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Business Model Innovation and Organizational Changes in the era of Digital Transformation: an empirical study in the Energy Utility Industry

Doctoral thesis of:

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ABSTRACT

This doctoral thesis aims at studying the complex relationship between business model innovation (BMI) and organizational change, trying to shed light on how organizational changes and BMI are intertwined and how proper organizational changes can facilitate the renewal of a traditional business model (BM). BMI is indeed dictated by the firms' need to cope with the current wave of digital transformation which is forcing them to renew traditional business models to offer a novel commercial value proposition to the market. We deepened also our understanding of the micro-foundations of how different partners, undergoing digital transformation, work together to develop novel business models. We did so by studying more than 500 heuristics, i.e. simple rules that managers learn to govern their activity.

The research starts with a detailed analysis of the relevant literature on BM, BMI, dynamic capabilities and organizational change. We studied the business of energy utilities, which is the context of our research, and how the diffusion of new technologies is changing the way energy solutions are consumed and experienced, while consumers increasingly take ownership of their consumption, acting as "prosumers".

We hence elaborated a framework (Fig. 7) to offer a comprehensive view on the organizational dynamics of BMI, describing the internal and external factors that stimulate and create a need for BMI. The framework presents the relationship between the innovation process and organizational changes realized at firm level.

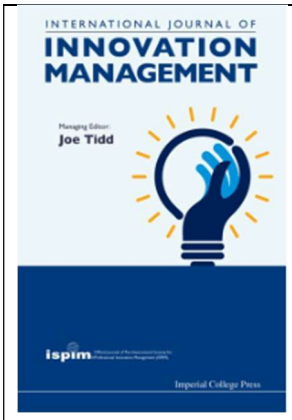
Since there are several organizational changes that can be executed at firm level, we reviewed the most cited ones in academic literature and systematize such changes into four main macro categories (i.e., structural changes; cultural changes; changes in the firm boundaries; changes in the internal resources configuration and management) to better investigate their relationship with BMI.

To conclude, the present doctoral thesis contributes to the ongoing academic debate on BMI, its practical applications and its intertwined with organizational changes, while with regard to the analysis of the heuristics, it shows that heuristics provide governance to business model co-innovation by directing the development of BM processes and content.

Keywords: Business Model; Business Model Innovation; Business Model Co-Innovation; Organizational Design; Organizational Change; Dynamic Capabilities; Digital Technologies; Energy Industry

List of appended papers:

This thesis encompasses a cover essay and the subsequent three appended papers. The papers are referred to in the text by the letter prior to each title (A – C).

	**Paper A:** **Manfredi Latilla, V**., Frattini, F. Franzò, S. and Chiesa, V. (2019) Organizational change and business model innovation: an exploratory study of an energy utility company. *International Journal of Innovation Management*, In press
	**Paper B:** **Manfredi Latilla, V**., Urbinati, A., Cavallo, A., Franzò, S. and Ghezzi, A. Organizational Re-Design for Business Model Innovation while exploiting digital technologies: A Single Case Study of an Energy Company. (2019) Special Issues on Digital Innovation Management, *International Journal of Innovation and Technology Management*. Minor revisions, resubmitted.
	**Paper C:** Loock, Moritz; Vernay, Anne Lorène; Cousse, Julia; **Manfredi Latilla, Vito**. Microfoundation of Business Model Co-Innovation in Digital Transformation. Special issue on Digital Innovation, *Journal of Product Innovation Management*. R&R, due date: October 20th, 2019.

List of additional publications:

In addition, I have coauthored other publications and conference papers during my doctoral thesis. They appear here below in chronological order.

	Chiaroni, D., Chiesa, V., Franzo', S., Frattini, F. and **Manfredi Latilla, V**. (2016). Overcoming Internal Barriers to Energy Efficiency through Energy Audit: a Case Study of a Large Manufacturing Company in the Home Appliances Industry. *Clean Technologies and Environmental Policy*, 19(4), pp. 1031-1046.
	Chiaroni, D., Chiesa, V., Franzo', S., Frattini, F. and **Manfredi Latilla, V**. (2017). The impact of the electricity tariff reform on renewable energies and energy efficiency investments: the case of the Italian residential market. *International Journal of Green Energy*, 14(11), pp. 889-898.
	**Manfredi Latilla, V**., Frattini, F., Messeni Petruzzelli, A., Berner, M. (2018). Knowledge management, knowledge transfer and organizational performance in the arts&crafts industry: a literature review. *Journal of Knowledge Management,* 22(6), 2018
	**Manfredi Latilla, V**., Frattini, F., Messeni Petruzzelli, A., Berner, M. (2019). Knowledge management and knowledge transfer in arts & crafts organizations: evidence from an exploratory multiple case-study analysis. *Journal of Knowledge Management*, In press, 2019

Conference papers:

- Franzò S., Frattini F., **Manfredi Latilla V**., Brenna M., Foiadelli F., Longo M. (2017) "The diffusion of Electric Vehicles in Italy as a means to tackle main environmental issues", *Twelfth International Conference on Ecological Vehicles and Renewable Energies (EVER)*, Monaco, 2017.
- Franzò S., Frattini F., **Manfredi Latilla V**., Longo M., Foiadelli F. (2017) "Towards the diffusion of Smart Buildings: the Economic Viability of the Adoption of a Home Automation System in an Existing Building", *12th IEEE Power and Energy Society PowerTech Conference,* PowerTech Manchester (UK), 2017.
- Franzò S., Frattini F., **Manfredi Latilla V**., Foiadelli F., Longo M. (2017) "The Electricity Tariffs Reform for the Residential Market in Italy", *6th International Conference on Clean Electrical Power (ICCEP),* Santa Margherita Ligure (Italy), 2017.
- Franzò S., Frattini F., **Manfredi Latilla V**., Foiadelli F., Longo M. (2017) "Towards the Development of Residential Smart Districts: the Role of EVs", *IEEE 17th International Conference on Environment and Electrical Engineering and 1st Industrial and Commercial Power Systems Europe*, Milan (Italy), 2017.
- Urbinati A., **Manfredi Latilla V**., Chiaroni D., Frattini F. (2017) "The PLM implementation challenges in the Power Generation Industry". *The XXVIII ISPIM Innovation Conference – Composing the Innovation Symphony*, Wien (Austria), 2017.
- **Manfredi Latilla, V**., Urbinati, A., Frattini, F., Chiaroni, D. (2017). Harnessing Open Innovation in the reorganization of an energy utility. *18th International CiNet Conference*, 2017 Potsdam (Germany) 2017.
- Urbinati, A., **Manfredi Latilla, V.** and Chiaroni, D. (2018). The Role of Product Design practices in a Circular Economy Business Model: A Single Case Study Analysis of an Italian Manufacturing Company. *ISPIM Innovation Conference 2018*, Stockholm (Sweden).
- Manfredi Latilla, V., Franzò, S., Frattini, F. (2018). Organizational Re-Design and Digital Technologies: a single case study analysis through the perspective of Business Model Innovation. *R&D Management Conference 2018,* Milan (Italy).

Further publications:

- De Massis A., Frattini F., **Manfredi Latilla V**. (2017). Digitale, da minaccia a vantaggio: Ripensare i modelli di business. *Sistemi & Impresa,* Giugno *2017,* pp. 19-21.
- De Massis A., Frattini F., **Manfredi Latilla V**. (2018). Domanda energetica e tecnologie: Ripensare il business delle utility. Sistemi & Impresa, Gennaio/Febbraio 2018, pp. 93-96.
- Gregori, O., Sylos Labini, S., Franzò, S. **Manfredi Latilla, V.** (2018). Green Business Models e finanziamento di progetti di Smart Adaptive Lighitng e Smart Street Services. DOI 10.12910/EAI2018-009.

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1. Introduction

This doctoral thesis aims at examining the organizational change process that enables energy utilities to innovate their business model (BM) while exploiting digital technologies. Digital technologies (such as Big Data, Internet of Things, and Cloud Computing), are changing the way people live, as well as the way businesses bring value to customers. As noted by Bonaccorsi et al. (2006) and Amit and Zott (2001), digital technologies have opened new opportunities for organizing business activities, completely reshaping previous BMs for established firms. To say it with Autio et al. (2018) the integration and embedding of digital technologies challenge the core business of many organizations to alter products, services, operations, and employees' behavior. Digital technologies, indeed, have enabled new organizational architectures and have ignited important changes at organizational level (Sosna et al., 2010). Even firms in traditional industries, as energy is, are increasingly realizing the disruptive potential of the digital transformation era we are living (Dellermann et al., 2017). Hess et al. (2016) report indeed that incumbent firms face significant challenges even if senior leadership teams are internally motivated to support the digital transformation of business models, structures, and processes.

Fitzgerald et al. (2014, p. 2) define digital transformation as, "the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements […] or creating new business models." Liu et al. (2011, p.1730) argue that digital transformation is "as an organizational transformation that integrates digital technologies and business processes in a digital economy." Rogers (2016, p. 308) argues that "digital transformation is fundamentally not about technology, but about strategy," meaning that senior leadership teams must find ways to capitalize on new and unexpected business model innovations that optimize customer needs and experiences.

Extensive academic literature has analysed what a BM is and what is its role in the value creation process of a firm (i.e., Zott et al., 2011; Spieth et al., 2014; Tucci et al., 2017). A comprehensive literature review on business model innovation (BMI) has been performed by Foss and Saebi (2017) analysing more than 150 peer-reviewed articles on BMI published between 2000 and 2015. Specifically, it has emerged that BMI literature is mainly focused on either examining BMI as an organizational process or identifying new and innovative types of venture.

Building on these premises, the present doctoral thesis focuses on BMI intended as an organizational change process related to the "architecture of value creation, delivery and capture mechanism" of a firm (Teece, 2010, p. 191). BMI can indeed be interpreted as a dynamic process that requires the design of proper organizational structures to facilitate the change in the BM, involving all the levels of the organization (Chung and Choi, 2016). Hence, BMI is interpreted as the outcome of the organizational change process; it is, as noted by George and Bock (2011, p.24) "the design of

organizational structures to enact a commercial opportunity". Notwithstanding the aforesaid, Foss and Saebi (2017), argued that the role of organizational design has been almost completely neglected in the research on BMI, even though organizational design is strongly intertwined with BMI and a successful implementation of it requires correspondent changes in the organization (i.e., the structuring of the organizational processes, the coordination of activities and the role of functions, units and departments within an organization).

The role of organizational design within the research on BMI is even more important today in the wake of the proliferation of digital technologies (Gambardella and McGahan, 2010). This pervasiveness has a radical impact on firms' BMs, as firms are called to recombine existing non-IT-based resources and activities with the digital ones (Svahn et al., 2017). This demands for shifting, with different degrees of radicalism, from an existing BM to a new one (Tucci et al., 2017). Indeed, when a new technology becomes available on the market, a firm that is interested in adopting it should investigate whether the current BM is suited to support the nascent technology or there is a need for innovating its BM.

BMs may evolve, change and be source or vehicle of innovation (Mitchell and Coles, 2003; Massa and Tucci, 2013), to the point that there is debate whether we should generally talk about BM change, adaptation, renewal, development and so on rather than using (or abusing) the term "innovation" (Spieth et al., 2014; Saebi et al., 2017). Foss and Saebi (2017) adopted the conceptualization of "business model reconfiguration" for incumbent firms, which have to modify their architecture to adapt to changes in the external environment. Adaptation through BM reconfiguration, hence, can be the key to survive in an era of major technological change, where traditional BMs are not anymore guarantee of success and profitability for established firms.

Recognizing a gap in the academic literature in the lack of understanding of the relationship between BMI and organizational changes, the purpose of the present doctoral thesis is to understand whether a change in the organizational design is an antecedent or a consequence of a change/innovation in the BM. Since in its early stage of development, this specific stream of research on BMI as organizational change process "inherently requires more of a qualitative approach" (Foss and Saebi, 2017, p. 209). Consequently, an empirical analysis has been conducted on a sample of established energy utilities that need to innovate their BM to respond to external societal and technological trends. Eventually, we would like to contribute to the resolution of research questions that "are not currently being systematically posed, addressed and answered reflecting the emerging nature of BMI research" (Foss and Saebi, 2017 p. 201). The domain of research at the intertwin between organizational design and BMI represents, indeed, a hot topic of research nowadays, both in the business and academic community, since environmental dynamism (market and technology turbulence), intra-industry

threats (competitive forces) as well as extra-industry threats (factor conditions, complementarities) and regulatory changes (taxation, product-related regulation etc.) are common triggers (Ansoff, 1975; Christensen, 1997; Zott, 2003; Demil and Lecocq, 2010; Sosna et al., 2010; Cavalcante et al., 2011; Saritas and Smith, 2011) that demand a continuous adaptation and innovation of BMs. Furthermore, current major technological trends, such as the wave of digital transformation, pose great threats to the profitability and, ultimately, to the survival of established firms, since they are less able than new comers to innovate and embody digital technologies in the design and commercialization of new products and services, which typically demand for the innovation of established organizational processes (Greenstein, 2017; Bresnahan et al., 2012; Dyer et al. 2009; West and Gallagher, 2006; Chesbrough, 2003; Frambach and Schillewaert, 2002; Teece et al., 1997).

The present thesis hence addresses the following research question:

What organizational changes BMI requires and why? Is organizational change an enabler of BMI and how?

with the aim of developing a proper understanding of the new organizational structures that energy utilities shall adopt to innovate their BMs in a time of technological transformation. To do so, the thesis builds on an inductive, longitudinal series of case studies of energy utilities. Case studies allow us to analyze the unfolding mechanisms through which the BM of an energy utility has been innovated over time and the organizational changes that enabled and fostered this innovation. To support answering the above main research question, three additional research sub-questions (RSQ1, RSQ2 and RSQ3) were proposed and answered through the appended papers, i.e.:

- Paper A: *What organizational changes does BMI require and why? How does organizational change influence BMI?*
- Paper B: *How do established companies embrace organizational re-design to innovate their business model while exploiting digital technologies?*
- Paper C: *What are the micro-foundations of business model co-innovation in digital transformation?*

Papers A and B look at the organizational design and change within organizations and how such process is intertwined with BMI. They aim indeed to understand whether a change in organizational design is an antecedent or a consequence of a change in the business model. Paper C looks at how established organizations and external partners, such as startups, work together in co-innovating the traditional business models of established organizations in a digital ecosystem. The paper, indeed,

starts from the assumption that, among the organizational changes that are relevant in the innovation of a consolidated business model, the collaboration of a large organization with different and external partners is crucial to effectively realize business model innovation. Building on this assumption, paper C investigates how the definition of the collaboration forms among organizations, and specifically between an established one and external startups, is part of the business model innovation process and to be effective requires intervening on the organizational design.

Figure 1 below briefly synthetizes the content of the three papers appended to the present cover essay.

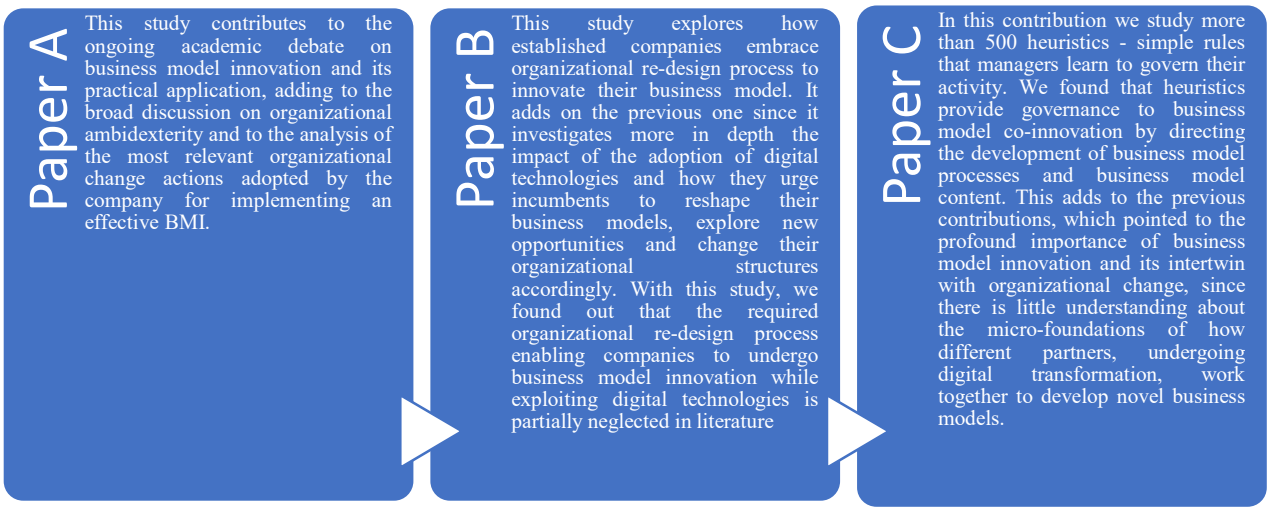


Figure 1: structure of the doctoral thesis

1.1. The Energy sector in brief

The energy sector is currently undergoing a profound transformation challenged by medium and long-term societal and technological trends. Incumbents see themselves confronted with fundamental changes arising from new technologies, changing policy requirements and higher customer expectations. Meanwhile, European electricity producers have scaled back their investments and focus them on targeted segments, particularly renewable energy, energy efficiency, distribution and services. Nevertheless, energy generation is still a capital-intensive business and the energy produced is a vital commodity. This for decades has allowed producers to run a stable business in a high regulated market, with solid rate of returns and huge amount of cash generation to distribute to shareholders.

Nowadays, new technologies as well as the development of new electricity uses are forcing electricity producers to come up with new solutions and new (decentralized) models of production (Baines et al., 2009; Abdelkafi et al. 2013, Helms et al., 2016). For example, large scale deployments of renewable energies change the way energy is produced and distributed, involving every step of the conventional electric energy value chain; while local communities and customers are taking a more

active role in guiding energy matters, acting as “prosumers”. This leads to a loss of market share and profit for incumbents, which must find new ways of creating and capturing value. In Italy, for example, in the period 2008 - 2016, the overall consumption in the energy retail power market felt by 14%, from about 291.3 TWh in 2008 to around 250.6 TWh in 2016 (average decrease per year equal to 1.8%). Focusing on the share of residential customers, it confirms the negative trend with a decline in consumption by 8.4%, whilst Points of Delivery increased by 6.6%, moving from 28 million in 2008 to 29.9 million in 2016. On average everyone consumes less, but the volume of consumers increased. All this happens in a context in which net margins for a utility are between 3% and 5% of revenues (in the retail market). The above data show that the energy and utility market in Italy is a less rich market nowadays than it was a decade ago and there is a contraction of the market combined with a higher pressure on margins. Utilities, hence, need new sources of revenues, broadening up their value proposition.

While there is unity on the fact that utilities need to develop new business models for producing and delivering energy, there is no clear picture of how the successful business models of the future will look like (Richter, 2012). Surely, the BM of an energy utility needs to consider and explore different technological solutions (i.e., energy efficiency measures, demand response solutions, smart metering, etc.), new way of power generation (i.e., renewable energy sources) and, finally, to confront with new market actors (i.e., prosumers), in a different regulatory scenario and legal framework. All this requires utilities to evolve from simple commodity suppliers to comprehensive energy solution providers, turning to digital technologies to revitalize their shrinking businesses. Some utilities (e.g., EDF, Enel, see Chesbrough, 2016) have adopted open innovation practices and formalized engagements with start-ups to benefit from the innovation generated by the external ecosystem. Generally, such utilities have gradually built up a portfolio of programs they can mix and tailor, depending on their needs and the market forces they deal with (Chiesa & Manzini, 1998). Other companies, such as the Danish Ørsted, and former oil and gas companies such as RWE, Vattenfall and Equinor, have massively reinvented their businesses shifting their capabilities from traditional oil to the offshore wind, having at 2018 the largest installed offshore capacity at the world level.

Figure 2 captures the keywords of the utility of the future and shows the relations among them. It is the result of the several interviews run throughout my 3-years Ph.D. program: in red, the word “sustainability” represents the cornerstone of the new business model for an utility; the blue keywords represent the guiding lights of such transformation; the green keywords represent the technological changes and challenges that characterize the present social, economic and technological era.

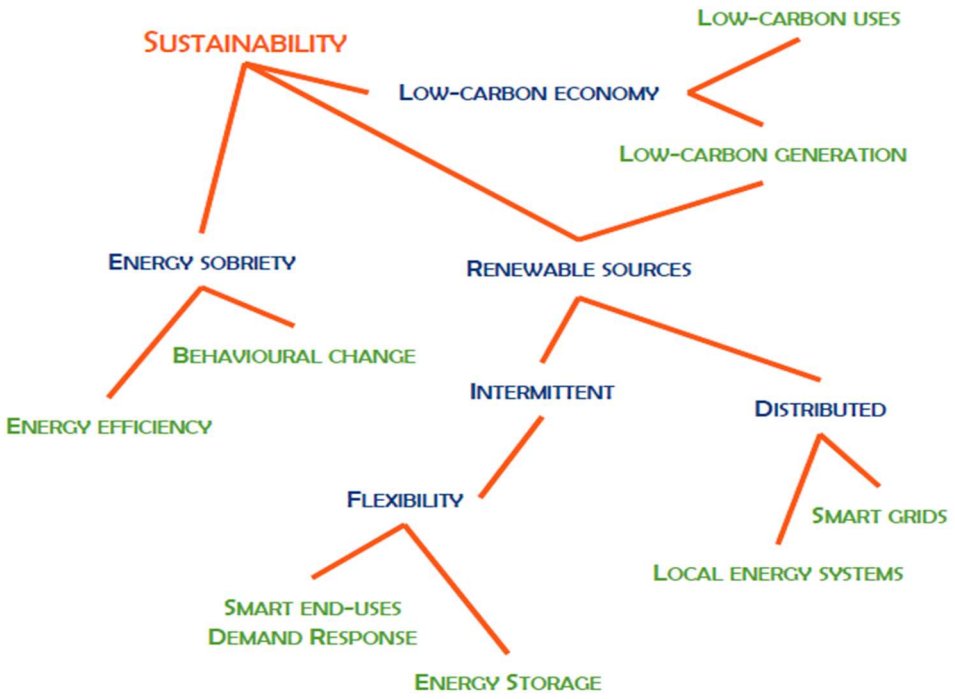


Fig. 2: The keywords' connection for the energy utility of the future

1.2. The impact of Innovation on the Energy Industry

Over the last decade, innovation has become a priority topic on the agenda of many organizations, including energy utilities. In a recent study published by the European Political Strategy Centre of the European Commission (2018), it was pointed out that firms that invested in innovation in the 2014-2017 had an average revenue growth of 10%, while those that did not got an average revenue decline of 3%. The most innovative firms might expect revenue growth 3 time bigger than the less innovative ones.

It is worth to mention that the average lifetime of a firm listed in the Fortune 500 was 75 years in the mid '90, while the life expectancy is less than 15 years today and this decreasing trend will continue in the future. Moreover, Fig.3 shows that only innovative firms increased their ranking from 2000 to 2016 maintaining or even improving their profitability, while most of the non-innovative firms faced a sharp decline or even disappeared from the ranking. During the last years, activities related to R&D were strongly correlated to the economic growth of the countries (*Fig.4*). The Accenture report of 2016 shows this correlation highlighting the top countries by Research & Development expenditures: the benefits of innovation investments are not only restricted within firms' boundaries, but they generate positive spillovers for the whole country.

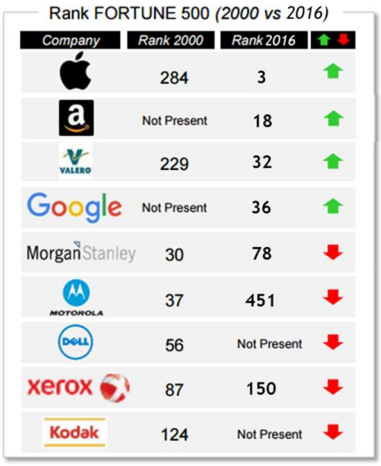


Fig. 3: Rank Fortune 500 2000 vs. 2016

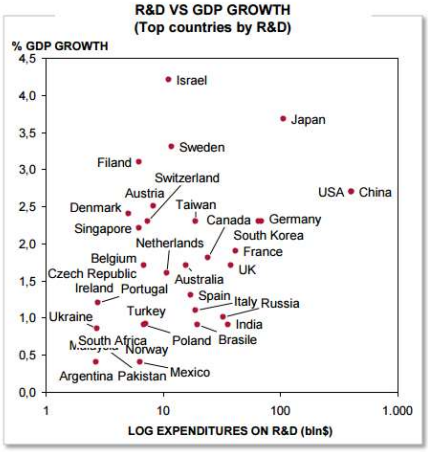


Fig. 4: R&D vs. GDP Growth

The energy industry is not an exception: the global energy landscape is changing; since the early 2000s, there have been several attempts to adapt and react to changes in this industry.

In the beginning, utilities embraced the "multiutility" approach, i.e. expanding their business by selling the maximum number of public services such as telecommunication, gas, water provision, appliances, etc. Despite the adoption of the multiutility approach, utilities did not have enough information, competences or a proper internal organizational structure and culture to fully understand where the energy industry was oriented and how to proliferate in this new business. Therefore, this first attempt resulted in a failure, and most of the utilities, like the case of Enel and its newborn telecommunication division (i.e., Wind), returned to their core, historical, legacy activities. According to the Energy Innovation Report (2019), in the last ten years utilities have decreased their investment in R&D, since nowadays only 10% of the utilities interviewed invest in R&D, compared to the 25% of ten years ago. On the other hand, startups and SMEs are massively investing in R&D related to energy solutions and services, proving how the core of the innovation process within the energy sector is moving outside the traditional boundaries of large incumbents, since the pervasiveness of digital technologies has enabled the creation of novel BMs. With this regard, the above mentioned Energy Innovation Report has identified 14 technological trends that are impacting the energy sector as a whole, which can be clustered into three groups: the emerging technologies with a high impact in the long term (i.e., blockchain, cybersecurity, cloud computing and energy storage); developing technologies with high impact in the medium term (i.e., artificial intelligence and machine learning, big data & analytics, electric mobility, IoT & connectivity, smart grid and demand-response); the mature technologies with incremental impacts in the short-medium terms (i.e., 3D printing, augmented and virtual reality, energy efficiency, renewable energies, robotics and

drones). The above technological trends bring to three main streams of development for the utilities of the future: decentralization, digitalization and servitization.

1.2.1. Decentralization

As the World Energy Outlook 2017 notes, the new policy scenario changed the traditional energy model in which a big, centralized, plant was in charge of powering a whole region, focusing on the rise of renewables and energy efficiency solutions. As noted, "*The 21st century will mark the end of fossil fuels which will gradually be replaced by energy from decarbonized renewable resources such as solar power [...] Alongside large-scale plants, we will see the emergence of a multiplicity of decentralized local generating facilities*" (Isabelle Kosher, Ceo of Engie, *Le Monde,* 2016).

Decentralization means to create a network of a multitude of small plants based on renewables, connected to power grid or natural gas supply network, able to produce and supply energy at local level. This generation mechanism allows to reduce energy wastes during transmission and to ensure lower carbon emissions. Beyond the initial investment for the instalment, the distributed energy plants will surely guarantee a benefit from more competitive prices compared to the traditional plants. Moreover, the new role of users as prosumers is contributing to the decentralization of energy generation.

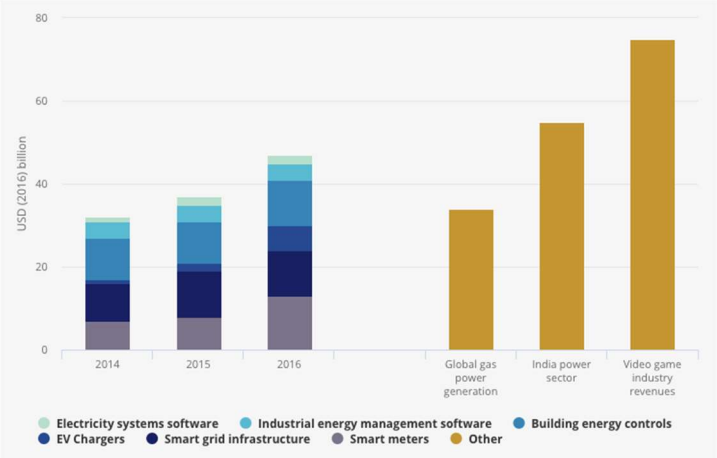
New policies, such as the one implemented at European level (Renewable Energy Directive, 2012/27/EU) and updated in 2018, aim at developing a more sustainable environment addressing at the same time problems regarding harmful emissions (i.e. improve air quality), climate change (i.e. reduce CO_2 footprint, thus, decarbonization) and ensures modern energy supply. Outside the European borders, China and India are working to scale-up solar photovoltaics. This process is expected to lead the solar power to become the future largest source of low carbon capacity by 2040 (World Energy Outlook 2017).

The rise of renewables is not only related to the power generation, but also to the provision of heat and mobility. Indeed, the focus of global investors in power plants will be on renewables, since it is becoming the most efficient energy generation source. Furthermore, off-grid electrification may be the most valuable solution to guarantee electricity access to developing countries as it would reduce costs for the access of energy in remote areas (Venturini, ENEL X, 2017).

1.2.2. Digitalization

A research shows that 90% of data ever produced by mankind are only the results of the last two years of the data production activity (Digitalization & Energy, 2017). Digitalization is giving birth to new value capture mechanisms for energy firms. Digital technologies offer indeed good opportunities for

increasing productivity, efficiency and safety across energy systems. This is the main reason behind the increasing investments in digital technologies made by energy firms. *Fig. 5* shows how investments in electricity systems software and industrial energy management software grew year on year by approximately 20% between 2014-2016.



source: Digitalization and Energy, IEA 2017

Fig. 5: Investments in Digital Electricity Infrastructure and Software

Digitalization may deploy its effects at the best by transforming the electricity networks into smart grids, an interconnected system where digital technologies reduce the edge between electricity generation and consumption. Smart grids may then enable new digital solutions, such as: demand/response; the integration of variable renewable energy sources; implementation of smart charging for electric vehicles; the emergence of small-scale distributed electricity resources such as household solar PV (Digitalization & energy, 2017). All these opportunities can work together to improve the environmental sustainability of all the energy value chain, from generation to final consumption, thus enabling a cleaner energy generation and lower level of final energy consumption. For example, renewables and smart charging stations for electric vehicles can work together to balance the fluctuations in energy demand: during the day PV are enough to cover energy demand and to recharge vehicles, while during the night, when there is a demand peak, electric vehicles could work as batteries and increase grid flexibility: in this case, digitalization acts as an enabler for the shift from centralized plants to distributed energy producers.

1.2.3. Servitization

Servitization is a common trend in almost all the current market arenas. Assets are not a source of competitive advantage anymore, but intimacy with customers has become a crucial key success factor; the most exhaustive example is the lack of real estate investments of Airbnb as well as the uberization model. This pervasive trend is encompassing also the energy utilities that are moving

towards servitization to maintain a competitive advantage in a sharply competitive industry. According to Venturini, CEO at Enel X, the energy is facing a "*shift of business from a pure energy commodity to a value-added service provider model, with utilities looking for new opportunities such as the provision of aggregation services for the home environment, aiming at completing energy supply with energy efficiency solutions […]*".

The shift towards servitization - from selling commodities to services - is changing the business paradigm of utilities, from offering the lowest electricity price, to try to offer the most valuable services. Hence, utilities are focusing on improving the whole customer experience, introducing for example smart solutions that can change the value associated by clients to their offerings. In this perspective, the traditional energy value chain is not sufficient anymore, hence utilities are expanding outside their boundaries to provide end-to-end services. Digitalization is hence creating new business opportunities: while new gaps in the industry give the chance to newcomers to gain market shares, incumbents need to re-design their business model if they want to be prepared for the future market scenario (Gartner, 2014).

1.2.4. The Case of E-Mobility

Beyond the automotive sector, the diffusion of EVs is impacting the energy industry as well. For example, the diffusion of EVs demands a larger production of car batteries, increasing the positive effects of economies of scale and, consequently, reducing the battery price. Consequently, utility scale energy storage costs are shrinking, thus enabling a good business case for expanding the amount of renewable energy sources paired with storage solutions.

Nowadays, the most important interaction between EVs and energy companies is the Vehicle-to-Grid (V2G), which may turn EV in a large distributed energy storage network.

The energy sector will probably be revolutionized by the entrance of new players which will gain market shares by filling the gaps created by the e-mobility market innovation, while incumbents will have to adapt their business model. A recent case of this revolution is represented by the Volkswagen Group, which in 2019 has established an own German subsidiary, Elli Group GmbH to develop products and services connected with energy and charging for the brands of the Group, thus underlining its strategic goal of becoming a leading provider of sustainable mobility.

2. Literature Review

The research stream of Business Models (BM) and Business Model Innovation (BMI) springs from a combination of various strategic management theories, such as transaction cost economics (Coase, 1960; Williamson, 1985), the resource-based views (Barney, 1991), system theory and strategic network theory (Amit and Zott, 2001; Hedman and Kalling, 2001; Morris et al., 2005).

The BM, both as a concept and a related construct, has largely referred to the value architecture of a business (Timmers, 1998; Rappa, 2001; Weill and Vitale, 2013; Teece, 2010; Foss and Saebi, 2017), that is, how the firm creates value, delivers value to customers and entices them to pay, eventually converting these payments into profit (Teece, 2010). Earlier research shows that business models are "innovation devices" that facilitate coordination between diverse stakeholders within processes of value creation and capture (Doganova and Eyquem-Renault, 2009). Business models are indeed "models" (hence rule-based structures) that define how value is created and secured (Baden-Fuller et al., 2017) and aim at identifying customer needs, specifying how the organization will address them and how will be able to capture value from its activities (Teece, 2017). BMI, by contrast, deals with "designed, novel, non-trivial changes to the key elements of a firm's business model and/or the architecture linking these elements" (Foss and Saebi, 2017, p. 201).

Notwithstanding the great emphasis that the literature has recently put on the development of a shared understanding of BMs and BMI (Zott et al., 2011), this research stream and the associated practice both still suffer from a severe lack of homogeneity, clarity and direction (Johnson et al., 2008; Ghezzi, 2013; Wirtz et al., 2016).

Massa et al., (2016) tackled this controversial state in the academic debate finding that, beyond the traditional interpretation whereby BMs are seen as formal conceptual representations of how a business is structured and functions - i.e. a firm's value architecture - two further perspectives have emerged from the management literature: (i) business models as attributes of real firms; and (ii) business models as cognitive/linguistic schemas.

This fragmentation has led scholars to debate whether defining BMs and BMI is actually a "wicked" problem - a problem so poorly defined and structured that inquiry appears hopeless (Buchanan, 1992). Foss and Saebi (2017) eventually argued that, instead of being a wicked problem, what burdens the research on BMs and BMI is rather a "paradigmatic" issue, where a lack of construct clarity, little agreement about definitions and the difficulty in finding the dimensions for assessing core constructs together currently limit cumulative theory from being built and tested. In an attempt to solve this issue, Foss and Saebi (2017) proposed that both BMs and BMI should be assessed in terms of the architecture of the firm's value creation, delivery and capture mechanisms - in line with Teece (2010).

The definition and assessment of BMs and their innovation process has become a topic of paramount importance in the fields of strategy, innovation and entrepreneurship, where e a growing number of scholars and practitioners agree that both established companies and startups shall look beyond their isolated products, services or processes innovation to focus on innovating their entire BM, which becomes the new unit of analysis for the innovation dimension (Chesbrough, 2007, 2010; Lindgardt et al., 2009).

BMI requires innovating at least one of the foundational elements of value creation, delivery and capture, and thereby gives a firm the potential to activate overlooked value sources or create news systems that are difficult to imitate (Amit and Zott, 2012). To date, the literature contains notable contributions and evidence on successful examples of BMI processes relating mainly to large organizations (Schaltegger et al., 2012; Chesbrough, 2007; Sosna et al., 2010; Amit and Zott, 2012; Johnson et al., 2008), although BMI also refers to smaller organizations and startups (Klewitz and Hansen, 2014). More importantly, scholars and practitioners alike are calling for the development of practical tools and approaches to support BMI (e.g. Trimi and Berbegal-Mirabent, 2012; Foss and Saebi, 2017).

2.1. Business Model: History and Main Definitions

The notion of BM is several decades old and encompasses more than thirty years of research on the topic. The original concept was firstly introduced by Peter Drucker, who defined a BM as "the way firms operate to deliver to a customer a product or service from which revenues are collected, and to capture customers' preferences in a competitive market" (Drucker, 1985). In the HBR article "The theory of the business" (Drucker, 1994), BM was presented as a set of three fundamental assumptions about "identifying customers and competitors, their values and behaviours. They are about technology and its dynamics, about a company's strengths and weaknesses." (Drucker, 1994, p. 2). A business, therefore, should be built on three main components (i.e., assumptions). First, what an organization is paid for; second, how the organization wants to impact the economy and the society, i.e. the mission of the organization; third, the core competences required to pursue the mission of the organization (Drucker, 1994). This theory based on assumptions is close to the Michael Porter's definition of strategy as "the creation of a unique and valuable position, involving a different set of activities" (Porter, 2000 p. 1). The various elements of a strategy must be aligned and coherent, and the same holds for the alignment between an organization's strategy and its BM (Rumelt, 2011). Traditionally, studies on strategy put emphasis on competitive advantage, competition and value capture, while the business model historically focused on cooperation, partnership and joint value creation (Magretta, 2002; Mäkinen and Seppänen, 2007; Mansfield and Fourie, 2004). This led to the

wrong consideration of strategy and BM as substitutes. Despite the traditional interpretation, Zott and Amit (2008) highlighted that the strategy and the BM of a firm must be considered as complements and not as substitutes. The most important alignment for BM implementation is the one between the firm and customer needs in a way that provides the company an ongoing stream of profits (Teece, 2017). The elements of a BM shall be internally aligned and coherent (Ritter, 2014), as well as the BM shall be aligned with the internal structure and overall management model of the company (Birkinshaw and Ansari, 2015). It was only in the mid-1990's that entrepreneurship and strategy scholars applied the BM construct as a holistic description of a firm's key business processes and how they are linked (Timmers, 1998; Venkatraman and Henderson, 1998; Selz, 1999). Most recently, Teece (2017 p. 172), after three decades of researches, has provided its (final) definition of BM, i.e. the "design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit".

There is also a great interest of scholars in the relationship between BM and strategy (Wirtz, 2015). Several studies (Amit and Zott, 2001; Casadesus-Masanell and Ricart, 2010; Osterwalder, 2004; Rajala and Westerlund, 2005; Tikkanen et al., 2005) highlighted that, although strategy and BM look similar, they are not the same. Casadesus-Masanell and Ricart (2010 p. 212) emphasize: "strategy and business model, though related, are different concepts: a business model is the direct result of strategy but is not, itself, strategy." While the business strategy can be defined as a coherent and integrated long-term plan that includes strategic decisions for achieving a sustainable competitive advantage (Wirtz, 2015), the BM provides the value creation logic for implementing it (Osterwalder et al., 2005; Dahan et al., 2010).

Given the great interest of the academic world towards the concept of BM and the multitude of interpretations proposed, several scholars (Shafer, Smith, Linder, 2005; Osterwalder and Pigneur, 2009; Zott et al., 2011; Lambert and Davidson, 2013; Spieth et al., 2013; Foss and Saebi, 2017) focused on listing or comparing various definition of BM. In general, scholars gave several interpretations to the concept of BM referring to it as a "*statement* (Stewart and Zhao, 2000), a *description* (Applegate, 2000; Weill and Vitale, 2001), a *representation* (Morris, Schindehutte, and Allen, 2005; Shafer, Smith, and Linder, 2005), an *architecture* (Dubosson-Torbay, Osterwalder, and Pigneur, 2002; Timmers, 1998), a *conceptual tool or model* (George and Bock, 2009; Osterwalder, 2004; Osterwalder, Pigneur, and Tucci, 2005), a *structural template* (Amit and Zott, 2001), a *method* (Afuah and Tucci, 2001), a *frame- work* (Afuah, 2004), a *pattern* (Brousseau and Penard, 2006), and a *set* (Seelos and Mair, 2007)" (Zott et al., 2011 p. 1022). All such definitions are built around the concepts of value creation, value delivery and value capture (Zott et al, 2011; Teece, 2017). A

growing body of research acknowledges the relevance of business models for economic activities but also points to a challenge: researchers have produced a variety of approaches of how to define business models (Massa et al., 2017). In their review of the state of the art and future challenge for the research on BMI, Spieth et al. (2013) listed a range of definitions that emerged describing the BM, such as 'a statement of how a firm will make money and sustain its profit stream over time' (Stewart and Zhao, 2000, p. 290); 'a scale model of a new venture, which aims at demonstrating its feasibility and worth to the partners whose enrolment is needed' (Doganova and Eyquem-Renault, 2009, p. 1568); an outline of 'the essential details of a firm's value proposition for its various stakeholders and the activity system the firm uses to create and deliver value to its customers' (Seddon, Lewis and Freeman, 2004, p. 429); 'representations that allow managers to articulate and instantiate the value of new technologies' (Perkmann and Spicer, 2010, p. 265); a 'description of the mechanisms enabling it to create value through the value proposition made to its clients, its value architecture, and to harness this value in order to transform it into profits' (Moingeon and Lehmann-Ortega, 2010, p. 271); an explanation of 'how a venture is expected to create a profit'; a reflection of 'the operational and output system of a company, and as such captures the way the firm functions and creates value' (Wirtz et al., 2010, p. 274); 'a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network' (Shafer et al., 2005, p. 202); 'an abstraction of a business identifying how the business makes money' (Betz, 2002, p. 1); or as 'stories that explain how enterprises work' (Magretta, 2002, p. 87).

2.1.1. Streams of Research on BM Literature

Three main streams of research in BM literature have been identified (Lambert and Davidson, 2013; Zott et al., 2011). First, BM is adopted for performing enterprise classification. Second, BM impacts on firm's performances. Third, the BM is intended as a unit of innovation (Zott et al., 2011).

- **First stream of research - Enterprise classification**

The study of BM as a way to classify firms taxonomically is of great interest in an era characterized by digital disruption in many industries (e.g., energy) (Ha and Ganahl, 2004). BM classifications are divided into studies that provide models for specific industries or specific users (Lambert and Davidson, 2013) and models developed with the aim of giving an overall understanding of the current practices used across different contexts (Morris et al., 2005). According to Morris et al., it is possible to classify firms belonging to different industries capturing strategic perspectives along with economic and operational aspects of the firm. The authors proposed a framework composed by four clusters of generic BMs: technical service,

standardized producer, product franchiser and customized service business models. This framework provided a useful backdrop for strategically adapting fundamental elements of a business. Camison and Villar-Lopez (2010) proposed another framework for a general classification of companies presenting seven variables that reflect degree of diversification, organization structure and value chain management to identify four distinct clusters of BMs, namely: multidivisional model, integrated model, hybrid model and network-based model.

- **Second stream of research – Firm Performance**

Business model represents a potential source of competitive advantage (Markides and Charitou, 2004) and plays a central role in explaining firm performances (Zott et al., 2011). Several studies aim at identifying the business model type that is most frequently related to company success. Zott and Amit (2007), focusing on entrepreneurial firms, compared how business models based on efficiency and those based on novelty can influence firms' performances. In a subsequent study, Zott and Amit (2008) compared the fit between business model and product market strategy. In their empirical work, they see BM as the independent variable and link it to firm performances, moderated by the environment. Lambert and Davidson (2013) summarized the results of these two studies highlighting the positive relationship between company performances and novelty-centered business models, coupled with appropriate market strategy. Actually, scholars are acknowledging that firms can compete through their business models (Casadesus-Masanell and Ricart, 2010a) and that "business models integrate the activity-based, resource-based, and knowledge-based perspectives and facilitates the identification of sources of competitiveness" (Casadesus-Masanell and Ricart, 2010b, p. 126).

- **Third stream of research – BM as potential unit of innovation**

There is evidence from the literature that technological and market-related forces (de Reuver et al., 2009), factor conditions and conflicts (Chung, Yam, and Chan, 2004), cause companies to change their BMs. One important role of the BM could consist in unlocking the potential value embedded in new technologies and converting it into market outcomes (Zott et al., 2011). This allows to introduce the concept of BMI that will be investigated in the following paragraph.

In Table 1, we condensate and list the BM definitions we deem more relevant according to the scope of the present doctoral thesis. Hence, the list is not intended to be definitive and omni-comprehensive.

Tab. 1: Selected Definitions of Business Model (ordered chronologically)		
Year (page)	*Author(s)*	*Definition*
1985	**Drucker**	BM as the way firms operate to deliver to a customer a product or service from which revenues are collected, and to capture customers' preferences in a competitive market.
1998:4	**Timmers**	An architecture for the product, service and information flow, including a description of various business actors and their roles; and A description of the potential benefits for the various business actors; and A description of the sources of revenues.
1998	**Venkatraman and Henderson**	The authors define business model as an architecture of a virtual organization along three vectors: customer interaction, asset configuration and knowledge leverage.
1999: 106	**Selz**	Business model is understood to be an architecture for the product, service and information flows, which includes a description of the various economic agents and their roles. Furthermore, a business model describes the potential benefits for the various agents and provides a description of the potential revenue flow.
2000: 65-112	**Hamel**	[A] business model is simply a business concept that has been put into practice. A business concept comprises four major components: Core Strategy, Strategic Resources, Customer Interface, Value Network. [...].
2000	**Amit and Zott**	A business model is the architectural configuration of the components of transactions designed to exploit business opportunities. ... A transaction component refers to (1) the specific information, service, or product that is exchanged and/or (2) the parties that engage in the exchange. ... The architectural configuration depicts and characterizes the linkages among the components of transactions and describes their sequencing.
2000: 4f	**Tapscott, et al.**	The authors do not directly define business model but business webs. A business web is a business on the internet: "[D]efinition of a business web (b-web): a distinct system of suppliers, distributors, commerce service providers, infrastructure providers, and customers that use the Internet for their primary business communication and transactions".
2000: 59	**Mahadevan**	A unique blend of three streams that are critical to the business. These include the value stream for the business partners and the buyers, the revenue stream, and the logistical stream.
2000: 1	**Linder and Cantrell**	The organization's core logic for creating value. The business model for a profit-oriented enterprise explains how it makes money.
2001: 4	**Amit and Zott**	A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.
2002: 174	**Bienstock, et al.**	The way we make money.
2002: 4	**Magretta**	The business model tells a logical story explaining who your customers are, what they value, and how you will make money in providing them that value.
2002: 532	**Chesbrough and Rosenbloom**	The business model provides a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic inputs. The business model is thus conceived as a focusing device that mediates between technology development and economic value creation.
2004: 9	**Afuah**	A business model is the set of which activities a firm performs, how it performs them, and when it performs them as it uses its resources to perform activities, given its industry, to create superior r customer value (low-cost or differentiated products) and put itself in a position to appropriate value.
2005: 17	**Osterwalder, et al.**	A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams.
2005: 202	**Shafer, et al.**	Business is fundamentally concerned with creating value and capturing returns from that value, and a model is simply a representation of reality. We define a business model as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network.
2005: 792	**Tikkanen, et al.**	We define the business model of a firm as a system manifested in the components and related material and cognitive aspects. Key components of the business model include the company's network of relationships, operations embodied in the company's business processes and resource base, and the finance and accounting concepts of the company.
2005: 261-262	**Voelpel, et al.**	The particular business concept (or way of doing business) as reflected by the business's core value proposition(s) for customers; its configurated value network(s) to provide that value, consisting of own strategic capabilities as well as other (e.g. outsourced/allianced) value networks and capabilities; and its leadership and governance enabling capabilities to continually sustain and reinvent itself and satisfy the multiple objectives of its various stakeholders (including shareholders).
2005	**Morris, et al.**	A business model "is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture and economics are addressed to create sustainable competitive advantage in defined markets.
2007: 1329	**Teece**	A hypothesis about what customers want, and how an enterprise can best meet those needs and get paid for doing so.
2007: 12	**Chesbrough**	The business model performs two important functions: value creation and value capture. First, it defines a series of activities, from procuring raw materials to satisfying the final consumer, which will yield a new product or service in such a way that there is net value created throughout the various activities. Second, a business model captures value from a portion of those activities for the firm developing and operating it.
2008: 52	**Johnson, et al.**	A business model consists of four interlocking elements (customer value proposition, profit formula, key resources, key processes) that taken together create and deliver value.

2009: 11	**Santos, et al.**	A business model is a configuration of activities and of the organizational units that perform those activities both within and outside the firm designed to create value in the production (and delivery) of a specific product/market set.
2009:14	**Osterwalder and Pigneur**	A business model describes the rationale of how an organization creates, delivers, and captures value.
2010: 219	**Zott and Amit**	We have defined the business model as depicting the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.
2010: 172	**Teece**	The design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit.
2010	**Casadesus-Masanell and Ricart**	A business model "is a reflection of the firm's realized strategy.
2011	**Zott, et al.**	A business model is a holistic description of a firm's key business processes and how they are linked.
2016	**Wirtz, et al.**	Business models are "a simplified and aggregated representation of the relevant activities of a company. It describes how marketable information, products and/or services are generated by means of a company's value-added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the superordinate goal of generating, or rather, securing the company the competitive advantage.
2017:172	**Teece**	Design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit.

2.1.2. The mechanisms underlining the Business Model Design: value creation, delivery and capture

A successful BM shall take into account several components, namely, "the firms value proposition and market segments, the structure of the value chain required for realizing the value proposition, the mechanisms of value capture that the firm deploys, and how these elements are linked together in an architecture." (Saebi et al., 2017, p. 568).

Value creation is the ability of a firm to create value, which means to generate profits for its shareholders. With the emergence of e-commerce, for example, companies have developed new ways of doing business, this because the digital economy has allowed firms to adopt novel forms of value creation mechanisms, built on the concept of network: the value is created "in concert by a firm and a plethora of partners, for multiple users" (Zott et al., 2011 p.1029). Value creation mechanisms are not strictly related to the firm, since value can be created through (re)configuration of the value chain (Porter, 1985), so the appropriate unit of analysis should go beyond firms' boundaries. (Amit and Zott, 2001).

According to Teece, the BM reflects a "hypothesis about what customers want, and how an enterprise can best meet those needs, and get paid for doing so" (2007 p. 1329). In other words, with "value delivery" we refer to the relationship between the firm and its customers, to whom products and services are sold. The firm must effectively communicate and deliver value to external parties (i.e. stakeholders and shareholders) and customers (Zott and Amit, 2008). A BM in this sense is a mean to communicate value proposition with the external world and provide customers with products and services designed and delivered according to their specific needs (i.e. customer-focused value creation) (Chesbrough and Rosenbloom, 2002; Mansfield and Fourie, 2004).

After creating value, a firm should focus on how to organize the value appropriation process (i.e., value capture), and so how value is ultimately appropriated by individuals (i.e. stakeholders, shareholders, management, employees). Value appropriation is articulated in two different processes: "*inter-organizational value appropriation* (i.e., how value is distributed among the firms within a population) and *intra-organizational value appropriation* (i.e., once value is appropriated by a firm, how that value is distributed among the firm's internal stakeholders)" (Di Gregorio, 2013, p. 42). The first highlights that a firm must consider the presence of different actors (i.e. competitors, suppliers and customers) in the competitive arena. In order to properly appropriate the value created, firms should rely on some key specific resources to create something that is difficult to imitate (Moran and Ghoshal, 1999). When dealing with inter-organizational value appropriation, it might be necessary to consider also some strategic relationships with the rest of the network (i.e. joint venture, alliances, etc.), that could enhance the possibility to build a sustainable competitive advantage (e.g., Dyer, 1997; Gulati and Singh, 1998; Inkpen and Beamish, 1997). Intra-organizational value appropriation, on the other hand, depends mostly on the internal policies of a firm (Jensen and Meckling, 1976).

2.2. Business Model Innovation

2.2.1. Introduction: Definition of BMI

Since the mid- '90s the advent of digital technologies, together with environmental dynamism, created a market space for new potential competitors since they decreased the importance of economies of scale as a barrier to entry (Chesbrough, 2010; Lambert and Davidson, 2013). Digital technologies (such as e-commerce, internet, etc.), allowed even small firms, addressing a niche market, to enter the competition. Thus, they have created opportunity to adopt new business models both for newcomers and incumbents.

In the last decade, an increasing number of studies have focused on the innovation dimension of the BM and, therefore, examined Business Model Innovation (BMI). BMI derives from the necessity to find new solutions to answer the Drucker's original question on how to capture customers' preferences. With this regard, BMI can be defined as the "designed, novel, non-trivial changes to the key elements of a firm's business model and/or the architecture linking these elements" (Foss and Saebi, 2017, p.201).

Several scholars tried to offer definitions and conceptualizations of BMI (e.g., Amit and Zott, 2012; Santos, Spector and Van der Heyden, 2009; Teece, 2010), and previous reviews of the literature have attempted to categorize BMI research in different ways. Among those, Morris et al. (2005) define three general categories – economic, operational and strategic – to cluster the various definitions of BMI; Zott et al. (2011) classify the existing literature in accordance with their areas of investigation:

e-business and use of information technology, strategic issues, and innovation and technology management; Perkmann and Spicer (2010) identify transactional structures, value extracting devises and mechanisms for organizational structuring as dominant business model conceptions; Demil and Lecocq (2010) differentiate between static and transformational approaches of the business model concept; George and Bock (2011) distinguish six broad themes that business models commonly reflect on: organizational design, the resource-based view, narrative and sensemaking, the nature of innovation, the nature of opportunity and transactive structures; Schneider and Spieth (2013) categorize existing literature on BMI in three streams of research: (1) prerequisites of conducting BMI, (2) elements and process of BMI and (3) effects achieved through BMI. In Table 2, we collect the most relevant definitions of BMI. As per Table 1, the list is not intended to be final and omni-comprehensive, but it is intended as a snapshot of the research done on the topic and of the most relevant definitions collected. Definitions indeed abound and many of them lack specificity. Some scholars emphasize the innovation component of BMI reflected into customer segmentation, value proposition, channels, customer relationship, revenue streams, key resources, key activities, key partnerships, cost structure (Osterwalder and Pigneur, 2010); others stress that what is innovated is the architecture of a BM rather than its individual components: an architecture is not a list of the firm's mechanisms for creating, delivering, and capturing value, but a mapping of the functional relationships among those mechanisms and the underlying activities (Foss and Saebi, 2017).

Tab. 2: Selected Definitions of Business Model Innovation (ordered chronologically)

Year (page)	*Author(s)*	*Definition*
2004a: 17	**Mitchell and Coles**	By business model innovation, we mean business model replacements that provide product or service offerings to customers and end users that were not previously available. We also refer to the process of developing these novel replacements as business model innovation.
2005: 732	**Morris, et al.**	Business model lifecycle, involving periods of specification, refinement, adaptation, revision and reformulation. An initial period during which the model is fairly informal or implicit is followed by a process of trial-and-error, and a number of core decisions are made that delimit the directions in which the firm can evolve.
2006: 20	**Markides**	Business model innovation, "the discovery of a fundamentally different business model in an existing business
2009: 14	**Santos, et al.**	Business model innovation is a reconfiguration of activities in the existing business model of a firm that is new to the product service market in which the firm competes.
2010: 263	**Gambardella and McGahan**	Business model innovation occurs when a firm adopts a novel approach to commercializing its underlying assets.
2010: 239	**Demil and Lecocq**	Business model evolution, a fine-tuning process involving voluntary and emergent changes in and between permanently linked core components.
2010:312	**Yunus, et al.**	Business model innovation is about generating new sources of profit by finding novel value proposition/value constellation combinations."
2010	**Teece**	Business model learning, an established firm modifies its business model in face of competition from a new business model.
2010	**McGrath**	Business model erosion, the declining competitiveness of established business models.
2010: 47	**Aspara, et al.**	Business model innovation, "initiatives to create novel value by challenging existing industry-specific business models, roles and relations in certain geographical market areas.
2011: S7	**Sorescu, et al.**	As a change beyond current practice in one or more elements of a retailing business model (i.e., retailing format, activities, and governance) and their interdependencies, thereby modifying the retailer's organizing logic for value creation and appropriation.
2012	**Amit and Zott**	Innovate business model by redefining (a) content (adding new activities), (b) structure (linking activities differently), and (c) governance (changing parties that do the activities).
2012: 184	**Bucherer, et al.**	We define business model innovation as a process that deliberately changes the core elements of a firm and its business logic.
2013: 13	**Abdelkafi, et al.**	A business model innovation happens when the company modifies or improves at least one of the value dimensions.

2013: 460	**Aspara, et al.**	Business model transformation. a change in the perceived logic of how value is created by the corporation, when it comes to the value-creating links among the corporation's portfolio of businesses, from one point of time to another.
2013: 276	**Berglund and Sandstrom**	A BMI can thus be thought of as the introduction of a new business model aimed to create commercial value.
2013: 464	**Casadesus-Masanell and Zhu**	At root, business model innovation refers to the search for new logics of the firm and new ways to create and capture value for its stakeholders; it focuses primarily on finding new ways to generate revenues and define value propositions for customers, suppliers, and partners.
2014: 324	**Khanagha, et al.**	Business model innovation can range 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.
2017: 201	**Foss and Saebi**	Business model innovation as "designed, novel, non-trivial changes to the key elements of a firm's business model and/or the architecture linking these elements.

2.2.2. The Role of Digital Technologies in BMI

Innovation and technology management are strongly related to the concept of BM. Digital technologies, in particular, are reshaping the way a business brings value to its customers. Internet of things, social networks, artificial intelligence, big data and virtual reality are only a few examples of digital technologies enabling companies to establish intimacy with customers. However, it is only in the last few years that digital technologies have been adopted as enabler tools for business, beating the misleading perception of such technologies as only supportive to information and communication. The use of digital technology during the process of innovating is called digital innovation (Aron, 2013; Mithas et al., 2013). Digital innovation involves the core business of many organizations, changing the nature and structure of products, services and operations, pushing for novel value creation and value appropriation pathways. Given the above conceptualization, scholars stroke into a new field of investigation: digital innovation management as "practices, processes, and principles that underlie the effective orchestration of digital innovation." (Nambisan et al., 2017, p. 224). Thus, digital technologies are bringing in managers' agenda a wide spectrum of business opportunities, together with serious managerial and organizational challenges, triggering the overall strategy (Berman, 2012).

2.2.3. BMI in Established Firms and Newcomers: BM Design and BM Reconfiguration

When considering BMI, it is fundamental to make a distinction between established firms, less able to innovate and embody new technologies in the design and commercialization of new products and services (Hill and Rothaermel, 2003), and newcomers, more flexible and able to react to external stimuli. With this regard, BMI may refer to the design of novel BMs for newly formed organizations, namely, business model design (BMD): it refers to the entrepreneurial activity of creating, implementing and validating a BM. Alternatively, BMI may refer to the reconfiguration of existing

BMs, namely, business model reconfiguration (BMR): it refers to the phenomenon by which managers reconfigure organizational resources to change an existing BM (Massa and Tucci, 2013).

While sharing the potential for the same outcome, reconfiguration implies challenges linked to the existence of a BM: organizational inertia, management processes, modes of organizational learning, modes of change and, more in general, path dependent constraints. On the other hand, "newly formed organizations may face other issues such as considerable technological uncertainty, lack of legitimacy, lack of resources and, in general, liability of newness, which do influence the design and validation of new BMs" (Massa and Tucci, 2013, p. 425). Aldrich and Auster (1986) in their study on the important concept of liability of newness (Stinchcombe, 1965), refer to some internal and external barriers to enter the competitive arena, especially for small, newly born firms. For example, newcomers may face difficulties in acquiring resources, reaching customers and, internally, organize the roles and communication between the newly hired workforce. In other words, young organizations, going through a BMD process, face a higher risk of failure than incumbent firms (Bruderl and Schussler, 1990).

- Business Model Design

Amit and Zott (2001) described BMD as the process of creation of a new entrepreneurial venture, embracing the design of content, structure and governance of the transactions that bring value to the company. It is a mix of traditional entrepreneurial activities (e.g., opportunity recognition, links with market, etc.) (Bhave, 1994) and it explains "how an organization is linked to external stakeholders, and how it engages in economic exchanges with them to create value for all exchange partners" (Zott and Amit, 2007 p. 181). Nonetheless, the number of possible combinations between BM components (Afuah and Tucci, 2001), activities (Zott and Amit, 2010) and choices (Casadesus-Masanell and Ricart, 2010) increase computational complexity and cause uncertainty.

- Business Model Reconfiguration

External forces, such as internet technology and globalization, are blurring the distinction between industries, lowering barriers to entry, and causing opportunities for newcomers (Gambardella and McGahan, 2010; Hacklin et al., 2009; Gambardella and Torrisi, 1998). This pushes incumbents to rethink and redesign how they create, capture and deliver value; in other words, to exploit new opportunities, managers shall conceive the design of new business models, namely doing BMR (Kim and Min, 2015; Osiyevskyy and Dewald, 2015; Massa and Tucci, 2013). Analyzing the BMR, we shall take into account structural barriers, those related to conflicts

among existing assets: the BM already established for the existing technology, and the one which may be required to exploit the emerging technology are in tension. Cognitive barriers shall be considered as well: managers are likely to resist experiments that might threaten the ongoing company value, as well as they may be unable to recognize external opportunities (Amit and Zott, 2001). Another interpretation of cognitive barriers has been proposed by Rosenbloom and Chesbrough (2002), who argue that the success of the established BMs strongly influence the information that subsequently gets routed into corporate decision processes.

2.2.4. The Scope of BMI: Architectural and Modular Change

When introducing the concept of "scope" of BMI, it can be a matter of both architectural and modular changes. We shall indeed consider the complexity that arise when there is a huge number of interdependencies among firm's processes of value creation, delivery and capture (i.e., concept of BM as a "complex system") (Fleming, 2001; Levinthal, 1997; Simon, 1962, 1973).

The so-called Complexity theory (Simon, 1962) explains that to change the BM of a highly interconnected firm architectural changes shall be implemented, changing the nature of interactions among core components (Henderson and Clark, 1990), while a less tight interdependency can be treated as a modular change, i.e. the redesign of core components while leaving linkages between them unchanged (Henderson and Clark, 1990).

The model proposed by Foss and Saebi (2017) analyses BMI with regard to "scope" (as measured in terms of the level of architectural and modular change) and "novelty" (new to the firm and new to the industry; see also Foss and Stieglitz, 2015), distinguishing four types of BMI: evolutionary, focused, adaptive and complex (*Table 3)*.

Novelty	Scope		
		Modular	*Architectural*
	New to firm	Evolutionary BMI	Adaptive BMI
	New to industry	Focused BMI	Complex BMI

Tab. 3: BMI Scope-Novelty Model proposed by Foss and Saebi (2017)

More in detail, evolutionary BMI refers to the idea of "a fine-tuning process involving voluntary and emergent changes" (Demil and Lecocq, 2010 p. 239) in individual components of the BM, often occurring naturally over time.

A focused BMI is the process by which "managers actively engage in modular or architectural changes in the BMI to disrupt market conditions" (Foss and Saebi, 2017 p. 217).

Moving forward to the upper right corner, adaptive BMI involves changes in the overall BM that are new to the firm but not necessarily to the industry (Saebi et al., 2016). These are the cases where firms adapt the BM architecture in response to changes in the external environment. Eventually, Complex BMI affects the BM in its entirety, for example when traditional companies transform themselves in on-line, web-based companies.

2.2.5. Antecedents and Outcomes of BMI

Another important stream of research on BMI is the investigation of the BMI outcomes and antecedents. Outcomes explain how BMI improves competitive advantage, profitability, innovativeness and other aspects of organizational performances. BMI may be undertaken for several reasons, such as reducing cost, optimizing processes, introducing new products, accessing new markets, and ultimately improving financial performances.

BMI antecedents are mainly divided among external and internal drivers of BMI. External antecedents can be identified as modifications in the external environment that facilitate BMI (e.g., new technologies, changes in customer preferences, new competitors, etc.) (Foss and Saebi, 2017). Internal antecedents are intended as the capabilities that enable firms to strategically adapt to environmental changes, reconfigure their pool of resources and preserve competitiveness over time: such capabilities are referred to as "dynamic capabilities" (Teece et al., 1997; Teece, 2007).

2.3. Dynamic Capabilities

2.3.1. Definition of Dynamic Capabilities

The elements that ensured the success of a business in the past (e.g., monitoring of performances, costs, and quality, etc.) are not sufficient anymore to guarantee the leadership in the market. Consequently, to ensure a sustainable competitive advantage, a firm does not only face the urge of acquiring knowledge but also of developing proper capabilities that are difficult to imitate by competitors, to the point that an enterprise that lacks dynamic capabilities cannot build a sustainable competitive advantage and so guarantee itself a long-term success (Teece, 2007). In this context of analysis, the dynamic capabilities framework has become one of the most active research streams in the strategic management literature because this area of study explains how firms respond to rapid technological and market change (Eisenhardt and Martin, 2000; Di Stefano et al., 2014; Helfat et al., 2007; Teece, 2007; Teece et al., 1997). To say it differently, the dynamic capabilities framework provides a powerful lens for studying strategic change in organizations (Peteraf et al., 2013; Schilke et al., 2018).

In general, an organization has a portfolio of capabilities, articulated on two levels (Winter, 2003). At the lower level there are ordinary capabilities: operational or "zero-level" capabilities as those that permit a firm to run routine activities, administration, and basic governance. These capabilities "allow any organization to pursue a given production program, or defined set of activities, more or less efficiently" (Teece, 2017 p. 1).

Resources of a firm (and the ones of its partners) are "orchestrated" and developed by higher-level capabilities, namely, dynamic capabilities: these help firms to address turbulent environments by resetting those internal and external capabilities (Teece, 2017; Teece et al., 1997).

The first definitions of dynamic capabilities were given by scholars in the early 90's. We collected several interpretations (definitions) of dynamic capabilities in the period between 1994 and 2017. All these definitions are consistent with an important aspect of the dynamic capabilities, i.e. dynamic capabilities impact on the pool of resources of the firm, which include "tangible, intangible and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis" (Helfat et al., 2007 p. 4).

Tab. 4: Selected Definitions of Dynamic Capabilities (ordered chronologically)

Year (page)	*Author*	*Definition*
1994: 537	**Teece and Pisano**	Timely responsiveness and rapid and flexible product innovation, along with the management capability to effectively coordinate and redeploy internal and external competences.
1997: 516	**Teece, et al.**	The firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.
2000: 1006	**Eisenhardt and Martin**	The firm's processes that use resources-specifically the processes to integrate, reconfigure, gain, and release resources-to match and even create market change; dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die.
2000:36	**Teece**	The ability to sense and then seize opportunities quickly and proficiently.
2001: 597	**Griffith and Harvey**	Dynamic Capabilities is a combination of resources that are difficult-to-imitate, including effective coordination of inter-organizational relationships, on a global basis that can provide a firm competitive advantage.
2002: 340	**Zollo and Winter**	A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness.
2002: 734	**Lee, et al.**	Dynamic capabilities are conceived as a source of sustainable advantage in Schumpeterian regimes of rapid change.
2003: 1012	**Adner and Helfat**	The capabilities with which managers build, integrate, and reconfigure organizational resources and competences.
2003: 999	**Helfat and Peteraf**	Dynamic capabilities do not directly affect output for the firm in which they reside, but indirectly contribute to the output of the firm through an impact in operational capabilities.
2003: 991	**Winter**	Those (capabilities) that operate to extend, modify, or create ordinary capabilities.
2006: 918	**Zahra, et al.**	The abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s).
2007: 1319	**Teece**	Dynamic capabilities can be disaggregated in the capacity (a) to sense and shape opportunities and threats, (b) to seize opportunities, and (c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets.
2007: 4	**Helfat, et al.**	The capacity of an organization to purposefully create, extend and modify its resource base.
2011: 239	**Pavlou and El Sawy**	Dynamic capabilities have been proposed as a means for addressing turbulent environments by helping managers extend, modify, and reconfigure existing operational capabilities into new ones that better match the environment.
2015: 1	**Helfat and Martin**	The capabilities with which managers create, extend, and modify the ways in which firms make a living-helps to explain the relationship between the quality of managerial decisions, strategic change, and organizational performance.
2017: 1	**Teece**	The design and operation of business models are dependent on a firm's capabilities. The crafting, refinement, implementation, and transformation of business models are outputs of high-order (dynamic) capabilities. Dynamic capabilities, which are underpinned by organizational routines and managerial skills, are the firm's ability to integrate, build, and reconfigure internal competences to address, or in some cases to bring about, changes in the business environment.

2.3.2. Two Levels of Dynamic Capabilities: Microfoundations and Higher-order Capabilities

Dynamic capabilities can be analysed at two levels: "microfoundations" and higher-order capabilities (Teece, 2007). Microfoundations, which have been also referred to as second-order capabilities (Teece, 2017) are related to the creation of new capabilities, both by recombining existing ones or developing completely new ones (Helfat and Peteraf, 2015; Felin et al., 2015; Hodgkinson and Healey, 2011). Higher-order dynamic capabilities, on the other hand, aim at aggregating and guiding the second-order dynamic capabilities as well as ordinary capabilities. These are fundamental for a firm willing to innovate its BM for exploiting opportunities and/or solving problems that it is facing. Actually, the top management of a firm should be focused on high-order dynamic capabilities (Teece, 2017), being aware that they help to reconfigure specialized assets and adapt to new (and always evolving) customer needs, identify new potential opportunities and, most importantly, create value for shareholders

Higher-order dynamic capabilities are those "by which management, supported by organizational processes, senses likely avenues for the future, devises business models to seize new or changed opportunities, and determines the best configuration for the organization based on its existing form and the new plans for the future" (Teece, 2017 p. 2) Therefore, firms, to successfully implement BMI, need to develop proper (dynamic) capabilities to:

- **Sensing** new opportunities in a business context characterized by a high level of strategic discontinuities and by identifying the magnitude of a change in customers' preferences (Doz and Kosonen, 2010). To identify and shape opportunities, firms must continuously search for new technologies or market trends (March and Simon, 1958; Nelson and Winter, 1982). As Kirzner (1973) elaborated, opportunity sensing is fundamental for entrepreneurial action, and it can be done because information is unevenly spread across the markets (i.e., information gap). Eventually, "sensing" not only requires high investments in research, but also "involves understanding latent demand, the structural evolution of industries and markets, and likely supplier and competitor responses" (Teece, 2007, p. 1322).

- **Seizing** new opportunities is particularly augmented by the advent of digital technologies (Johnson et al., 2008). The big issue that a firm must face is to decide where, when and how much to invest in an opportunity. This is the reason why firms should always try to maintain and improve their resources, both in terms of complementary assets and technological know-

how and then, when an opportunity has acceptable risk and cost level, invest in it and conquer the market. A fundamental complement to these activities is the design of a proper BM that provides a strategy, not only for investments priorities, but also for market launch (Teece, 2007).

- **Transforming** their internal capabilities, consequently determining the best configuration for a firm to exploit the opportunities deriving from the adoption of a new technology. If sustained by a good commitment (i.e., investments, design of BM and focused efforts), a business opportunity can lead a firm to grow and to be more profitable. Moreover, as an enterprise grows, it is critical to maintain a good alignment between firm's (historical) core competences and investments in new (additional) capabilities. So, "a key to sustained profitable growth is the ability to recombine and reconfigure assets and organizational structures as the enterprise grows, and as markets and technologies change, as they surely will" (Teece, 2007 p. 1335).

Not all the firms are good in all the three types of capabilities (i.e., sense, seize, and transform). A firm might be excellent at discovering new business opportunities but, at the same time, not brilliant in exploiting them through the design of a novel business model (Teece, 2017).

2.3.3. Dynamic Capabilities and the Strategy of a Firm

Dynamic capabilities enable a firm to "seize the future and develop products, processes and business models to meet (and shape) ever-changing markets" (Teece, 2014, p. 23). They help identifying investments for the development of new products, services and BMs, that are more in line with the business environment in which the firm operates. Since those are strategic decisions, they are generated by the upper echelons of the organization; therefore, dynamic capabilities belong to the top managerial skills of a firm, and so they are largely characterized by tacit components.

Because they are difficult to imitate, the stronger the link between dynamic capabilities, internal culture and routines of an organization, the more a firm can have a chance to gain a sustainable competitive advantage (Teece, 2014). In this perspective, we can also assess the strong link that exists between the dynamic capabilities and the strategy of a firm, that in general defines how a firm competes in the market.

Rumelt (2011, p. 6) defined strategy as "a coherent set of analyses, concepts, policies, arguments, and actions that respond to a high-stakes challenge". According to Casadesus-Masanell and Ricart (2011, p. 100): "Strategy has been the primary building block of competitiveness over the past three decades, but in the future, the quest for sustainable advantage may well begin with the business model."

Nowadays, it is more accurate to say that dynamic capabilities determine the firm's level of competitiveness, as they are enablers of the design of a BM and, consequently, fundamental for the firm strategy (Teece, 2017).

In 2017, Teece proposed a simplified schema for putting together dynamic capabilities, BM and strategy, showing the relationship between the actions that a company takes to compete in a market and the capabilities that the company possess to undertake such actions (*Fig.6*).

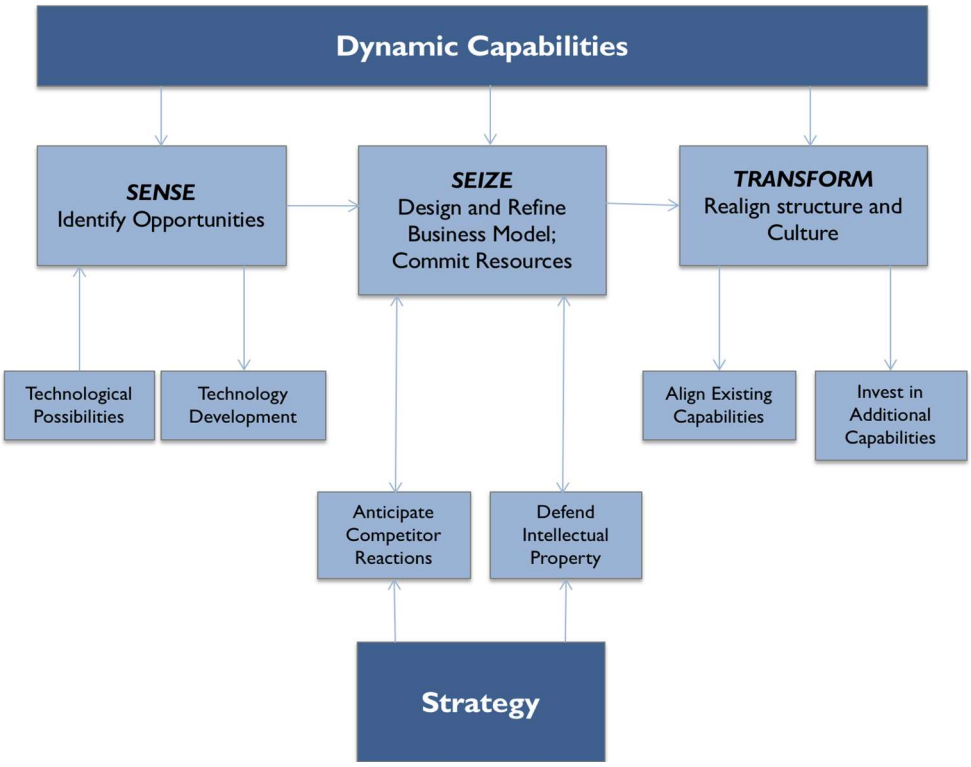


Fig. 6: Dynamic Capabilities Framework proposed by Teece

The adoption of a specific BM typically places requirements on multiple aspects of an organization (Leih et al., 2015). Indeed, dynamic capabilities encounter the firm strategy and the BM at organizational design level.

2.4. Organizational Design

The crossway between BMI and dynamic capabilities is represented by organizational design. As we have already seen, research has studied the importance of dynamic capabilities for BMI, by which management, supported by organizational processes, senses likely opportunities, reconfigures internal existing competences (or acquires new ones) and integrates processes to foster innovation (Teece, 2017, Bendig et al., 2018). With this regard, dynamic capabilities are enablers of BMs. Indeed, an organization with strong dynamic capabilities will be able to rapidly adapt to changes in the business environment and test new BMs. At the same time, dynamic capabilities depend in part

on the organizational flexibility allowed or denied by business model choices. More generally, a firm overall design and structure affects both its ability to innovate the BM and its dynamic capabilities. This section aims at studying the importance of organizational design for both business models and dynamic capabilities in a context of digital transformation. As noted, indeed, by Warner and Wager (2019) "the building of capabilities for digital transformation has received limited scholarly attention and is now an essential context for the study of strategic change".

2.4.1. Definitions of Organizational Design

Organizational design and BMI are strongly correlated, since successful implementation of BMI requires correspondent changes in the organizational design, which typically refer to the structuring of the organizational processes (i.e., delegation, departmentalization and job description), the coordination of activities inside a firm (liaison committees and lateral and vertical communication) and the role of functions, units and departments within an organization (Foss et al., 2013). Organizational design aims at identifying firm's current inefficiencies in the workflow of processes, procedures and structures and at modifying them "in a way that aligns [them] with its [firm] strategy, invigorates employees, builds distinctive new capabilities, and makes it easier to attract customers" (Neilson et al., 2015, p. 1).

Early authors did not recognize the relationship between BMI and organizational design, since the production process was interpreted as the main determinant of organizational design (Burns and Stalker, 1961). On the other hand, Alfred Chandler (1962) stated that "structure follows strategy", recognizing that long-term oriented strategy was necessary to drive a firm to build its structure and to identify its direction for the future (Kavale, 2012). Moreover, contingency theorists sustained the existence of a strong relationship between organizational design and strategic decisions taken by the top management of a firm. In this sense, a firm that decides to innovate its BM needs to implement an organizational change process, that requires changes in the way the firm is designed, through the creation of new business units, the definition of new internal functions and departments, the external hiring of new employees with specific skills and/or the training of the workforce to use new solutions and technologies in their everyday activities (Damanpour, 1996). A more contemporary interpretation is that "a combination of technology, strategy, and the applicable "appropriability regime" (Teece, 1986, 2006), as well as transaction costs jointly drive business model design and the concomitant organizational structure" (Leih et al., 2015, p.5). Following this interpretation, we will analyse more in detail the elements (i.e., drivers) that characterize organizational design.

2.4.2. The Boundaries of the Firm

Nowadays, the main driver of firms' survival can be represented by innovation since it enables firms to achieve a sustainable competitive advantage and ensure long-term growth (Greenstein, 2017, Bresnahan, et al., 2012; Dyer et al., 2009; Frambach and Schillewaert, 2002). A firm might differentiate its production and improve efficiency in its processes, achieving overall better performances over the competition (e.g. Stock, 2012; Dyer et al., 2009; Elmquist, 2009). With this regard, firms look for renewing (i.e., innovating) their BMs and, therefore, they need to redesign several peculiarities of their internal organization (Leih et al., 2015; Foss et al., 2013). One of the most developed streams of research in linking organisational design with BM is related to the definition and setting of firm's boundaries (Leih et al., 2015). This because once selected, a BM raises an important issue for managers: which functions will be owned by the firm and so performed in-house, and which ones will be left to external parties, and so outsources (Williamson, 1996; Hart, 1995). While taking the so called "make or buy" decisions, managers must protect the core firm activities, i.e. the critical assets for value capturing (Coase, 1960). Activities that do not represent a core competence and/or for which transaction costs are low should be outsourced (Cooper et al., 1997). One of the main advantages that firms encounter with outsourcing is an increasing internal availability of resources through which better focus on core activities.

When a firm decides to innovate and renew its BM, it is necessary to maintain in-house those activities (e.g., marketing, manufacturing, after-sale service, or distribution assets) that are critical for the innovation itself (Leih et al., 2015). Nevertheless, this is not a warranty of sustainable competitive advantage, since such activities may be copied by competitors. To define whether an innovation is easily imitable or not, the density of suppliers of a complement item and the easiness, or difficulty, in protecting a particular technology shall be taken into account: this is what Teece (1986) defined as the concept of "appropriability regime". What positively impacts on the appropriability regime is the nature of the technology and the strength of the legal protections available, such as patents; moreover, at the increase of the level of complexity, the imitability decreases (Teece, 1986). Hence, a property rights environment is said to be characterized by a "tight appropriability regime" if the technology is not easily imitable; on the contrary, with easily imitable technologies, it is characterized by "weak appropriability regime" (Teece, 1986 p. 287). This is relevant in the current business scenario, where changes both at the organizational and process level are mainly enabled by digital technologies. With this regard, Bharadwaj et al., (2013 p. 480), described digital technologies as able to shape "the new business infrastructure and influence the new organizational logic and patterns of coordination within and across firms", to the point that their growing proliferation makes the role of organizational design within the research on BMI even more important (Gambardella and McGahan, 2010).

2.4.3. Adaptation versus Innovation

In the literature, there are many different dynamic views on the concept of BM (Saebi et al., 2017), which mainly refer to changes in existing BM in response to external factors: BM evolution, intended as a voluntary change involving core components inside the firm (Demil and Lecocq, 2010); BM learning, when an established firm modifies its business model in face of competition from novel business models (Saebi, Lien and Foss, 2017; Teece, 2010); BM erosion, referring to the decline in competitiveness of established business models (Saebi, Lien and Foss, 2017; McGrath, 2010); BM transformation (Aspara et al., 2013); BM replication, which highlights the fact that a firm may benefit more from replicating the BM of an innovative firm rather than searching for its own BM (Aspara et al. 2010; Winter and Szulanski, 2001); BM lifecycle, referring to an iterative process of adaptation and reformulation (Morris et al., 2005); BM renewal, involving leadership actions and strategic sensitivity (Doz and Kosonen, 2010). Table 5 below collects the main definitions given by scholars for each dynamic concept of BM.

Tab. 5: Business model dynamics

Dynamic concepts	*Definition*	*Author*
Business model evolution	"a fine-tuning process involving voluntary and emergent changes in and between permanently linked core components".	**Demil and Lecocq**, 2010: 239
Business model learning	"Business models are necessary features of market economies where there is consumer choice, trans- action costs, and heterogeneity amongst consumers and producers, and competition. Profit seeking firms in competitive environments will endeavor to meet variegated consumer wants through the constant invention and presentation to the consumer of new value propositions [...]. [...]Being fast in learning and making the requisite adjustments to the model is important".	**Teece**, 2010: 176-188
Business model erosion	"Just as experimentation is central to business model creation, a new set of skills involving the early detection of any erosion of their business model will be at a premium for company leaders. [...]Successful incumbents may even entirely miss the erosion of their model's ability to generate value until it is too late".	**McGrath**, 2010: 256
Business model transformation	"...a change in the perceived logic of how value is created by the corporation, when it comes to the value-creating links among the corporation's portfolio of businesses, from one point of time to another".	**Aspara et al.**, 2010: 47
Business model replication	Replication, a familiar phenomenon sometimes referred to as the "McDonalds approach," entails the creation and operation of a large number of similar outlets that deliver a product or perform a service. [...]replication is typically conceptualized as little more than the exploitation of a simple business formula. Such a view clouds the strategic subtlety of replication by side- stepping the exploration efforts to uncover and develop the best business model as well as the ongoing assessment that precedes large-scale replication of it".	**Winter and Szulanski**, 2001: 730
Business model lifecycle	"A business model lifecycle involving periods of specification, refinement, adaptation, revision and reformulation. An initial period during which the model is fairly informal or implicit is followed by a process of trial-and-error, and a number of core decisions are made that delimit the directions in which the firm can evolve".	**Morris et al.**, 2005: 732
Business model renewal	A business model change and adaptation through strategic sensitivity that "allows firms to identify opportunities for new business models and also be sensitive to the timely need for the renewal and transformation of their existing business models" and leadership actions: "business model changes often involve gut wrenching decisions for executives, calling for difficult and risky personal adjustments and collective commitments".	**Doz and Kosonen**, 2010: 371

All these dynamic concepts of BM can be grouped into two disjoint major phenomena, namely, BM innovation and BM adaptation. Changes such as "evolution", "learning", "erosion" and "lifecycle" can be defined as BM adaptation, i.e. "the process by which management actively aligns the firm's business model to a changing environment" (Saebi et al., 2017, p. 569). Changes in the competitive arena as well as the behaviours/actions of external stakeholders are other two drivers of BM

adaptation (Miller et al., 2014; De Reuver et al., 2009). Some firms may need to modify their BM in face of external threats or opportunities in the environment such as technological changes, new customers preferences, new regulations, new entrants, etc. On the other hand, BMI happens when firms want to disrupt market conditions by implementing an innovative BM (see *tab.2*).

There is evidence of the difference between adaptation and innovation. BM adaptation is only implemented in response to external causes, looking for alignment with the external environment, and so, it does not require any innovation, but adjustments (Saebi et al., 2017). It is fundamental that firms are willing to engage in an experimentation and embark into a learning process to challenge core business assumptions and successfully adapt to changes (McGrath, 2010). Moreover, as highlighted by Doz and Kosonen (2010) and remarked by Saebi et al. (2017), leadership and organizational capabilities are very important facilitators of BM adaptation. As observed by Saebi et al. (2017), a firm engagement in adaptation mainly depends on its strategic orientation, defined as the set of decisions and actions a firm undertakes to perform better than its competitors (Gatignon and Xuereb, 1997), and on the perceived threats or opportunities (e.g., the more the threat is severe, the more likely a firm will adapt its BM).

Business models, in their nature, tend to be stable, but this stability, which brings firms to rapidly grow (i.e., more efficient and effective), will probably result in a strong rigidity (Doz and Kosonen, 2010). While new entrepreneurial firms are characterized by flexibility so they are not cognitively forced by path dependencies (Sosna et al.,2010), often incumbents prefer to rely on past success and experience also when there is evidence of a need for change: in this case path-dependent behaviours constrain incumbents in identifying new ways for creating value (Bohnsack et al., 2014). In this situation, a key for successfully renewing the organization is to let top managers to be "able to stand outside one's own job or organization" (Doz and Kosonen, 2010 p. 374) to look at the firm from an external perspective and to have the possibility to think about how to create a different system of activities and relationships. Nevertheless, many firms keep doing what is right for them, not caring about discontinuities and disruptions that are impacting their business arena: this because they are victim to the rigidity of their BM and of their internal inertia (Doz and Kosonen, 2010).

2.4.4. Inertia as a Complicated Threat

Today, the need for firms to innovate and reconfigure themselves is a strategic imperative (Agarwal and Helfat, 2009; Teece et al., 1997). Research has mainly advanced a competence-based explanation, highlighting that environmental changes that lead to innovations that significantly depart from the current pool of resources and capabilities are more difficult to develop (Tushman and Anderson, 1986), due to inertia (Hannan and Freeman, 1984) and competency traps (Levitt and March, 1988).

Organizational changes occur when the forces that push for change outweigh forces creating resistance to change (Ginsberg, 1988). Several studies focus their attention on the concept of organizational inertia. Inertia is "a pervasive problem that organizations face in spite of frequent calls for change and flexibility by different stakeholders" (Boyer and Robert, 2006 p. 325). Often, organizations strongly resist changes, and this is particularly true for large and old organizations (Amburgey et al., 1993). Following Hannan and Freeman's (1984) structural inertia theory, there are many factors, both internal and external to firms, that have been identified as sources of resistance to change. First, organizational changes can be directly opposed by individuals internal to the organizations, or by organizational rules/norms (Hannan and Freeman, 1977; McNeil and Thompson, 1971). Moreover, the more an organization seeks for stability in the external environment, the more the propensity to change is reduced. The characteristics that guarantee an organization's stability, (i.e., institutionalization, standardization and routine) are those who create barriers to change, and so factors of inertia (Boyer and Robert, 2006; Hannan and Freeman, 1984).

To be competitive in a market, a firm must account for its actions and perform with reliability. Reliability refers to the firm's ability to produce and deliver high-quality products to its customers, while accountability refers to the real documentation of processes in order to be always ready to take corrective actions, if necessary (Boyer and Robert, 2006). Reliability and accountability are high when organizational goals are institutionalized and patterns of organizational activity are routinized, but institutionalization and routinization also generate strong pressures against organizational change (Amburgey at al., 1993 p. 52).

Actually, an organization can be defined as a "structured system of routines embedded in a network of interactions with the external environment" (Amburgey et al., 1993, p. 52). So, from an internal perspective, organizational routines and competences play a leading role for organizational inertia (Hannan and Freeman, 1984; Nelson and Winter, 1982). Routines define both the actions/decisions that a firm should undertake and the knowledge inside the firm; they "refer to the repetitive patterns of activity by organizational members, both individuals and groups" (Amburgey et al., 1993 p. 52). Routines also embed the linkages between the firm and the external environment (Nelson and Winter, 1982). In this perspective, an organizational change may be a potential source of failure since it can lead to a decrease in internal performances and reliability and would also modify the relationship between the organization, the external actors and the whole environment (Amburgey et al., 1993). As Nelson and Winter (1982) noted, organizations tend to bring their existing routines in the future, relying always on past experiences.

The issue is that "today's operating routines restrict an organization's available procedures for producing outputs, acquiring resources, selecting among lower-level routines, and coordinating the

activities of members" (Nelson and Winter, 1982, p. 109). Eventually, in order to overcome the strong barrier of inertia, a firm should continuously change its operating routines in such a way that it "routinize the process of change" (Amburgey at al., 1993, p. 53).

2.4.5. The Concept of Fit

Since organizational design, BMI and dynamic capabilities are linked (Teece, 2017), it is necessary to study how they fit one with the other. The concept of "fit" is at the core of the research on organizational design (Venkatraman, 1989). Fit is a positive correlation between firm performances and both internal and external contingencies (Donaldson, 2001).

Studying the fit that lays within the firm's boundaries, namely, internal fit, the focus is on the alignment of organizational strategy, structure, and processes. On the other hand, looking beyond firm's boundaries, external fit represents the alignment of the organization with the environment in which it operates (Miles and Snow, 1984). As Donaldson (1987) highlighted, it may happen that a firm faces a misalignment, either externally or internally, and this causes a negative drop of organizational performances. Early studies (Burton, Lauridsen, and Obel, 2002; Zajac, Kraatz, and Bresser, 2000) described the concept of fit as static, in the sense that they looked at it as a prefixed target to be reached rather than being a continuous process. Nowadays, the dynamic environment, mixed with the high uncertainty that characterizes the market in which a firm competes, makes the static view of fit as anachronistic (Sinha and Van de Ven, 2005). For this reason, it is necessary to introduce the theory of strategic fit (Hofer and Schendel, 1980; Andrews, 1971), which assumes that the adequacy of a company's strategy is defined in terms of its "fit, match or congruence with environmental or organizational contingencies facing the firm" (Zajac et al., 2000, p. 429).

Actually, Burton et al. (2008) identified a set of 14 contingency factors (goals, strategies, environments, configuration, complexity, geographical distribution, knowledge exchange, task design, people, leadership style, climate, coordination, information systems, incentives) "that an organization must address in an integrated manner, and they explain how the specific contingency set a given organization faces can be expected to change over time" (Nissen, 2014 p. 30).

Therefore, the key role of strategic fit is remarkable to exploit environmental or organizational opportunities (Scholz, 1987). Eventually, we can highlight the importance of strategic fit for the right understanding of what actions to undertake to refine or create a novel BM and so start an organizational change process in order to be always ready to rapidly adapt to continuous changes in external environment (Zajac et al., 2000).

2.5. Organizational Ambidexterity

Studies on organizational ambidexterity reveal the important role of organizational design when a firm wants to exploit new opportunities without eroding the existing businesses (Simsek, 2009; O'Reilly and Tushman, 2008, 2004). If a firm wants to achieve a sustainable competitive advantage, it should consider "two diametrically opposed qualities, adaptability and alignment, an attribute that is sometimes referred to as ambidexterity" (Gibson and Birkinshaw, 2004 p. 3). Nevertheless, it is not easy to find the right balance between those two dimensions: alignment is too short-term oriented, and it will negatively impact on the long term-profitability of the firm; on the other hand, adaptability might not guarantee the survival and the success in the short-run. In other words, the theory of organizational ambidexterity has been created for addressing the problem of defining an optimal balance between adaptability and alignment (Gibson and Birkinshaw, 2004). Moreover, organizational ambidexterity has often been sided with the use of digital technologies (i.e., technological innovation) and organizational learning (Benner and Tushman, 2003; Siggelkow and Levinthal, 2003). For the latter, Baum et al. (2000) identified two main learning competences that enable organizational ambidexterity in a firm: exploration and exploitation: "exploitation refers to learning gained via local search, experiential refinement, and selection and reuse of existing routines. Exploration refers to learning gained through processes of concerted variation, planned experimentation, and play" (Baum et al., 2000, p. 768). Scholars agree on the need of a firm to focus on both those capabilities, trying to balance them in order to achieve better performances (O'Reilly and Tushman, 2013; Raisch and Birkinshaw, 2008; Gibson and Birkinshaw, 2004).

Two types of organizational ambidexterity

An innovation leveraging on digital technologies might require a separation between the historical business of the firm and a new one which adopts a novel BM (i.e., organizational ambidexterity).

Starting from the studies of Duncan (1976) which argued that ambidexterity should be managed through "dual structures", Gibson and Birkinshaw (2004) distinguished two types of organizational ambidexterity: structural and contextual ambidexterity.

Structural ambidexterity is based on the creation of two completely disjoint structures, each dedicated to a defined set of activities, within the same organization (see for example paper B). It is used when the set of activities that a company has to perform are so different that they do not permit any successful coexistence. Such approach, however, suffers from a strong negative effect related to the lack of communication and linkages between the separated structures, namely, isolation. A possible remedy experimented by some firms consists in replicating the separation inside a single business unit, granting higher linkage with respect to the traditional model (Gibson and Birkinshaw, 2004).

Contextual ambidexterity, on the other hand, aims at creating an organization where everyone is responsible for leveraging its own time between alignment and adaptability, rather than creating different units to structurally divide the work. To succeed, this model requires a high level of flexibility (Gibson and Birkinshaw, 2004).

When a firm has to deal with an innovation of its internal organization and strategy (i.e., BMI) that leverages on digital technologies, structural, rather than contextual ambidexterity is the preferred solution because of the risk of contrasting with the extant BM, hence with the core business units of the firm (Chang et al., 2009) (paper B).

2.5.1. The Role of Top Management

The success of a firm implementing ambidexterity depends mainly on the capabilities of its top management to manage separate business units and business models while not dissipating potential synergies (O'Reilly and Tushman, 2013). Managers are responsible for the setting of processes and procedures that enable the flow of information and knowledge from new business units to the extant ones. Entrepreneurs and top managers not only are responsible for choosing the boundaries of the firm, but they should also build the organizational structure defining a vision, creating a culture and establishing a flexible system of incentives that ensures and supports identification and loyalty within the firm (Augier and Teece, 2009; Ireland et al., 2009). Another key element that must be taken into account, when dealing with organizational design, is the management of flows of information and knowledge inside the firm that can be accomplished in two ways: centralization, and so through hierarchy, or decentralization and coordination (Galbraith, 2012, 1974).

Doz and Kosonen (2009), highlighted how the commitment of the whole organization during the process of BMI is mainly realized through the ability of the top management team to conquer the trust of the mid-management and employees. This is particularly complex for incumbent firms, since their portfolio of existing capabilities acts as a blinder for managers "from seeing novel opportunities to innovate or acting upon those opportunities when they see them" (Pisano, 2006; 1126). As Rumelt (1995) argued, the top management of a firm does not encounter the biggest problem in product-market strategy, but they face the most crucial problem with organizational change.

2.6. A Framework of Change Actions for BMI

Reviewing the literature on organizational design, we collected the most recurring change actions that a firm should undertake following a change in the BM and summarized such actions in Table 6. We divided them between:

- Changes in the organization of the firm;

- Changes in the boundaries of the firm;
- Changes in the profile of internal resources management.

Changes in the organization of the firm are related to modifications, or even creation, of BUs, departments, internal processes, as well as recombination of existing routines. They also account for changes related to the decentralization of authority, as well as actions aimed at establishing a new proper organizational culture, and, lastly, to the adoption of new processes and practices.

Changes in the boundaries of the firm highlight collaborations and partnerships with external firms, together with activities of outsourcing of non-core capabilities in order to focus the efforts on the core ones.

Changes in the profile of internal resources management group the actions regarding the development of new capabilities, the external hiring of new employees and the training of the workforce to use new solutions and technologies.

Decentralization of authority, which is strictly related to the creation of weak management hierarchies; extending boundaries of the firm through collaboration and establishing an appropriate organizational culture are the main change actions for realizing BMI on which scholars are aligned. Other recurrent change actions cited in the existing literature refer to external hiring of new employees with specific skills, training of the workforce and building distinctive new capabilities.

Tab. 6

The most recurring change actions for BMI

Change actions \ *Authors in the literature*		**Miles et al.** 1978	**Ginsberg** 1988	**Amburgey et al.** 1993	**Damanpour** 1996	**Gibson and Birkinshaw** 2004	**Doz and Kosonen** 2010	**Leih, Linden and Teece** 2015	**Neilson, Estupinan and Sethi** 2015	**Foss and Saebi** 2017	**Teece** 2017	**Fjeldstad and Snow** 2018
CHANGES IN THE **ORGANIZATION OF THE FIRM**	Creation/Re-organization of new/existing business units				X							
	Definition of new internal functions and departments	X			X	X						
	Recombination of existing routines	X		X								
	Decentralization of authority (weak management hierarchies)			X		X		X		X	X	
	Establishment of an appropriate organizational culture		X				X	X		X	X	
	Adoption of new processes and practices			X					X			X
CHANGES IN THE **BOUNDARIES OF THE FIRM**	Extend boundaries of the firm (collaboration, network)						X	X		X		X
	Outsourcing non-core capabilities and focus on core ones.							X			X	
CHANGES IN THE **PROFILE OF INTERNAL RESOURCES**	External hiring of new employees with specific skills	X	X	X	X							
	Training of the workforce to use new solutions and technologies				X				X	X	X	
	Build distinctive new capabilities						X	X	X	X		

3.Theoretical Framework

Following an iterative approach and with the purpose of showing, through a taxonomy, the cyclical nature of the business model innovation process, we designed several models to finally integrated them in a unique explanatory theoretical framework, here proposed in figure 7. The main objective of the framework is to present the external and internal factors that cause a need for innovation and show how BMI can be successfully implemented through organizational changes. We designed the framework starting from a circle, which represents the existing BM, providing a representation of the processes and capabilities that established firms shall implement to survive in the current competitive scenario.

As the literature shows, reconfiguration of established BMs means shifting, with different degree of radicalism, from an existing BM to a new one (Tucci et al., 2017). Hence, building on the existing BMs, we confronted the innovation process required to implement digital technologies with the organizational changes needed. This because established firms are characterized by their own organizational structure, activities, routines, skills, culture and capabilities. A firm should always consider the impacts that external factors have on its existing BM. External factors, indeed, create both a need for innovation and stimulate the top management to create the conditions to adapt, or even lead, changes, specifically with regard to the organizational design. This is possible thanks to the presence of proper capabilities (i.e., sense future opportunities in the market, seize those opportunities and transform internal capabilities for exploiting new trends) inside the firm, that help overcoming barriers and work as enabler for innovation.

Once the innovation process starts, the organizational re-design process takes place at firm level to eliminate current inefficiencies in processes, procedures and structures, and to re-align them with the new strategic objective(s), such as the specific case of the firm analysed in paper A.

There are several change actions that can occur during the organizational re-design process: we divided them in changes in the organization of the firm, changes in the boundaries of the firm and changes in the profile of internal resources (Tab. 6). They may require several actions to be performed and they may impact widely on firm structure, culture and resources.

We use this theoretical framework to investigate the innovation process and the organizational change efforts faced by two energy utilities (paper A-B) plus a further contribution (paper C) where we show how different actors work together to co-innovate and develop novel BM.

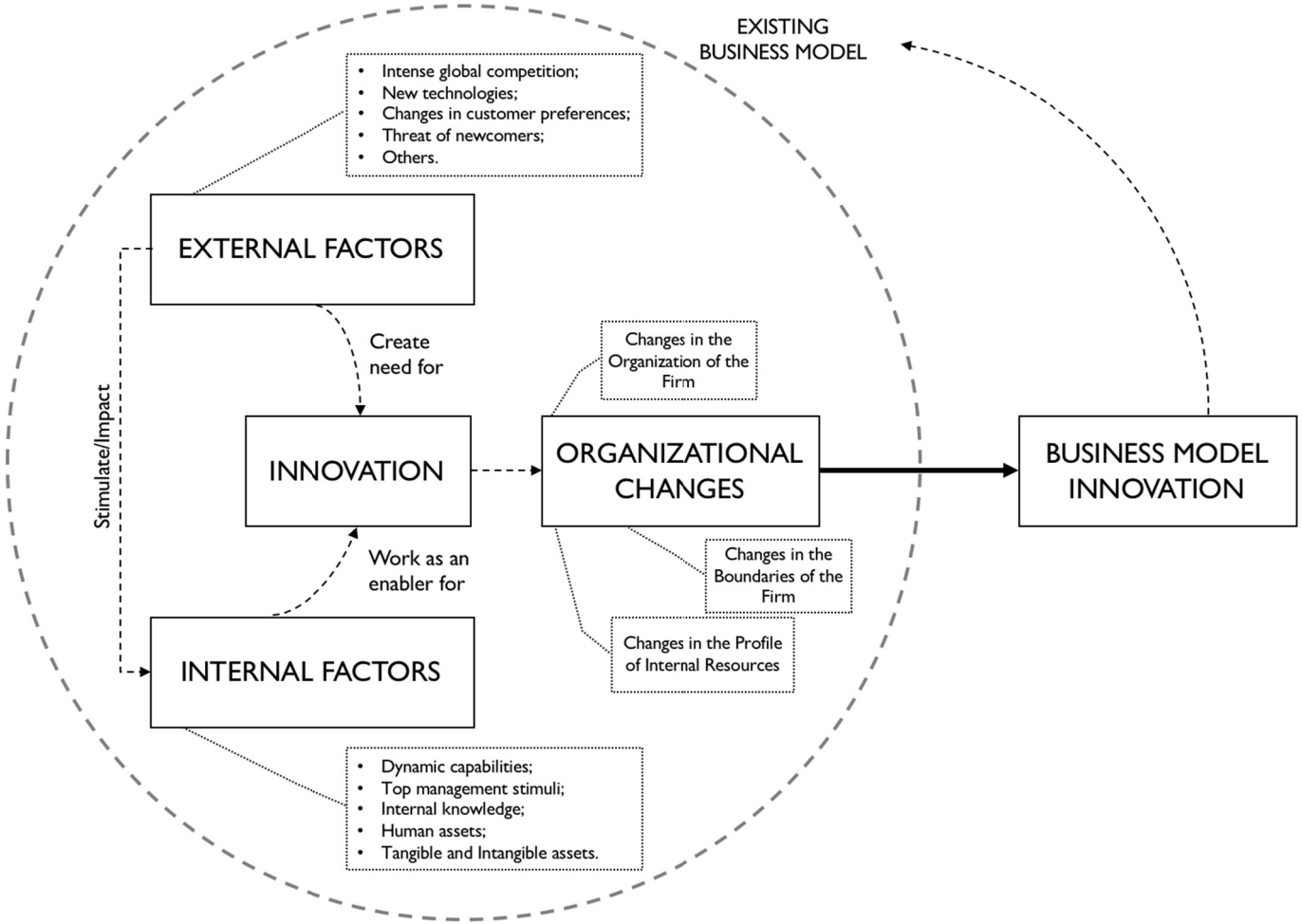


Fig. 7: The Theoretical Framework

4.Summary of appended papers

In this section, the appended papers are presented and their relationship with the whole doctoral thesis is emphasized. In all the papers co-authored, my role and contribution is clarified. After the paper summary, the relation between the paper and the overall thesis is clarified and the main paper contributions are explained.

Paper A:

Title and authors:

Manfredi Latilla, V., Frattini, F., Franzò, S. and Chiesa, V. (2019) Organizational change and business model innovation: an exploratory study of an energy utility company. *International Journal of Innovation Management*

Status of the manuscript:

The manuscript has been accepted for publication in International Journal of Innovation Management on April 18, 2019 and is now in press.

Abstract:

This manuscript aims at studying the intricate relationship between business model innovation (BMI) and the organizational changes it engenders, trying to shed light on how organizational change and BMI are intertwined, and how proper organizational changes can facilitate the renewal of a traditional BM. To do so, the manuscript builds on an inductive, longitudinal single case study of an energy utility, describing the mechanisms through which the business model of the utility has been innovated over time and the organizational changes that enabled and fostered such innovation. The innovation itself was dictated by the need to cope with the current wave of digital transformation that is forcing incumbent energy utilities to renew traditional business models to offer a new commercial value proposition to their customers. This study, therefore, contributes to the ongoing academic debate on business model innovation and its practical application, adding to the broad discussion on organizational ambidexterity and to the analysis of the most relevant organizational change actions adopted by the company for implementing an effective BMI.

Relation to the thesis:

The paper is the result of an extensive case study run in a major Italian utility over a period of one year. In this paper, the focus is specifically on the intertwined relationship between the innovation of a traditional business model of an incumbent firm and how, to effectively realize such innovation, major changes in the organizational design of the company were required, indeed new

functions and units were established and new managerial roles were assigned within the company throughout the transformational period that we investigated in the case study.

My role and contribution

I ran in person all the interviews and follow up with managers and directors within the organization. I then used the information gathered during the interviews to re-analyze existing theoretical knowledge and fit it to the practical organizational changes implemented by the company. A first round of interviews was followed by a second and, in some cases, a third round to consolidate information collected, cross check relevant data and clarify important issues. In some cases, interviews were also followed-up by emails with questions of clarification over the period of the study. I run the literature review consistent to the overall topic of the paper and wrote the main findings. My co-authors and may supervisor assisted me in the overall activity, providing guidance, constructive feedbacks and reviewing the overall manuscript throughout the first submission and the revise and resubmit phase.

Paper B:

Title and authors:

Manfredi Latilla, V., Urbinati, A., Cavallo, A., Franzò, S. and Ghezzi, A. Organizational Re-Design for Business Model Innovation while exploiting digital technologies: A Single Case Study of an Energy Company. (2019) Special Issues on Digital Innovation Management, *International Journal of Innovation and Technology Management*. Under review.

Status of the manuscript:

The manuscript has been submitted on June 11th, 2019 to the Special Issue on Digital Innovation Management in the International Journal of Innovation and Technology Management (IJITM). Under review.

Abstract:

Digital technologies are bringing a wide spectrum of business opportunities as well as significant organizational challenges for incumbent companies operating in traditional industries such as the energy one. The diffusion of new technologies is changing the way energy solutions are consumed and experienced, while consumers increasingly take ownership of their consumption, acting as "prosumers". In this evolving scenario, incumbents are urged to reshape their business models, explore new opportunities and change their organizational structures accordingly. Still, the

required organizational re-design process enabling companies to undergo business model innovation while exploiting digital technologies is partially neglected in literature. Hence, this study explores how established companies embrace organizational re-design process to innovate their business model. To this end, we leverage a single case study methodology focused on an incumbent energy company. Our findings show how the establishment of a business unit dedicated to digital technologies exploitation enabled company's business model innovation. More specifically, we point at the critical role played by the know-how and the industrial capabilities to sustain not only the innovation activities of the new business unit, but also the overall company performance and the shift towards a renewed business model.

Relation to the thesis:

As for the previous contribution (Paper A), this Paper B is the result of an extensive case study run in a major utility of a foreign country. In this paper, the focus is specifically on how the diffusion of new technologies is changing the way energy solutions are consumed and experienced, and hence how an incumbent utility innovates its business model changing the internal design of the organization to accommodate the innovation process.

My role and contribution:

I ran in person all the interviews and follow up with managers and directors within the organization. I then used the information gathered during the interviews to re-analyze existing theoretical knowledge. I wrote the literature review with the proactive support of my co-authors, who helped me as well in the analysis of the results and in the discussion section of the paper. My co-authors assisted me also in reviewing the overall manuscript finalizing it for submission to the mentioned special issue of the IJITM.

Paper C:

Title and authors:

Loock, Moritz; Vernay, Anne Lorène; Cousse, Julia; Manfredi Latilla, Vito. Microfoundation of Business Model Co-Innovation in Digital Transformation. Special issue on Digital Innovation, *Journal of Product Innovation Management*.

Status of the manuscript:

The paper was submitted to the Journal of Product Innovation Management's special issue on Digital Innovation on February 2019. It received a major revision on May, 2019 and will be revised and resubmitted by October, 20th, 2019.

Abstract:

While prior research has pointed to the profound importance of business model innovation in the business and technology domain, there is little understanding of how different partners, undergoing digital transformation, learn together to develop novel business models. To remedy this gap, we study more than 500 heuristics - simple rules that managers learn to govern their activity. The heuristics have been collected in three business model co-innovation projects (Norway, Italy and Switzerland). We find that heuristics are containing different tactics to deal with specifics of the ecosystem: The heuristics are differently effective on different types of proximity. The effectiveness works through different learning mechanism which are self-centered, receiving, giving, expectative and collaborative. We discuss important implications and opportunity for future work.

Relation to the thesis:

This paper aims at deepening our understanding of the micro-foundations of how different partners, undergoing digital transformation, work together to develop novel business models. It offers an additional perspective to the previous papers (A and B) analyzing the heuristics to show how practically managers of established utilities work together with startup up in the ecosystem to innovate their traditional business model, and what they learn and how they approach the overall innovation process of rather traditional business models.

My role and contribution:

This paper is part of my research as visiting Ph.D. at the university of St. Gallen, where I had the chance to collaborate in person with prof. Moritz Loock, contributing to the manuscript with a case study from the Italian experience. Specifically, I interviewed the founder of an Italian startup which had the opportunity to work together with four large Italian utilities, where I interviewed the innovation managers of each of the utilities involved in the project. The aim was to investigate the innovation experience of the startup with the utilities and the vice versa, in order to analyze which are the patterns of co-innovation and how managers approach the overall innovation process, at technological and business model level.

5. Conclusion, Limitations and Avenues for Further Research

This study examines the organizational re-design process enabling incumbent firms in the energy industry to innovate their business model while exploiting digital technologies. The choice of making researches on this topic was motivated by several aspects, both theoretical and empirical.

Firstly, scholars posed attention to the possible interdependency between BMI process and organizational design. Nonetheless, there is a need for further research. More in detail, the hot topic nowadays is which key organizational changes enable and support business model innovation process. As shown in our literature review, even if not in a systematic way, scholars have already hypothesized some relationships between organizational change actions and BMI.

Secondly, regarding the empirical reasons that stimulated the present research, there is the willingness to study the energy industry, which is facing a deep transformation of its consolidated business model and traditional value proposition. For this reason, we proposed the above theoretical framework (fig. 7) and, leveraging on a multiple exploratory case study analysis, we investigated the relationship between organizational changes and BMI (papers A-B) and the foundation of BM co-innovation in digital transformation (paper C).

Each of the firms we interviewed for papers A and B have recently undertaken relevant organizational changes to innovate their BMs. Both external and internal factors played a leading role for giving birth to this innovation process. On the one hand, for example, the rising of new technologies, the trend of decentralization and the increased competition due to industry convergence. On the other hand, some internal factors, such as the exploitation of dynamic capabilities, as well as the top management stimuli towards innovation, worked as enabler for the ignition of the innovation process.

Among the organizational changes we have documented, we can mention the creation/re-organization of existing BUs, the institutionalization of new processes and objectives and the establishment of an appropriate organizational culture were fundamental milestones in enabling BMI. This is mainly referable to the fact that a structural separation between the traditional business and the innovation unit was needed to make new value creation work. This separation enables the new value streams to grow in a proper environment and then, when ready, to be introduced into the firm business portfolio. Moreover, it is important to create an environment in which people are not scared by changes. Furthermore, the establishment of a culture of change, where the innovation is viral throughout the organization, is a fundamental enabler of BMI. Additionally, the top management has a critical role in the cultural organizational changes, since they are the one that, through the institutionalization of new processes and objectives, can move people's mind towards the new culture and really rethink the way the organization works every day.

We found also that the innovation process necessitates of some organizational changes to adapt the existing business models to the novel value proposition of a firm. The findings show how organizational changes work as enablers of BMI. To reconfigure existing business model into a new one, firms analyzed performed several organizational changes. Among them, the creation/re-organization of existing BUs, the institutionalization of new processes and objectives and the establishment of an appropriate organizational culture were fundamental milestones in pursuing BMI. We also found discrepancies between some organizational changes often cited in the literature and the recurring actions in the empirical research. Beyond the fact that this could be related to the small size of our sample, it is also true that the outsourcing of non-core capabilities was not interesting for the energy firms interviewed and a possible reason beyond this discrepancy is that the energy industry, facing turbulence due to the new emerging trends, is more risk adverse today than in the past. Therefore, companies want to diversify their risk and, thus, they want to develop in-house those competences that enable them to diversify their portfolio of products/services.

Additionally, our research shows which are the enabling capabilities to organizational change and which are the capabilities enabled by organizational change. We believe that this collection of capabilities is of great importance for overcoming barriers to the organizational change and guarantee a successful BMI process.

Notwithstanding our attempt to provide contributions for theory and practice, we are aware of the limitations of our case studies, as explained in the appended papers. This thesis can work as an informative tool for researchers that will investigate this subject in the future. Additionally, we hope it will also help managers to have an external perspective towards BMI and to identify which of the organizational changes that they can perform are the most important enablers for innovating their BM. Furthermore, through a wider spectrum of systematic literature review process and through the expansion of the sample of research, it will be possible to enrich the proposed framework.

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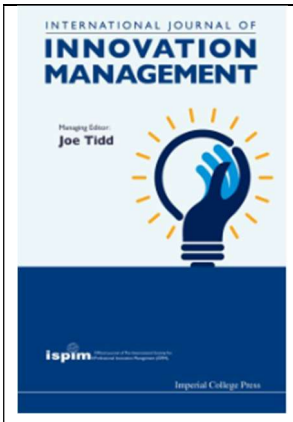
7. List of appended papers:

Here below the three appended papers to the Cover Essay. The papers are referred to by the letter prior to each title (A – C).

	**Paper A:** **Manfredi Latilla, V**., Frattini, F. Franzò, S. and Chiesa, V. (2019) Organizational change and business model innovation: an exploratory study of an energy utility company. *International Journal of Innovation Management*, In press
	**Paper B:** **Manfredi Latilla, V**., Urbinati, A., Cavallo, A., Franzò, S. and Ghezzi, A. Organizational Re-Design for Business Model Innovation while exploiting digital technologies: A Single Case Study of an Energy Company. (2019) Special Issues on Digital Innovation Management, *International Journal of Innovation and Technology Management*. Minor revision.
	**Paper C:** Loock, Moritz; Vernay, Anne Lorène; Cousse, Julia; **Manfredi Latilla, Vito**. Microfoundation of Business Model Co-Innovation in Digital Transformation. Special issue on Digital Innovation, *Journal of Product Innovation Management*. R&R.