible to focus on other projects. As a further step, the authors recommend conducting the same research focusing on other projects aiming to foster innovation in SMEs. Second, the case study took place in Italy; it may be useful to take different cases from different contexts, countries, and cultures in order to derive wider and deeper implications. At the same time, it would be interesting to analyse the behaviour of companies over time in order to understand if they will join other similar initiatives and if they will engage in broader innovation ecosystems.

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