

Master in Economics



**Business ecosystems and Supply
Network: an integrative perspective**

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Granada, July 2018

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ABSTRACT

Within a so dynamic and shifting landscape where companies presently perform, the traditional strategies followed by them stop being useful to survive in grounds with these characteristics. By this way, it emerges the business ecosystem theory, as a possible tool to deal with environments characterized by high levels of dynamism and volatility. Due to its recent emergence, there exists a hole in the scientific literature that fails in clarifying what is a business ecosystem and what are the edges that this theory offers to the business and operation management. The present work has a double goal: it looks for compiling all the available information about business ecosystems in order to clarify the ins and outs of this new emerging strategy (with the final objective of enabling all type of companies to accomplish the implementation of it) and a second target consisting of establishing the connections with the supply network theory and arising the positive or negative effects that business ecosystems can generate on these structures.

Key words: business ecosystems, supply network, dynamic capabilities, firm performance, business strategy.

JEL CODE:

INTRODUCTION

The current business world is completely different from ten years ago and if we analysed it year by year, each 365 days have something new or which is not the same as it was before. Our environment changes, new tendencies appear every day and customers' habits differ from one year to another. Bearing in mind this switching world, companies have to adapt their strategies to these volatile conditions and generate and develop capabilities and skills that enable them to be compatible to the elements surrounding them. Taking into account this scenario, strategic management becomes the perfect weapon to combat the danger of the uncertainty and instability of today's world.

Business ecosystems theory emerges as the next step on strategic management, rendering obsolete consolidated theories such as Five Forces of Porter theory¹ that, unlike business ecosystem theory, divides and splits companies into sectors. Instead of doing that, Business ecosystem theory goes beyond boundaries sectors and it becomes cross-sectorial (including more than only one sector) (Teece, 2007). An example of it is Amazon, which started being a cyber-bookstore and it has been creating its own business ecosystem over time by adding new services and products and building relations with other companies (Isckia, 2009). Moreover, other companies that have applied the same theory (business ecosystems), as Apple (Barrett, Davidson, Prabhu and Vargo, 2015), Google (Iyer and Davenport, 2008), and Facebook (Gómez-Uranga, Miguel and Zabala-Iturriagagoitia, 2014) among others, have become big world players thanks to their functioning as business ecosystems.

So many scholars and researchers have heard about business ecosystem theory, but it is little what has been written about it. The existence of some important loopholes in the area, in addition to the shortage of consensus on what is already written about it make necessary to fill this gap in the literature by creating and shaping an integrative framework to the business ecosystems theory. Furthermore, this work goes further and looks for connecting this theory with supply network theory (the organizational structure that have been applying by companies until now) and analysing the possible advantages or disadvantages that can appear

¹ The Five Forces of Porter theory defines the structure and components of an industry that shape the competitive interaction within a sector or industry. The forces show the most relevant factors of the competitive environment that influence the strategic and competitive position of a company: rivalry among existing competitors, suppliers bargaining power, buyers bargaining power, threat of substitute products or services and threat of new entrants. They also provide a basis for analyzing a firm's strengths and weaknesses (Porter, 2008).

from the development and implementation of this novel theory into the firms, specifically into supply networks. In other words, we want to give an answer to the following research questions: What does business ecosystem theory claim? What is a business ecosystem and how does it work? What is the relation between business ecosystem and supply network? How can supply networks benefit from entering or creating a business ecosystem?

With this work, we make the following contributions to the literature: shedding light and more clarity on business ecosystem theory, providing a neater image of what business ecosystem is, how it develops, which components take part in it and how it works; defining the theoretical boundaries between supply network theory and business ecosystem theory in order to be able to precisely distinguish both theories, but, at the same time, establishing bonds and bridges between both organizational structures which allow to understand how supply networks (being considered the preceding organizational structure of business ecosystems) can evolve to become business ecosystems; and an analysis about the potential benefit business ecosystems can entail as strategic tool in the functioning of supply networks, thus trying to clarify whether business ecosystems prove to be a useful and fruitful instrument to cope with current business environments. From a more practical viewpoint, this paper offers enterprises an analytical tool for the study of business ecosystem theory as well as a user guide which facilitates the implementation of this strategic option within the firm.

Being more accurate, the elaboration of this work pursues to reach the following milestones or accomplish the following targets: 1) offering an integrative framework of business ecosystem theory which allows the reader to have a stark and crisp idea of what a business ecosystem is and which are its major points; 2) bringing a comparative map which sets the connections between business ecosystem theory and supply network theory so as to see the similarities and dissimilarities both strategic options present; and 3) taking a first step in the assessment of business ecosystem's effects on the functionality and dynamic capabilities of supply networks and that of the companies that belong to them through the formulation of propositions which will be studied and empirically contrasted in the near future.

In order to respond these questions, we undertake this work dividing its content in four main parts: business ecosystem theory, supply network theory and its relationship with business ecosystems and the positive or negative effects of business ecosystem in supply networks. To be more exact, the paper unfolds the following structure: in the first chapter, we build a complete framework of business ecosystem theory, clarifying the most important aspects of this theory. During the second chapter, we undertake a summary of the main knowledge about supply network, overall focusing on the capacities and capabilities companies develop by taking part in a supply network. Finally, in the third chapter, we combine the previous chapters to establish the similarities and differences between business ecosystems and supply networks to eventually analyse the positive or negative impacts that business ecosystems can have on the functionality and abilities of supply networks.

CHAPTER 1. BUSINESS ECOSYSTEMS

1.1. INTRODUCTION

Nowadays, we move in a continuous changing environment with a high degree of complexity and dynamism. The relentless changes on technologies and the continued discoveries within the innovation field, generate a huge uncertainty that forces firms to be constantly evolving. If it were not enough, the huge amount of information that is possessed by the customers makes them more powerful and it obliges companies to catch up with the new trends and needs of customers due to the wide range of possibilities they possess.

Given this scenario, it is indispensable the strategic dimension of the firm to deal with this issues and the business ecosystem theory arises as a possible, plausible solution for these problems.

Business management evolves as technology does, hence catching up with new strategic management trends is crucial to maintain or even raise the firm's strategic position. Business ecosystem is up until now the newest step in this area, therefore this chapter seeks to provide a full and complete framework of this innovative strategy abstracting the essential cornerstone of it: the definition, the members, the kinds of business ecosystems and the internal scope of this structure.

Business ecosystem is a reality which is evolving in relevance despite the fact it has been existing in business environment since several years ago. The aim of this chapter is to provide a complete and enriched vision of this business strategy trend which could become the future of business management. The analysis of the literature reveals that there exists some gaps in the topic and there is no consensus on what is already written about this theory and, therefore, it is important to create a homogeneous framework which facilitates the comprehension of business ecosystem theory.

1.2 LITERATURE REVIEW

1.2.1 DEFINITION OF BUSINESS ECOSYSTEM

The first aspect to address is what we should understand with business ecosystem. The first mention to this term was in 1993, by James F. Moore. Moore (1993) was the pioneer in introducing the notion of business ecosystem. This author tried to explain business ecosystem as an evolution process quite similar to the biological ecosystems. Four concepts are the cornerstones of his definition: competitive and cooperative relationships, innovation, different sectors and satisfying customers. For this author, a business ecosystem is a group of companies, belonging to different sectors, which establish collaborative and competitive relationships in search of new innovations with the ultimate aim to satisfy the customers (Moore, 1993).

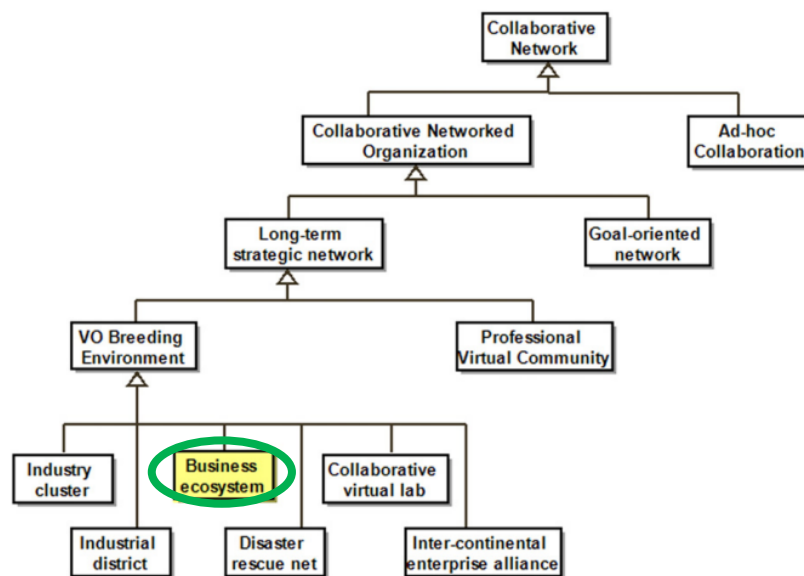
Going forward in time, Isckia (2009) presents business ecosystem as a business community which joins ventures belonging to varied related sectors or industries. This paper adds to this definition the fact that the boundaries of an ecosystem are volatile because of the interactions among the enterprises and the competition situations that occurs among the ecosystem. Moreover, Isckia (2009) teaches the meaning of business ecosystem using a real example, Amazon; which is, from my point of view, a notably didactic method. This company evolved from a little cyber book store to an application service provider, offering to other retailers its software platform and building by this way its business ecosystem. Amazon, which is the keystone of its ecosystem, plays two roles on it: it is a retailers and also a software supplier to other retailers. Teece (2007) following the identification of the business ecosystem as a community of diverse figures (institutions, organizations and individuals) highlights the effects and impacts that this community causes on the firm and its customers and suppliers.

Zahra and Nambisan (2012) define business ecosystem as a group of enterprises and other entities that relate each other, share knowledge and resources and create services, goods and technologies needed by customers. More recent authors, such as Clarysse, Wright, Bruneel, and Mahajan (2014) understand business ecosystem as a group of companies which create value by mixing their capabilities and assets. According to these authors, business ecosystems do not follow a linear value creation process and many of the players in such ecosystem fall outside the traditional value chain. Inside the ecosystem occurs a series of collaborative and competitive relationships which results in a competition structure. The ultimate target is to

create and deliver solutions that meet a full package of value to the end customer (Clarysse, Wright, Bruneel & Mahajan, 2014).

Furthermore, following the collaborative network perspective, Graça and Camarinha-Matos (2017) introduce the term “collaborative business ecosystems” to talk about business ecosystems. These authors assert that a business ecosystem is a long term strategic collaborative networked organization and, particularly, it can be sub-classified in a virtual organizations breeding environment (VBE). According to this paper, a virtual organizations breeding environment is a source network of organisations providing a suitable environment for rapid formation of goal-oriented networks targeting specific business opportunities. So this is the origin of the term ‘collaborative business ecosystems’ to refer to business ecosystems. Figure 1 depicts how these authors see and understand the different types of networks, communities, clusters and business ecosystem:

Figure 1: Types of collaborative networks



Source: Graça and Camarinha-Matos (2017).

Business Ecosystems: an empirical approach

Rong, Hu, Lin, Shi, and Guo (2015) connect the concept of business ecosystem with the idea of IoT (Internet of Things)², suggesting that an IoT based business ecosystem is an interdependent community which includes industrial players, government, industrial associations and other customers, surpassing in this way the edges of the traditional industry relations. In other words, IoT based business ecosystem is an extended supply network that connects all stakeholders, these act as players and contribute to develop the business ecosystem. In addition, these authors advocate that the concept of business ecosystem should be seen as a process rather than a static proceeding. This process starts from a fragmented social network, which develops over time, and it becomes a value network that benefits all the participants. Table 1 tries to offer a brief summary of all the definitions mentioned during this section of the work.

Table 1: Definitions of business ecosystems and their contributions

Author/s	Definitions	Contributions
Moore (1993)	<ul style="list-style-type: none"> • Evolution process quite similar to the biological ecosystems • Four cornerstones: competitive and cooperative relationships, innovation, different sectors and satisfying customers 	<ul style="list-style-type: none"> • Pioneer in business ecosystem theory • First one on establishing similarities between biological environments and business environments
Teece (2007)	<ul style="list-style-type: none"> • A community of diverse figures (institutions, organizations and individuals) 	<ul style="list-style-type: none"> • Effects and impacts between business ecosystem and its firms, customers and suppliers
Isckia (2009)	<ul style="list-style-type: none"> • Business community which joins ventures belonging to varied related sectors or industries 	<ul style="list-style-type: none"> • Cross-sectorial perspective • Volatile business ecosystem boundaries due to competition • Use of a real example: Amazon

² According to European Research Cluster, Internet of Things (also known as IoT) is "A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network." (IERC, 2016).

Zahra and Nambisan (2012)	<ul style="list-style-type: none"> • A group of enterprises and other entities that relate each other, share knowledge and resources and create services, goods and technologies needed by customers 	<ul style="list-style-type: none"> • Knowledge and resources sharing (dynamic capability) • Value creation
Clarysse, Wright, Bruneel, and Mahajan (2014)	<ul style="list-style-type: none"> • A group of companies which create value by mixing their capabilities and assets 	<ul style="list-style-type: none"> • Non-linear value creation process • Some members of the business ecosystem come from outside the traditional value chain • Collaborative and competitive relationships (coopetition)
Rong, Hu, Lin, Shi, and Guo (2015)	<ul style="list-style-type: none"> • [IoT based business ecosystem is] An interdependent community which includes industrial players, government, industrial associations and other customers 	<ul style="list-style-type: none"> • Introduction of IoT concept in the business ecosystem definition • Cross-sectorial perspective • The analysis of the business ecosystem as an evolutionary process
Graça and Camarinha- Matos (2017)	<ul style="list-style-type: none"> • A long term strategic collaborative networked organization and, particularly, it can be sub-classified in a virtual organizations breeding environment (VBE) 	<ul style="list-style-type: none"> • The terms of “collaborative business ecosystem” and “virtual organizations breeding environment”

Source: Own elaboration

In order to be coherent with the aim of this work, we propose the following definition of business ecosystem that will serve as basis of the rest of our analysis: *business ecosystem is a community of enterprises which can belong to different sectors and where they establish collaborative and competitive relationships, sharing knowledge and resources and having the final target of creating value for customers and for the whole business ecosystem.*

Continuing with this viewpoint of the definition of business ecosystem, within this heading other important issue of our central topic is how a business ecosystem emerge, develop and die. In other words, what the building process of a business is. As we have already seen,

ventures face turbulent, changing and instable environments that must be addressed through new strategic approaches such as business ecosystems. But to enter a business ecosystem or even to create it, firms need to know at which stage is the business ecosystem, because the features and ways to perform differ between each phase. Coming back to the pioneer of business ecosystems theory, Moore (1993) identified 4 stages which a business ecosystem passes through: birth, expansion, leadership and self-renewal or death. These stages or phases are what we could call *the business ecosystem life cycle*. According to this author, the first stage (birth) is spearheaded by the customer value proposition, which means that the main objective of the founders of the business ecosystem is to clarify the needs of their customers and, as a secondary goal, attracting and cooperate with the most important follower companies. So as to go through the second stage (expansion), the target is increasing the market demand, but without exceeding the ability to meet it. Thirdly, to enter the third phase (leadership), two are the principle activities: building a good image of being a worthy business ecosystem with well growth and profitability; and strengthening the stability of the business ecosystem structure. A complementary aspect which is also relevant in this stage (from an individual firm's standpoint) is the bargaining power. This bargaining power is maintain by innovating constantly and creating value. Finally, the last stage begins with the hazard of new rising ecosystems and innovations and offers two possibilities for the business ecosystem: renewing itself or dying. In order to achieve the first one (renewing and thus surviving), business ecosystems have three strategies that are no exclusive: slowing down the expansion of the new business ecosystem, introducing new innovations in the business ecosystem or rebuilding and adapting the structure of the business ecosystem to the new reality.

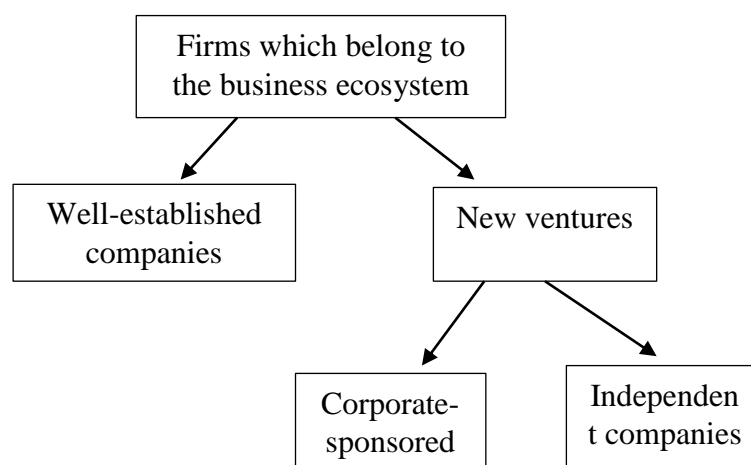
1.2.2 THE MEMBERS OF BUSINESS ECOSYSTEM

A second step in our work will be to know which elements play a part in the business ecosystem. Beginning with the business ecosystem's literature pioneer, Moore (1993) stressed a leading player: *the central ecological contributor*. The rest of the members cannot live without this pivotal company but it has to bolster its position by introducing relevant innovative contributions to the operation of the business ecosystem. Clarysse et al., (2014) referred to this particular firm as the keystone company. From these authors point of view, this company is an important element due to its role of ensuring the good health of the rest of the business ecosystem members. Keystones firms elaborate platforms (i.e. tools services and

technologies) which can be used by the other participants of the ecosystem to improve their individual and collective work. Powell et al. (2010) name this member as the anchor tenant, which provides access to the other firms so as to establish connections and boost economic growth within the ecosystem.

Zahra and Nambisan (2012) talk about the keystone as a central player which encourages business ecosystem participants to co-evolve, aligning their activities and targets and joining them through a set of strong links between them. From another standpoint to classify companies belonging to the business ecosystem, Zahra and Nambisan (2012) also distinguish between i) well-established companies and ii) new ventures. They play complementary roles within the ecosystem, but they have to follow the same path at the time of making the business ecosystem strategy and building the linkages between them. Within the second group of firms (new ventures), these authors differentiate two subtypes: independent new ventures and corporate-sponsored new ventures. There are some differences between them, but the essential ones are: 1) corporate-sponsored new firms are created by well-established companies (normally to test or exploit opportunities inside the ecosystem) while independent new ventures do not come from other pre-existing companies and 2) corporate-sponsored new firms act in a more limited and difficult context due to they have to manage two complex situations at the same time: maintaining their corporate parents' support (meeting their corporate parents' directives) while finding new ways of doing things and successful strategies. Figure 2 tries to simplify this classification with a diagram.

Figure 2: Companies belonging to the business



Source: Adapted from Zahra and Nambisan (2012).

Isckia (2009) refers to keystone player as the leader of the business ecosystem, which tries to share its business philosophy and its technology. This author uses the biological perspective, comparing the business ecosystem with a biological ecosystem. Isckia (2009) identifies pivotal species which are essential to the ecosystem because if they disappeared, the ecosystem would change. And then, redundant species that are useful, but they have to strive to keep up in the ecosystem.

On the other hand, taking into account the rest of the ventures that take part in the business ecosystem, Clarysse et al. (2014) sustain that an essential characteristic of these companies has to be the diversity of them. Iansati and Levien (2004) identify three kinds of participants within the business ecosystem: dominators, keystones and niche players. Dominators play a central role as keystones but the first ones look for getting the maximum value from the ecosystem but then they do not redistribute it to the rest of the members. They want to control the movements and the firms' performance among the ecosystem. However, keystones seek for create and share the value generated among all the participants of the ecosystem (nurturing a win-win landscape). Finally, niche players are the rest of the ventures that want to take part in the ecosystem contributing to the development of it and to the creation of value. Teece (2007) talks about complementors, regulatory authorities, educational and research institutions and suppliers. Table 2 tries to summarize the different players suggested by the mentioned authors and the third column tries to clarify some aspects of these classifications.

Table 2: Business ecosystem players and clarifications

Authors	Types of business ecosystem members	Notations/Clarifications
Moore (1993)	<ul style="list-style-type: none"> ▪ The central ecological contributor ▪ Rest of the enterprises 	Due to his biological standpoint, with the name of “central ecological contributor”, Moore refers to the figure we know as keystone
Clarysse et al. (2014)	<ul style="list-style-type: none"> ▪ Keystone company ▪ Rest of the firms 	This author highlights the importance of the diversity of the ecosystem members
Powell et al. (2010)	<ul style="list-style-type: none"> ▪ Anchor tenant ▪ Rest of the enterprises 	As in the case of Moore, with “Anchor tenant”, this group of authors refer to keystones

Zahra and Nambisan (2012)	<ul style="list-style-type: none"> ▪ Keystones ▪ Rest of the enterprises 	These authors make another classification of the ecosystem's firms. They also distinguish between well-established companies and new ventures (subdividing this last group into corporate-sponsored and independent ones)
Isckia (2009)	<ul style="list-style-type: none"> ▪ Leader or keystone ▪ Pivotal species ▪ Redundant species 	Following Moore's approach, Isckia adds the distinction between pivotal and redundant firms (alluding to the influence of those firms on the proper performance of the business ecosystem)
Iansati and Levien (2004)	<ul style="list-style-type: none"> ▪ Dominators ▪ Keystones ▪ Niche players 	These authors introduce a new figure and a new denomination of an existing one. Dominators, as the new figure, are companies with a similar role as keystones but aiming to capture the maximum value created. And niche players, as the new denomination, refer to the rest of the companies that take part in the business ecosystem
Teece (2007)	<ul style="list-style-type: none"> ▪ Complementors ▪ Regulatory authorities ▪ Educational and research institutions ▪ Suppliers 	Teece adds external organisations or entities less related to the business environment, such as regulatory authorities and educational and research institutions

Source: Own elaboration

1.2.3.A TYPOLOGY OF BUSINESS ECOSYSTEM

Reviewing the preceding literature, there is no consensus in the typology of business ecosystems, but some researchers have tried to shed light on this theme. Zahra and Nambisan (2012) propose four models of ecosystems based on the goal of clarify the present tie between entrepreneurship and strategic thinking: **the orchestra model, the bazaar model, the jam central model and the mod station model**. The first one, the orchestra model, refers to ecosystems which comprise groups of enterprises that are based on a particular innovation architecture or platform; this platform is designed by a dominant company, also called keystone player. The name of this type of ecosystem is due to its similarity with the composition and operation of a typical symphony orchestra. The article uses as examples of

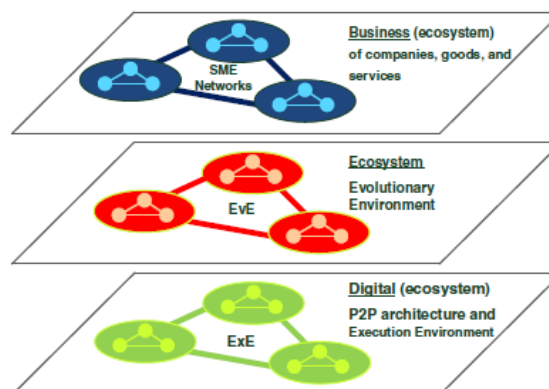
this type of business ecosystem the cases of Intel and Microsoft. The second one, the creative bazaar model, works as a shopping mall: a dominant firm buy innovation in a big bazaar of new products, ideas and technologies. The keystone player acts as a mean to put into practice these innovations. That is to say that the focal firm uses its tools and infrastructure to let other ventures develop and market the new ideas or products. This kind of ecosystem usually appears among biotechnological companies and large pharma firms. Regarding the third one, the jam central model, this type of business ecosystem is characterised by the lack of centralization; this means that there not exist dominant firms and the power is diffused among partners. This model implies a group of independent entities (generally research centers) that collaborate to develop an innovation in a radical new field. Example of it is the company IBM and its collaboration and open source projects with Linux. In the fourth position, the mod station model exploits an existing innovation architecture or platform provided by established firms and the ecosystem focus on new markets or technologies using communities of innovators (such as customers, Scientifics and experts). Instances of this structure could be those companies that use customers, scholars and experts as part of its production process. The distinction between the different kinds of business ecosystems is related to how firms think strategically within the ecosystem, what is the entrepreneurial potential of the firms and the innovation process used by the enterprises (if they apply a more open innovation culture or a more close innovation culture).

Moreover, Rong et al., (2015), instead of offering a set of business ecosystems, focus on a specific kind of business ecosystem, the one which is based on Internet of Things (henceforth IoT), the **IoT based business ecosystem**. They use a 6C framework (drawing from a 3C framework) in order to explain the characteristics of this ecosystem. The meaning of these six c's are: context (the business environment), construct (the central structure and the supportive infrastructure), configuration (the relations between the members and what configuration patterns are followed by the ecosystem), cooperation (the use of collaboration and governance regulations), capability (the capacity of finding the qualities which will carry the ecosystem to success) and change (the ability of the ecosystem to adapt to the environment). Its methodology is so thorough because the paper uses a data base collected from different fields (car rental, instant messenger, car-operating platform, internet TV, E-amp and CCTV), which gives the article a widespread application.

Business Ecosystems: an empirical approach

Following the line of the revolution of internet (particularly, the above mentioned concept of Internet of Things) and the digitalization move, it is necessary to mention the **digital business ecosystem**. This type of business ecosystem, introduced by Nachira (2002), can be explained along three levels: digital (ecosystem), business (ecosystem) and ecosystem (Nachira et al., 2007). The digital (ecosystem) is the technological infrastructure or the software technology that transports, finds and connects information and services through internet linkages, allowing transactions and distribution of digital objects within the network. The business and ecosystem level, are defined by Moore (1996). Business (ecosystem) is an economic community composed of interacting companies and individuals that produce goods and services to create value to the customers, who take also part of the business (ecosystem). Finally, ecosystem is a biological metaphor used to illustrate the interrelations between the participants in the business landscape, how they co-evolve and how they work. Briscoe (2010) shares Nachira's vision of the digital business ecosystem defining it as a combination of three types of ecosystem: the social ecosystem, the digital ecosystem and the business ecosystem. Figure 3 tries to clarify the visual image of the three tiers of the definition of digital business ecosystem.

Figure 3: Tiers of understanding of a Digital Business Ecosystem



Source: Retrieved from Graça and Camarinha-Matos (2017).

Due to the wide variety of products and possibilities that firms offer to satisfy clients' needs, nowadays customers prefer to obtain the utilities of the products without owning the physical component. This tendency can be seen in the sector of cars where the hiring model is overlapping the owning model. This trend is also known as the service dominant logic. Taking into account this current service dominant logic (S-D logic) that dominates the present consumers' world, we can find a particular kind of business ecosystem, which is the **service ecosystem** (Lusch, 2011). According to Lusch (2011), a service ecosystem is a large structure where social and economic actors interact through institutions (i.e. property rights, norms, monetary system) and technology, to accomplish three objectives: cocreate value, swap service offerings and coproduce service offerings. Service ecosystems are mainly characterised by weak ties, what allows other firms and networks (that are not still joined to the service ecosystem) to form a larger macrostructure which can acquire some characteristics such as fluid, agile and adaptable.

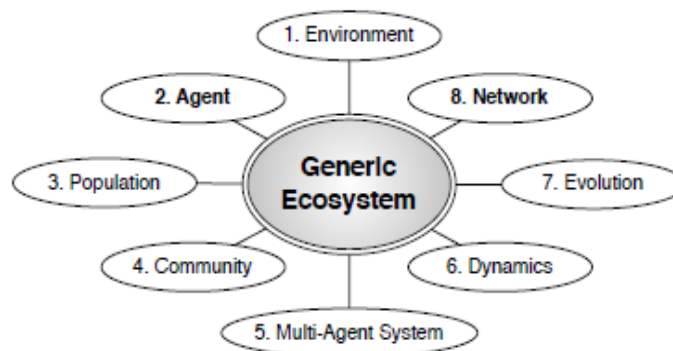
Finally, regarding the relevance of innovation activity in current business environment in combination with information technologies, we have to mention the **innovation ecosystem**. More generally, Kirsi, Makinen, Pertti, Antti and Joni (2016) define innovation ecosystem as a group of actors which interact each other and share knowledge and technologies with the final target of transforming new ideas into new products, services or processes. Being more thorough on the explanation of this type of business ecosystem, Dedehayir, Ortt and Seppanen (2014) offer another definition of innovation ecosystem which is more precise. According to these authors, innovation ecosystem is a network of ventures which jointly produce global, integrated product systems, with the ultimate goal of creating value for firms and final users of the products and services. They underscore the importance of keystones as entities responsible for the success of their innovation ecosystems. Specifically, these authors claim that the success of the innovation ecosystem befalls on keystones and on their ability to supply a platform (e.g. services, technologies, and manufacturing processes) that can be used by the rest of the companies of the ecosystem. Battistella, Colucci, De Toni and Nonino (2013) refer to this platform, which they called PC platform, as a tool or physical enabler that generally allows collaboration and union between business ecosystem's fellows and particularly permits the development of each firm's offerings.

1.2.3.B TYPES OF NON-BUSINESS ECOSYSTEMS

As can be seen, the different types of business ecosystems are related to varied movements and tendencies that appear among the firm's environment. However, there are some ecosystems that are not clearly recognised as business ecosystems, but, due to their relevance and influence on business ecosystems, should be mentioned. Actually, despite not being considered business ecosystems, these non-exactly business ecosystems can integrate and overlap with authentic business ecosystems in such a way that could be finally difficult to decouple.

Briscoe (2010) identifies a general ecosystem whose structure can be applied to the different kinds of ecosystems that can appear. The different elements are defined in a universal manner to then be customized to the specific ecosystem. Figure 4 shows how Briscoe (2010) visualizes a generic ecosystem.

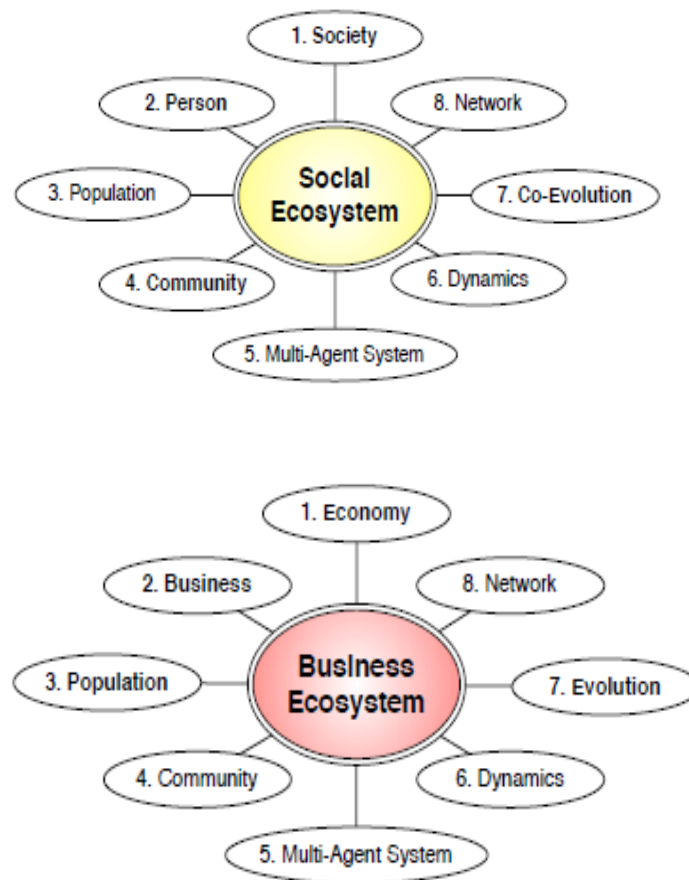
Figure 4: The Scheme of a generic



Source: Retrieved from Briscoe (2010).

One of the first ecosystems was the **social ecosystem**. Due to a basic necessity of human being, the first interactions that are built are those between people. The social ecosystem emerges this way as the basis ecosystem of the rest of ecosystems. Within this ecosystem, the basic units are people and the ties are the relationships established between them. Connecting this ecosystem with the central topic of this work (business ecosystems), we could say that within a business ecosystem there is always a social ecosystem made of business men and business women who perform the business activity. Figure 5 shows the scheme of both types of ecosystem and the reader can appreciate that the only substantial difference between social and business ecosystem are the actors of each structure: people in the case of social ecosystem and businesses in the case of business ecosystem.

Figure 5: The scheme of social and business ecosystems



Source: Retrieved from Briscoe (2010)

The second one is that related to knowledge field. As we have advanced before, knowledge management is a booming topic that influences on business ecosystem developing. Knowledge generators such as universities, public research organizations and firms with established R&D departments have become important tools for the business world. Clarysse et al., (2014) address this topic differentiating business ecosystem from **knowledge ecosystem**. Both ecosystems look similar, but they have some core differences. Within business ecosystems, keystones are large, established enterprises; however, these principal players in knowledge ecosystems are universities and public research organizations. Secondly, the basis of knowledge ecosystems relies on a linear value creation process, that starts with the generation of knowledge through investigation and ends with the creation of ideas that can be applied in the business domain; and, nevertheless, business ecosystems work with non-linear value creation process. A well-founded conclusion of this article is that knowledge ecosystem does not automatically lead to the emerge of a business ecosystem.

Policy makers play an important role in this kind of ecosystems because they can convert knowledge ecosystems into ‘engines of regional economic development and drivers of technological innovation’; using tools such as spin-offs or contract research (Clarysse et al., 2014).

Knowledge ecosystems do not have to become business ecosystems. The financial support network is the key to transform a knowledge ecosystem into a business ecosystem. In other words, financial investors act as a bridge between knowledge ecosystems and business ecosystems (Powell et al., 2010). Figure 6 depicts the principal elements of the knowledge ecosystem.

Figure 6: The scheme of knowledge ecosystems



Source: Retrieved from Briscoe (2010)

1.2.4 FUNCTIONING AND STRATEGIC ORIENTATION OF BUSINESS ECOSYSTEMS

Once we have ascertained what is a business ecosystem, which are its components and how many kinds of it exist, the last but not less important part is the functionality of a business ecosystem and its approach as a strategic tool to cope with turbulent environments; that means, the internal aspects of this structure and the capabilities, abilities and resources a firm can develop, improve or obtain from its membership to the business ecosystem. To address this section, we will divide it in two parts: 1) Dynamic capabilities, enablers and business ecosystems and 2) collaboration and competition, to make easier the analysis of the internal atmosphere of the business ecosystem.

DYNAMIC CAPABILITIES, ENABLERS AND BUSINESS ECOSYSTEMS

As we already know, to deal with this dynamic and uncertain environment, firms must develop and implement capabilities which allow them to be agile, flexible and versatile. These capabilities are known in the literature as **dynamic capabilities**³. These dynamic capabilities emerge as a necessity to confront the characteristics of the current business landscapes and combined with the implementation of business ecosystem structure can drive firms to lead their competitive surroundings. Moreover, Teece (2007) claims that these capabilities allow the company fitness to the environment in addition to the capacity of shaping it.

Dynamic capabilities are developed and implemented in the company through routines, processes and workforce attributes. These capacities are oriented to strategic change, allowing the accomplishment of changes at the corporate level as well as at the individual level and with the aim of adapting the company to the new characteristics and circumstances of the business environment (Helfat and Raubitschek, 2018).

Since business ecosystem theory appears as a response or tool to handle the present scenario, dynamics capabilities will be the required skills to create, develop and maintain the internal structure and functionality of the business ecosystem as well as those of companies and other organizations which take part of the ecosystem. There exists a lot of literature related to dynamic capabilities, but not so much connected to business ecosystems. Among the few articles that set a relation between dynamic capabilities and business ecosystems, we underscore the classification of dynamic capabilities within business ecosystems made by Teece (2007). This author distinguishes three types of dynamic capabilities inside a business ecosystem: 1) sensing new opportunities and threats (highlighting the relevance of analysing three aspects of the business environment: customer needs, technological opportunities and the performance of the competition), 2) leveraging new opportunities through the design of business models and strategic investments and 3) modifying and reconfiguring the current business models and strategies (Teece, 2007).

³ Helfat and Winter (2011) define dynamic capabilities as those kinds of abilities which allow firms to modify its current way of doing things in order to respond and adapt to the changing business environment.

Regarding the first group of dynamic capabilities (sensing new opportunities and threats), Teece (2007) suggests the suitability of accomplishing complementary activities, such as: a) investments on R&D, b) exploration of new technologies and the reaction of stakeholders to them and c) a proper process of harvest and filtering of information (this last complementary activity has quite relevance due to the fact that avoids the problem of isolated information⁴). Furthermore, the author recommends not leaving this capacity to a small group of people, but inserting it into the entire company and the ecosystem; that would suppose all the members of each enterprise and all participants of the ecosystem would be able to make contributions thereon. As enablers of this capacity, Teece (2007) mentions creativity and managing social sciences (for instance, behavioural economics), attributes that can facilitate the development of the sensing new opportunities and threats capability.

Looking at the second group of capabilities (leveraging new opportunities through the design of business models and strategic investments), an asset which becomes important during the development of this capability are financial resources, a matter that becomes thorny when people in charge of managing it lack of open mentality and focus on progress and innovation. Aspects that are stressed by Teece (2007) are: commercial strategy and definition of investment priorities as operational tools; committee decision-making structures, which influence the speed of approving measures, and thereby the agility to leverage opportunities; and the role of complementary assets and cospecialization⁵ during the innovation process.

Finally, taking into account the third group of dynamic capabilities, reconfiguration is an essential element when key changes take place outside in order to preserve the fitness of the firm and that of the ecosystem to the environment and decentralization becomes important to avert strategic decisions to turn into isolated (Teece, 2007).

Deepening the analysis of the dynamic capabilities within the context of business ecosystems, we will only highlight the more relevant ones for our analysis. Among all dynamic capabilities business ecosystems are able to develop and acquire, integration arises as one of the most important ones for this structure. **Integration capability** is implemented in the company through the realisation of tasks which suppose: suitable communication and

⁴ Isolated information is a problem which generally occurs in high hierarchical companies, where the information suffers an undesirable process of descontextualisation owing to it has to pass through too many hierarchical levels (Teece, 2007).

⁵ According to Teece (2007), two assets are cospecialized when their joint use generates greater value than that they create separately.

coordination of activities inside the ecosystem, proper allocation of resources, capabilities and knowledge where needed, completion of investments, sharing and transmission of knowledge and alignment of principal goals. The implementation of this capacity serves as a tool to position the products and services of a firm within its business ecosystem. (Helfat and Raubitschek, 2018; Teece, 2007).

Despite all members of the business ecosystem can benefit from their membership to it, Helfat and Raubitschek (2018) underscore the higher advantages platform leaders can experiment from the integration capability. The deployment of this skill by platform leaders allows them to: i) establish the governance structure of its business ecosystem; ii) it boosts cross-side network effects (since whether a complementor makes a discovery or launches a new product, this capacity will enable platform leader and the rest of the firms to align this innovation with their own business activity, and finally being able to develop new complementary products or services or implementing these new technologies), iii) it facilitates knowledge transmission; and iv) the creation and development of intangible assets (Helfat and Raubitschek, 2018). Despite these benefits and the value creation of this skill, companies should learn and know how to withhold this value (it can be accomplished through holding inside the company those assets which are essential and which can generate competitive advantage).

Due to the significance of this capacity, firms should search and develop those implements or attributes which facilitate the task of implementing and executing integration capability inside their ecosystem. There appears here what literature calls **enablers**. Amid them, we will focus on information technologies (henceforth IT) and trust.

Information technologies, although it can be also considered a dynamic capability very useful to face current turbulent environments (Wadhwa, Mishra and Saxena, 2007), play an important role in this aspect, because they can facilitate integration with the use of the same computer programmes or softwares. They also let firms coordinate and interact each other without having to be in near physical locations. Isckia (2009) talks about web service technologies as a neutral language to coordinate what happens inside and outside the firm and this tool simplify the electronic data interchange. In addition, He argues that web services ensure connectivity, easy accessibility and availability of e-services within the business ecosystem.

During the nurturing of the business ecosystem and also during its performance, companies that take part in it have to share important financial data, resources and know-how to undertake the main goal of this business structure: creating and capturing value. The establishment of alliances is difficult due to the power differences that exist between firms and the uncertainty and distrust this fact implies. For these reasons, trust, and particularly the balance between trust and power, becomes a key element to the creation of these alliances and in general to the good health of the business ecosystem (Perrons, 2009).

Trust, as the second enabler we previously mentioned, is an indispensable instrument for the membership to business ecosystems because companies belonging to them had been acting as competitors until now, when they start to behave as collaborators. Thus, trust turns into a previous condition to pertain to the business ecosystem and also to develop collaboration and competition relationships that happen inside the business ecosystem. Despite the business ecosystem objective of implementing a culture with healthy collaboration and competition relationships, the existence of platform leaders shows the difficulty to deploy total equality between firms. In other words, these figures (platform leaders or keystones) reveal the unavoidable being of power imbalances (Perrons, 2009).

Human relations as well as ventures interactions are based on combinations of trust and power (what is generally known as power asymmetries). Relationships mostly based on exercise of power are generally doomed to failure due to the fact that enterprises in worse conditions will try to enter and belong to other communities of firms. On the other hand, full confidence relations are very complicated owing to the competitive spirit of ventures and their search of higher market share. Consequently, a good balance of trust and power becomes vital to the proper functionality of the business ecosystem as well as to its survival. For instance, in the case of Intel's ecosystem, this company (which is the platform leader of its business ecosystem) uses a mixture of trust and benevolent form of power in such a way that Intel defines the behavioural rules so as to make predictable the supply network's behaviour but, on the other hand, Intel arranges events in order to share its projects, ambitions, aspirations and information with the rest of the ecosystem members. Furthermore, Intel influences its collaborators and tries to manage to some extent the elaboration of the products Intel has previously ordered to them. However, it combines that control with the help or assistance it provides to its collaborators so as to enhance their processes, quality and cost structure (which in turn will entail the enhancement of the entire ecosystem) (Perrons, 2009).

To finish this heading, we would like to comment that among the little existing literature about dynamic capabilities and business ecosystems, there appears a paper⁶ that approach the relation between both variables(dynamic capabilities and business ecosystem) from the inverse perspective. Helfat and Raubitschek (2018), the authors of the referenced paper, addressing digital platform-based ecosystem, introduce dynamic capabilities as a tool to generate business ecosystems. By stressing the central role of platform leaders⁷ (players preciously called keystones or focal firms) as figures in charge of balancing the completion of its activity and the management and orchestration of business ecosystem, Helfat and Raubitschek (2018) focus on three types of essential dynamic capabilities that these members must develop: innovation capabilities, environmental scanning and sensing capabilities and integrative capabilities to business ecosystem organization. Regarding the first capability (innovation capability), the authors highlight the importance of innovate continuously due to the threat of competitive innovation and the constant emerging opportunities for innovation. Looking at the second group of skills (environmental scanning and sensing capabilities), the authors claim that having this kind of capabilities, enterprises are able to detect possible opportunities as well as avoiding possible threats and weaknesses. This type of capabilities entails: i) checking customers' needs to spot new needs and requirements or current needs that are not being satisfied yet by companies; ii) updating existing technologies or discovering new ones; and iii) analysing the current competitors and the possible entry of new ones. All of them essential aspects to develop the firm's activity and to ensure the sustainability of the firm over time. Finally talking about the third set of skills (integrative capabilities to business ecosystem organization), Helfat and Raubitschek (2018) stress the importance of coordination between the members of the business ecosystem to adapt to the changing conditions and remain competitive. One of the explanations of the relevance of the integrity capability is the existence of cross-side network effects. Cross-side network effects mean that the value of a firm of the ecosystem is affected by the quality of the rest of enterprises belonging to the ecosystem and by the amount of firms that belongs to the ecosystem. The bigger the amount of cross-side network effects, the greater the interdependence between companies of the ecosystem will be (Helfat and Raubitschek, 2018).

⁶ Helfat, C. E., & Raubitschek, R. S. (2018). Dynamic and integrative capabilities for profiting from innovation in digital platform-based ecosystems. *Research Policy*

⁷ In this article and also in others, some scholars refer to business ecosystems as 'platforms'. Specifically, they understand platforms as business ecosystems which have a technology base or software that acts as a medium to business ecosystem performance letting flows of knowledge and information between platform members and facilitating the relationships between participants (Helfat and Raubitschek, 2018; Perrons, 2009).

COLLABORATION AND COMPETITION

As we commented on preceding paragraphs, within the business ecosystem collaborative and competitive relationships are generated among business ecosystem participants. The success of companies and, in particular, that of business ecosystems lies in finding an appropriate balance between competition and cooperation (Hannah and Eisenhardt, 2018).

Hannah and Eisenhardt (2018), carried out a complete analysis of these interactions using firms and ecosystems belonging to the solar energy sector. They assessed the relations of collaboration and competition between those companies and ecosystems over time. After their observations, they identified three kinds of ecosystem's strategies that were followed by companies: bottleneck⁸ strategy (when firms focus on the component where the bottleneck is), component strategy (when ventures focus on one or few components of the value proposition, searching the rest among other companies) and system strategy (when enterprises concentrate on most or all of the components of the value proposition because they possess the required abilities to address them).

Among the conclusions of their study, highlight: i) Bottleneck strategy combines competition con collaboration interconnections, while system strategy tress competition relations and component strategy empathizes cooperation links; ii) Ventures which do not worry about neither cooperation nor competition relations finally fail, so this strategy becomes ineffective; iii) The success of each ecosystem's strategy is influenced by the maturity degree of the business ecosystem; and iv) Due to it is important to create value (objective of the collaboration) but also capture it (goal of the competition), firms should develop, implement and adjust a suitable balance of competitive and cooperative relationships (Hannah and Eisenhardt, 2018).

In order to finish this section, we will establish the possible connection point between collaboration and competition relationships and integration capability; this capacity make competitive side of firms emerge. In other words, at the beginning, integration capability increases the desire of coordination between companies so as to gain the maximum benefits and advantages of the business ecosystem membership and value creation; but then, once integration capability reach certain degree of maturity , integration enhances competition

⁸ According to Hannah and Eisenhardt (2018), bottlenecks are elements of the ecosystem which restrict the development and activity of the it owing to their scarcity, low quality or deficient performance.

levels of firms to allocate themselves on the platform leader location (Helfat and Raubitschek, 2018).

1.3 CONCLUSIONS

In order to synthesize the content of the previous sections, we are going to stress the main conclusions of this chapter:

- 1) Despite the fact that there are a lot of definitions of business ecosystem, the majority of the concepts seems to have some common characteristics which take part in the business ecosystem concept, and which become essential to whatever definition of this business structure: business strategy, collaborative and competitive relations, sharing knowledge, capabilities and resources and value creation and value capture.
- 2) As a first contribution, we propose the following definition of business ecosystem: *business ecosystem is a community of enterprises which can belong to different sectors and where they establish collaborative and competitive relationships, sharing knowledge and resources and having the final target of creating value for customers and for the whole business ecosystem.*
- 3) Related to the participants of the business ecosystem, there exists a lot of opinions about it but we can spotlight the existence of two principal members within the business ecosystem: the big firm which runs and controls the business ecosystem performance (known as keystone or focal firm) and the rest of the enterprises which contributes to create value and improve the ecosystem operation (that can be classified following diverse criteria).
- 4) Regarding the kinds of business ecosystems, there is a wide range of business ecosystem typologies due to the broad diversity of sort criteria that can be used. This occurs in the same way with non-business ecosystem. This fact, along with the possibility of fusion between business ecosystems and business ecosystems with non-business ecosystems, make difficult the work of creating and providing a closed catalogue of business and non-business ecosystems.
- 5) Finally addressing the final section of this chapter, it has to be said that within a business ecosystem all dynamic capabilities are generated and developed by companies to a greater or lesser degree, but in this chapter we have only underscored the most relevant

dynamic capabilities because of the next chapter will present the rest of them. In addition, we have to advance that functioning and dynamic capabilities within business ecosystems will become the most important issue of this first chapter because they will entail the bridge that will connect chapter 1 with chapter 2 during the drafting of chapter 3.

CHAPTER 2. SUPPLY NETWORK

2.1. INTRODUCTION

Until a few years ago, business landscape was quite different from the current scenario: companies only established competitive relationships with their competitors in order to achieve the highest number of customers or market share and, on the other hand, collaborative relationships were only built with companies that helped to carry out the principal activity of the firm. The present tendency of collaborating and sharing resources with rival companies, something that nowadays is common within the business world, was unthinkable some decades ago. So as to properly understand the evolution of ventures within strategic management arena and how the insertion in business ecosystems or their creation can benefit current enterprises, we should analyse the structure or strategic organization that companies have been using until now. Today, this structure which is being using, and which is more similar to business ecosystems, is supply network. Supply networks are defined as complex nets of enterprises that create a value system and where it takes place flows o materials and knowledge between companies (Choi, Dooley and Rungtusanatham, 2001).

While it is true that business ecosystems do not have to emerge from supply networks, it is common to think that business ecosystem will likely have their origin on supply networks because supply networks are the most advanced stage on the firms' union process and on their collaboration process. Therefore, there will be more probabilities of finding business ecosystem with their beginning on supply networks than that of individual enterprises. For all that, we have a well-founded interest on addressing supply network theory because they will probably be the first step on the generation or companies' insertion into business ecosystems.

As we realized with business ecosystem, throughout this second chapter we will undertake a brief travel through the most essential points which define supply networks, specifically concentrating on the internal side of this structure and on the dynamic capabilities that can be created or enhanced within supply networks along with some of their enablers. The principal reason of this approach is the fact that supply network theory and business ecosystem theory will be connected to elaborate the third and last chapter of our work. Specifically, the internal level of the business ecosystem as well as the dynamic capabilities which will govern it will be the connection point that we will set with the supply network theory.

2.2 BACKGROUND

2.2.1 SUPPLY NETWORK CONCEPT AND OTHER RELATED NOTIONS

Before starting with the functionality and the complex relationships that take place within a supply network, it is important to know what we mean when we talk about this concept. Taking into account that there are a lot of definitions of supply network, depending on the theory or viewpoint followed, we will define the supply network from the angle of social network analysis (Kim, Choi, Yan and Dooley, 2011). We propose to see a supply network as the final stage of a continuous process of unions between organizations which starts with a first connection between two companies (that we call dyad) and ends with the formation of an entire network of companies. In other words, at a first stage, pairs of firms establish relationships between them creating a dyad. Then different dyads join together building chains or paths and finally these chains generate a more complex net where all companies affects each other and the position of the venture in the network become important having consequences for the enterprise (Borgatti and Li, 2009).

Another definition of supply network is that suggested by Narasimhan and Narayanan (2013). According to these authors, supply network can be defined as the possible network of suppliers that are part of the firm's value system and have established direct or indirect relations. The novelty of this definition is the term "possible", because it includes all the present and future partners that can take part of the supply network. Other authors opt for using simpler meanings as that made by Pérez and Gómez (2015), who see supply network as the management and coordination of a group of individual chains.

As we advanced in the introduction of this chapter and as can be abstracted from the reading of the first chapter, business ecosystems and supply networks reveal several similarities as organizational structures but, simultaneously, show differences that let these structures possessing different denominations. Among similarities of these strategic options, we would outline the fact that both of them (business ecosystems and supply networks) consist of nets of firms that establish relationships between them so as to add value to their stakeholders (overall their customers). And, on the other hand, among the differences of both structures, we would highlight: a) the greater complexity of business ecosystems, as structures which are bigger than supply networks and whose connections are not only for collaboration

objectives (as it occurs in the case of supply networks) but also for competition between the business ecosystem participants (what is known in the recent literature as cooptation⁹); b) the value creation inside both architectures have dissimilar scopes: regarding the supply network, value creation simply search to supplement or perfect the product or service offered, whilst business ecosystem goes beyond with the generation of products or services completely new and revolutionary; and finally c) Working with rival companies, something that appears as a new innovative element within business ecosystem, has no place inside supply networks.

Table 3: Comparative map between business ecosystems and supply networks

Structure	Similarities	Differences
Supply networks	<ul style="list-style-type: none"> ➤ Nets of firms which establish relationships between them ➤ Main goal: adding value to their stakeholders (overall their customers) 	<ul style="list-style-type: none"> ❖ Smaller size and, thus, less complexity ❖ Only collaborative relationships ❖ Value creation: supplementing or perfecting the product or service offered ❖ Working only with collaborators¹⁰
Business ecosystems		<ul style="list-style-type: none"> ❖ Bigger size and, thus, more complexity ❖ Collaborative and competitive relationships ❖ Value creation: supplementing/perfecting the product or service offered and generation of completely new or revolutionary products or services ❖ Working with collaborators and competitors

Source: Own elaboration

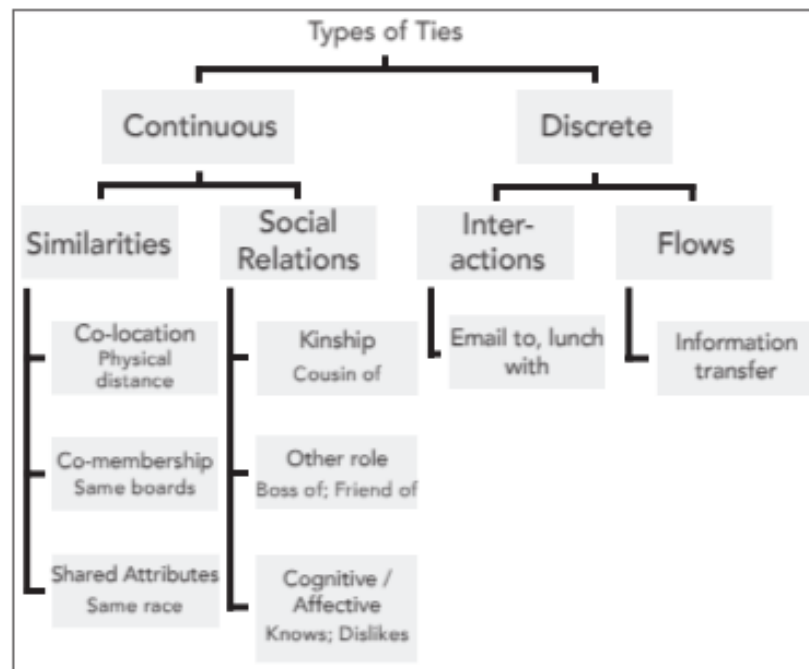
⁹ Scholars use the term cooptation to refer to the combination of collaborative and competitive relationships that are set between enterprises.

¹⁰ With the term collaborators we mean those companies that do not undertake the same business activity. That is, those ventures that complement the value proposition of the firm.

2.2.2 SUPPLY NETWORK STRUCTURE AND RELATED NETWORKS

Switching to the structure of a supply network, we have to know the different elements that can appear. As we have anticipated before, the basic unit of a network is the dyad. This basic unit is composed by nodes or actors which represent the companies or organizations that take part in our supply network and the ties or connections which are the different types of relationships that can be built between them. In simpler words, the dyad, as the smaller unit of the supply network (and in general for all networks), is the relationship established between two firms or organizations (Borgatti and Li, 2009). Figure 7 summarizes the different types of relations or ties that can be built between people but which are also suitable for companies.

Figure 7: Types of ties between people



Source: Borgatti and Li (2009)

Despite not being exactly supply networks, there exists other types of networks that are related to them and which are important to be known. One of them is **social networks**. Using the previous information about the elements and the structure of the network, within social networks the nodes are persons and the ties are the relationships that they set between them (Susarla, Oh and Tan, 2012). Connecting this social network with the supply network (the main topic of our second chapter), we could say that within the supply network exist a social network which consists of the set of relationships built between the business men and women (suppliers, entrepreneurs and customers, among others) who take part in the supply network.

Another type of networks is **collaboration networks**. They consist of nets composed by entities (including companies, universities or research centers) which establish bonds and relations between them so as to cooperate and share resources and abilities with the final target of performing joint activities that create value. Collaboration networks are considered a more generic type of network because depending on the goal of collaboration (researching, innovation or business), they can have different surnames. For instance, Wang, Rodan, Fruin and Xu (2014) analyse knowledge collaboration networks or collaboration networks between researchers, where scholars, students and experts cooperate to enrich their knowledge basis and to carry out discoveries and advances.

These collaboration networks can also appear within supply networks under the shape of **network communities**. Network communities are small groups inside supply networks that build nearer and closer connections between them. According to Sytch and Tatarynowicz (2014), network communities can amplify invention productivity because they facilitate knowledge, capabilities and resources transmission and sharing. Nevertheless, network communities have other side: these structures have high levels of community affiliation that can drive to a general isolation among different network communities of the same supply network; finally destructuring their supply network (Sytch and Tatarynowicz, 2014).

A third type of networks we will analyse are **knowledge networks**. These kinds of networks should be differentiated from social networks because the first ones refers to the connections between cores of scientific and technological knowledge; which means that the nodes of these networks are elements of knowledge and the relationships between them are the varied mixes of knowledge elements that can be created (Wang, Rodan, Fruin and Xu, 2014).

Just as it happened with social networks, knowledge networks can be observed connected with the first ones and with supply networks. Regarding the former combination, knowledge networks and social networks usually appear linked because knowledge is generally possessed by people and simultaneously those people that have the knowledge set bonds between them, therefore generating connections among their knowledge (Wang, Rodan, Fruin and Xu, 2014). Similar to this, Hansen (2002) shows how supply networks and knowledge networks can also appear interconnected because of firms have knowledge and when they establish relationships with other firms, they share this knowledge generating bonds between companies and the knowledge or know-how owned by those companies. We can see that both networks live together and are interconnected, but they can be decoupled from a more theoretical

perspective. From the work of Wang, Rodan, Fruin and Xu (2014), an interesting aspect is the way these authors get to identify in the real world the elements of the networks. Specifically they sustain the existence of a tie between two knowledge elements when they appear together inside a patent and ties between researchers when they create or establish co-authorship among them in a patent.

Finally, regarding the innovation field, we can find **innovation networks** (Dhanaraj and Parkhe, 2006). According to Frenken (2000), whatever mix of a technology, a market and a country can be considered an Innovation network. Moreover, Smart, Bessant and Gupta (2007) add that innovation networks offer opportunities to leverage complementary resources that are allocated outside the company. As can be seen, innovation networks are generally connected to supply networks because innovation is usually carried out to improve a product or service or the way companies work.

Focusing only on supply networks, Kim (2014) distinguish four types of them attending to the kinds of enterprises that participate on them: supplier networks (where there is only a supplier and several buyers), buyer networks (the opposite of the supplier network, where there is a buyer and several suppliers), focal-organization supply networks (where there exist several suppliers and buyers but also appears a third figure, a focal firm) and sector supply-network (where multiples manufacturers, suppliers y buyers live together).

As can be abstracted comparing supply network typology with business ecosystem typology (previously seen within chapter one), there exist an approximated analogy between both classifications for two reasons: 1) both organizational structures share foundations, being their differences the incorporation of added features and 2) the distinction or sort criterion used to determine the different kinds of supply networks and business ecosystems is based on the diverse fields or approaches these structures have. For example, if the goal or basis of the structure is innovation, we encounter innovation networks and innovation ecosystems; or if the target or basis of the structure is knowledge generation, we find knowledge networks and knowledge ecosystems.

2.2.3 DYNAMIC CAPABILITIES, ENABLERS AND BENEFITS WITHIN SUPPLY NETWORKS

Once we know what a supply network is and which shapes can adopt in the real world, a third step should be determining the benefits and opportunities a company can obtain from belonging to a supply network.

To begin with, one of the first groups of capabilities a company should develop when it enters in a supply network is the **network capabilities**. Mitrega, Forkmann, Zaefarian, and Henneberg (2017) rightly recognise these capabilities as a needed first step to start their journey inside a supply network. They define networking capability as a collection of activities and organizational routines that managers deploy in the firm to start, develop and finish business relations with the final goal of the company's success. These authors disaggregate networking capability in three main sets of skills: supplier relationship initiation capabilities, supplier relationship development capabilities and supplier relationship ending capabilities (Mitrega et al., 2017).

The first group refers to actives devoted to exploit the potential of new supplier relations. Among these capabilities, we have to distinguish two subsets: those abilities looking for selecting the proper supplier and those searching for the better manner to attract those possible new suppliers. Both of them are quite relevant because, before building bridges with other firms, it is necessary to gather information about them and elaborate the best strategy to engage them (with the final target of creating strong and long lasting ties). Turning to the second one (supplier relationship development capabilities), this group of capabilities concern actions and activities conducted by the company to enforce the relations with its current suppliers. Some pivotal factors in this kind of capabilities are the level of integration with the suppliers, the degree of collaboration and communication and the possible control systems between them. Finally, regarding the third group (supplier relationship ending capabilities), we find activities and behavioural standards which set the stage for the termination of current supplier relationships. As cleverly Mitrega et al. (2017) highlight, beginning and maintaining attachments with suppliers is as important as terminate these connections, because the completion of a relation with a particular supplier does not mean that new relations can be built with the same supplier in the future (Mitrega, Forkmann, Zaefarian, and Henneberg, 2017).

An accurate establishment, development and completion of supplier relationships (which we already know as networking capabilities) is necessary element or basis on which to build the rest of the capacities and abilities the supply network provides: Flows of knowledge and information, sharing resources, innovation process and the rest of dynamic capabilities. For this reason, our next task will be analysing the most relevant dynamic capabilities on supply network area (as we did during business ecosystem study).

One of these dynamic capabilities is **the generation and transmission of knowledge**. Inside the supply network, it takes place steady flows of knowledge and resources between companies, which enhance the adaptability and dynamism of all firms that belong to the supply network. These internal and external flows of knowledge can be improved by defining and setting procedures and routines. Teece (2007) refers to this capability as the need to combine inventions generated internally and externally, getting and keeping involve customers, suppliers and complementors in the innovation process and collaborating and getting in contact with universities. As one of the benefits of this dynamic capability, Handfield, Cousins, Lawson and Petersen (2015) underscore the fact that it allows suppliers and other supply network partners to know better the needs and requirements of the rest of the stakeholders of the companies they work with. Moreover, as a result of this skill and the generation of supply networks, Kim (2014) stresses the creation of what he names **social capital**. According to this author, social capital is the collection of current and future resources that are originated as a consequence of supply network formation. But this social capital is not led and managed automatically. Instead of it, social capital demands certain degree of harmony and organization during the management of it on the part of supply network members (Kim, 2014).

Going deeper in this capability, generation and transmission of knowledge capability has enablers which facilitate its deployment within supply network ventures. Among these enablers we would like to stress **information technologies** because, in the current world, the transmission of knowledge is conducted through the digital support (Iyengar, Sweeney and Montealegre, 2015). Ventures usually utilize different technologies and software to undertake their activity, but within the supply network, it can occur two situations: on the one hand, the set of enterprises belonging to the supply network can opt for deploying a single software or a homogenous technological system; and on the other hand, each company can keep its technology base performing the focal firm as a knowledge and technological integrator of the

whole supply network (Narasimhan and Narayanan, 2013). This second choice allows firms not to concern about the continuous upgrade of their technological tools and focus on the things they do better (but without forgetting the needed adaptation to the new technologies that appears).

Another important dynamic capability that has to be mentioned is the **innovation capability and invention productivity**; Narasimhan and Narayanan (2013) defined this capability as the process through which firms modify products, processes and services with the goal of generate new value for the customers and stakeholders by using the knowledge efforts of all members of the supply network.

As an enabler of Innovation and invention productivity capability, we highlight **innovation culture**. Innovation culture plays an important role as a facilitator to boost this skill, because having an open innovation vision will facilitate the development of this capability. In order to implement this innovative culture, aspects that companies have to take care are: the existence of a working atmosphere where employees can feel free to express their opinions, a good coordination between departments and events and meetings should be arranged to join members of all supply network in order to intensify and facilitate the information and ideas flow (Narasimhan and Narayanan, 2013).

As similarly happens with business ecosystems, **integration** (also called coordination or alignment by other authors) plays an essential role within supply network (and in general inside all types of strategic structures) because it ensures the stability and continuance of whatever kind of structure. Handfield, Cousins, Lawson and Petersen (2015) refer to integration capability with the name of supply management alignment. They explain supply management alignment as the capacity to specify internal needs, strengthen communication process and transmit firm's expectations to key suppliers. Since we have already introduced what integration capability is during the wording of chapter one, and the essence of dynamic capabilities does not change depending on the organizational structure adopted by companies, we will supplement this capability by examining other enablers of integration capability that have not been addressed yet. They are relational embeddedness and cultural embeddedness.

Regarding the first one, Kim (2014) highlights the importance of supply network **embeddedness**. Particularly, he talks about **relational embeddedness** as the basis to accomplish integration capability at supply network level, because relational embeddedness consists of the strength of the relationships between each pair of ventures, which in turn influences the integration degree of the entire supply network (Kim, 2014). Other authors refer to it as simply integration, understanding it as an improved connection and coordination of the supply network participants, which at the end will imply a higher number of commercial trading between them (Pérez and Gómez, 2015). Pérez and Gómez (2015) also sustain that integration entails the generation of alliances to create long-term relationships, the search of getting flexibility within the processes and the assurance of quality and sustainability.

Since firms are conducted by people and companies' relationships rely on social interactions, factors that affect humans and their relations also will influence enterprises and their connections. Among these factors excels culture. Culture¹¹ is one of the elements that will condition the integration process of the supply network (Fletcher and Fang, 2006). It can be claimed that culture can be developed at two levels, at individual level (that is, at firm's level) and at corporative level (that is, at the entire supply network). In other words, when companies are generated, they create their own organizational culture; but when they take part in a greater structure (for instance, as in a supply network) a new culture at the level of the whole supply network is created based on each of firms' cultures that enter the supply network. Due to these interconnections, the establishment of bonds between completely different companies culturally speaking becomes more complex, although not impossible.

As can be abstracted from the previous paragraph, Culture, as an element that influences the evolution and permanency of supply networks, is a quite important factor during the integration process, because the higher the similarity of organizational cultures is, the easier and faster the integration process of companies within supply network will be (Wu and Pullman, 2015).

¹¹ Following the definition of Wu y Pollman (2015) we understand culture as the set of beliefs, attitudes, ceremonies y norms that govern people and affect their processes of decision making.

So as to carry out the integration process of the supply network, laws, rules and routines are stated in order to minimize possible contradictions at cultural level among firms, and letting by this way **cultural embeddedness**. Wu and Pullman (2015) explain cultural embeddedness as the extent to which firm's actions and supply network actions are being influenced by culture. In other words, cultural embeddedness is the identification of the members with the supply network culture. An example of business structure which is quite affected by culture embeddedness is agricultural cooperatives (Wu and Pullman, 2015).

Finally, being true that large-scale trust and integration cannot be implemented in few days, I would like to underline that **Network communities**¹², despite have been classified as a specific kind of collaboration networks, can act as an initial action to build trustworthiness relationships and execute coordination activities; what makes network communities to be considered an enabler of trust and integration.

As can be observed, firms' dynamic capabilities are the same in their essence regardless of the organizational structure where companies are integrated. That is, the fact that a company which belongs to a supply network enter a business ecosystem later on does not radically alter its dynamic capabilities, but these capabilities are geared to the new strategic option via small changes that do not affect the capability foundations. The same thing occurs in the case of entire supply networks: their dynamic capabilities will only experiment small shifts to adapt to the new structure (the business ecosystem).

¹² Network communities are defined by Sytch and Tatarynowicz (2014) as small group of near companies that are created inside the business ecosystem. They emerge as a first step on the establishment of connections and relationships between the members of the ecosystem. This author asserts that the creation of these small communities (which in the future will generate more links and thus higher communities) make dynamic capabilities (overall integration, trust and knowledge sharing) to be better developed due to they follow a more sequential and gradual process which simultaneously makes the development and implementation of these skills more sustainable over time.

2.3 CONCLUSIONS

As we did with business ecosystem theory, during this section we want to recap the main points of this theory in order to let the reader keep in mind the major points of this business strategy:

- 1) Despite there being so many definitions of supply network (owing to the maturity of this theory), there exists quite proximity between them. Thus, we will remember the definition offer by Narasimhan and Narayanan (2013) which is quite simple to be understood and retained: supply network is the possible network of suppliers that are part of the firm's value system and have established direct or indirect relations.
- 2) Regarding the structure of the supply network, we have that the basic unit of a network is the dyad which consists of nodes or actors (representing the firms or organizations that take part in a supply network) and ties or connections (depicting the different types of relationships that can be built between them). In addition, tackling the kinds of related networks, we have seen that, although they cannot be exactly considered supply networks, they appear quite connected to them (being very complicated to decouple related networks from supply network in some cases). Particularly, we have encountered: social networks, collaboration networks (with the particular case of network communities), knowledge networks and innovation networks.
- 3) Finally, within dynamic capabilities, enablers and benefits heading, we have analyzed four main groups of these capabilities, which are: network capabilities, generation and transmission of knowledge capability, innovation and invention productivity capability and integration (also known within supply network context as supply management alignment).
 - Among networking capabilities, we have seen three subtypes: supplier relationship initiation capabilities, supplier relationship development capabilities and supplier relationship ending capabilities. All of them very important as the basis to develop and implement the rest of the dynamic capabilities.
 - Addressing generation and transmission of knowledge capability, we have underscored information technologies as a relevant enabler of this capacity.

- Thirdly, during innovation and invention productivity capability study, we have emphasized innovation culture as a factor that makes easier the execution of this capacity (that is, as an enabler of it).
- Lastly, talking about integration, we have completed its analysis by introducing other enablers of this skill; which have been: relational embeddedness, cultural embeddedness and network communities.

CHAPTER 3. THE INTRODUCTION OF SUPPLY NETWORKS INTO BUSINESS ECOSYSTEMS: POTENTIAL ADVANTAGES AND DISADVANTAGES

3.1 INTRODUCTION

As we commented during the introduction of this paper, the goal of it is to see how business ecosystem theory can confront dynamic and changing environments that companies have to face and how business ecosystems influence the evolution and implementation of dynamic capabilities. Specifically, our work has analysed supply networks and how their insertion in business ecosystems or its generation can uplift the adaptation to the current business landscape and the execution of the dynamic capabilities supply networks already own.

Having realized an integrative study about business ecosystems (their characteristics, types and functionality) throughout chapter one and a brief review about supply network theory (their features, types and functionality) along with their relation with business ecosystems (during chapter 2), this third chapter pursues to build a connection among both organizational structures, focusing on the internal sphere of both structures (including the functionality and the development and implementation of dynamic capabilities).

In order to elaborate this chapter, we will establish a track through the dynamic capabilities we have been underscoring in previous chapters with the aim to elaborate propositions that allow the study of the influence of business ecosystem on the supply networks' functionality and dynamic capabilities. In other words, these propositions will let us try to answer the following research question: How can supply networks benefit from entering or creating a business ecosystem?

3.2 EFFECTS OF BUSINESS ECOSYSTEM ON SUPPLY NETWORKS: PROPOSITIONS

As we discussed before, supply networks can be seen as a previous stage in the business ecosystem formation. But, which effects does the inclusion in a business ecosystem have on supply networks and on the companies that belong to them? Is it a good idea to become a business ecosystem? In other words, which positive and negative consequences do business ecosystems have on supply networks and their firms? With the formulation of the following propositions we intend to set the possible business ecosystems' effects on supply networks which will be studied and empirically contrasted in a near future.

Starting with the dynamic capability of generating and transmitting knowledge, the flows of knowledge and resources between companies take place inside supply networks, which enhance the adaptability and dynamism of all firms that belong to the supply network (Teece, 2007). A clear example of this is the case of Toyota, which implants this dynamic capability via three interorganizational processes: supplier associations, consulting groups and learning teams that facilitate knowledge and resources transfer through the whole supply network. With the deployment of this capacity and its philosophy of considering their suppliers and partners as critical elements for its success (helping them to improve what they better do to consequently obtain the success of the entire supply network), Toyota has accomplished to enhance its suppliers' performance and simultaneously its own performance in addition to create a sustainable competitive advantage based on the generating and transmitting knowledge capability (Dyer and Hatch, 2004).

Furthermore, as a result of this skill appears social capital that we have defined as the collection of current and future resources that are originated as a consequence of supply network formation (Kim, 2014). However, Lawson, Tyler and Cousins (2008) go further in the definition of social capital. These authors emphasized the social and relational aspect of social capital, asserting that this asset should be considered more than a simple set of resources and information and it should be included in its understanding the network of contacts generated by the establishment of bonds among firms. In other words, social capital should be seen as the availability of knowledge and resources thanks to the establishment of relations between companies. With this wider definition of social capital and with basis on an empirical study, these authors demonstrate that a good development and formation of a proper

social capital positively impact in the performance of firms that are members of the supply network (Lawson, Tyler and Cousins, 2008).

Therefore, the introduction of the supply network in the business ecosystem involves a knowledge stock increase of each company and the creation of a better social capital because of the fact of sharing resources with a greater number of enterprises that consequently enriches the diversity and amount of knowledge and assets, in addition to the generation and development of a greater social network of enterprises. For all these reasons, we propose:

P1: The introduction of a supply network into a business ecosystem enhances the dynamic capability of generation and transmission of knowledge because business ecosystems provide a wider social capital resource.

Following with innovation capability or invention productivity, we have seen how supply network arises as a first effort in the innovation task through the collaboration with the rest of the supply chain participants and those of the entire supply network in order to improve or supplement company's value proposition (Tsai, 2009). However, business ecosystems go further. As we checked, these structures emerge with two added peculiarities: large-scale collaboration (Isckia, 2009); that is, team working among an enormous number of firms (higher than that of supply networks and with companies that can belong to different sectors) and collaboration with rival companies (Moore, 1993; Isckia, 2009). These ground-breaking singularities of business ecosystems make them the organizational structures with greater potential to nurture innovation and thus prone to enhance and boost innovation capability within supply networks that enter the business ecosystem.

Therefore, owing to the innovative and disruptive nature of business ecosystems, these architectures can provide a plus to the development of innovation capability because the fact of building collaborative relationships with rival companies (firms that undertake the same or quite similar commercial activity), allow ventures to benefit the knowledge of these rival companies about the product or service and focus on perfecting and refining it or even offering something completely new. All of this can be carried out via the establishment of strategic alliances or improvement and innovative projects. For these motives, we propose:

P2: The introduction of a supply network into a business ecosystem enhances the dynamic capability of innovation and invention productivity because the participation of a higher number of companies inside the business ecosystem provides a higher number of strategic thinking approaches that simultaneously implies higher probabilities of creating value in a faster and more efficient manner.

Regarding the integration capability, we have noticed that this dynamic capability is essential for the survival and accurate performance of whatever kind of organizational structure. In the case of supply networks, integration capacity is also known as supply management alignment (Handfield, Cousins, Lawson and Petersen, 2015). Handfield, Cousins, Lawson and Petersen (2015) define supply management alignment as the capacity to specify internal needs, strengthen communication process and transmit firm's expectations to key suppliers. As other authors and papers assert (Romano, 2003; Danese and Romano, 2012; Maleki, Shevtshenko and Cruz-Machado, 2013), this dynamic capability is needed to orchestrate and organize the joint functionality of the entire supply network and to make possible the difficult task of maintain the company and the whole supply network working for a long period of time.

On the other hand, in the case of business ecosystems, integration capacity is, in its essence, the same skill, but adapted to the business ecosystem singularities (Isckia, 2009; Hannah and Eisenhardt, 2018). As we observed in lines above, business ecosystems present higher number of participants and interactions and a singular combination of competitive and cooperative relations. All of this entails greater complexity in the business ecosystem structure and functioning, which consequently will imply a decrease or deterioration in the development of integration capacity. For instance, Basole (2009) highlights the complexity of mobile ecosystems that is originated by factors such as: the constant incorporation of new ventures, the appearance of new participants and the setting of new connections between firms and the power changes produced by them, among others (Basole, 2009). In other words, integration capability of the business ecosystem's firms will be hamper due to the wider complexity that business ecosystem exhibits. On the other hand, other authors boldly stress the complexity that environments surrounding business ecosystems display and which add an aggregated difficulty to the accomplishment of the integration capacity (Akaka, Vargo and Lusch, 2013). Based on these arguments, we propose:

P3: The introduction of a supply network into a business ecosystem hinders the dynamic capability of integration because business ecosystems entail greater complexity that is mirrored on the larger size of this structure and the greater sophistication of its relationships.

Following the analysis of integration capability, we should remember that the insertion in the business ecosystem will involve the coexistence and interplay with unfamiliar enterprises (Basole, 2009). This shortage of familiarity results in an absence of trust among ventures and, consequently, after entering the business ecosystem it will be required time and dedication so as to build trust relationships which substantiate the future commercial relations between these unknown firms. As previously analysed on chapter 1, trust emerges as an important enabler of integration capacity without which coordination between different companies becomes transient and greatly hard to deploy (Perrons, 2009). Based on these reasoning, it can be presumed that the lack of trust within the business ecosystem and its need to be constructed over time will be a factor that will hamper the integration capability inside the ecosystem. Thus, we propose:

P4: The introduction of a supply network into a business ecosystem hinders the dynamic capability of integration because business ecosystems suppose the establishment of bonds with new ventures where trust has to be built, which entails time and effort.

Finally, despite not being exactly connected to dynamic capabilities, business ecosystems provide a series of elements which positively affect firm performance. Within these elements, we can stress: a greater stock of resources and knowledge (Kim, 2014), access to a wider market share which simultaneously facilitates the internationalization of the company (Rong, Wu, Shi and Guo, 2015) and higher probabilities of innovation (Zahra and Nambisan, 2012), among others. All these factors would permit supply networks and firms belonging to them to be more productive and increase their profits. For example, it is remarkable the empirical study done by Rong, Wu, Shi and Guo (2015) to demonstrate how big companies, aiming to amplify their market share and enter new markets, make use of business ecosystem theory to attain these goals. That is, these large enterprises nurture business ecosystems so as to enter and market within new countries and thus stimulating the demand of their products or services. The results of this paper prove the better performance and the higher profits of these firms after their introduction or generation of a business ecosystem (Rong, Wu, Shi and Guo,

2015). Therefore, we formulate the last proposition that link the inclusion in the business ecosystem with the profitability and enhancement of firm performance.

P5: The introduction of a supply network into a business ecosystem optimizes the firm performance and productivity because business ecosystems deliver access to a wider market share or amount of potential customers along with a higher diversity of resources and know-how.

After the reading of the different propositions we have formulated, it can be abstracted that business ecosystems entails high benefits for companies that belong to supply networks (but also to those ventures operating outside supply networks); nevertheless, these structures also have a flip side when they stunt one of the most important dynamic capabilities for wider organizational structures: integration capacity. Despite all of this, as a global analysis we could claim that business ecosystem theory presents a major opportunity to survive within the current landscapes which are so dynamic and changing and it can be employed as a tool to enhance or acquire the precious dynamic capabilities and increase the profits and scope of the firm. In addition to this, the possible difficulty in accomplishing integration capability within business ecosystems could be addressed with the establishment of procedures and routines, transparency policies, a culture of collaboration and with a continued development of this skill over time.

FINAL CONCLUSIONS

From what we have previously seen and analysed, it arises the significance of business ecosystems because they are structures which houses and nurtures dynamic capabilities that are at the same time essential for supply networks and firms to face current volatile and turbulent settings. An example of this is how the combination of collaborative and competitive relationships within the ecosystem (a ground-breaking feature of these structures) serves as a lever or boost of the dynamic capability of innovation and invention due to the fact that it allows to mix different standpoints about the product or service from companies that undertake the same business activity (that is, those which better know the product or service). In addition, this business ecosystem's characteristic bolsters the combination of efforts to create value and improve firm's productivity (collaboration) but without neglecting the final objective of trying to be the best in the market (competition).

Along these three chapters, we have elaborated an integrated framework or unified vision of business ecosystems, studying how they are defined, which traits characterize them, which members take part in them, which types exist and how they work and develop (chapter 1); moreover, we have undertaken a brief review of supply network theory, following an outline similar to that used to business ecosystem chapter, which allows to liken both strategic options and check how a supply network can evolve to a business ecosystem, along with the production of a comparative chart of both organizational structures which permits to differentiate them and see their similarities and differences (chapter 2) and, lastly, we have formulated a list of propositions which set the possible bonds between supply networks' dynamic capabilities and the introduction of these supply networks into business ecosystems (in other words, the benefits or effects of business ecosystems on supply networks' dynamic capabilities). These propositions sill serve as the starting point of a future study about business ecosystems, supply networks and the benefits of the first ones based on samples extracted from real companies.

With this paper we have covered existing gaps on the literature (commented at the beginning of the work) such as: a) the absence of a uniform view of business ecosystem theory, b) the shortage of a comparative frame that establishes connections between supply network theory and business ecosystem theory and simultaneously lets firms clearly see the similarities and differences between both structures, and thirdly c) the lack of literature which connects business ecosystem theory, supply network theory and dynamic capabilities.

In order to cover these gaps or loopholes, we have achieved the following contributions: 1) the contribution of an integrated framework of business ecosystem theory that permits to know business ecosystems and their main components in a basic and simpler manner; 2) the realisation of a comparative scheme between supply networks and business ecosystems which can be employed as a tool to differentiate both architectures (glimpsing their common points and their divergences); and the presentation of a set of propositions that serve as the beginning of a thorough study of the influence of business ecosystems on supply networks and on the dynamic capabilities development of the firms belonging to them.

Future research lines can be orientated to the production of the variables which will be used to measure the relationships and effects we have raised in our propositions. Particularly, an appealing variable to be studied can be how keystones of the different business ecosystem manage to reduce the mobility of companies among ecosystems and thus increase the loyalty of the firms that belong to the ecosystem. Consecutively, a second task could be the creation of the items which will be introduced in future surveys to ask ventures and thus obtaining the empirical information.

Other interesting aspect to be addressed would be the location of the business ecosystems that exist in Spain in order to use them as the target population of a future study about business ecosystems and from where samples can be extracted to obtain the information and subsequently analyse it. Until now, known Spanish business ecosystems are those located in Barcelona (Barcelona Tech City), Valencia (VIT Emprende), País Vasco (Innovación y sociedad de la información del Gobierno Vasco) and Granada (On Granada Tech City). All of them have different maturity degrees (being the last one, On Granada Tech City, the most recent one), a fact that would allow to introduce as a variable to be analyse the maturity or lifecycle phase where the business ecosystem is situated.

Finally, regarding the limitations, as whatever research paper, the present work has weaknesses and limitations that can be remedied with supplement future work. On the one hand, as a work based on literature review, it lacks an empirical basis that provides firmness to the posed theory. Moreover, a deeper study of each dynamic capability could allow to reinforce the substantiation of the effects of business ecosystems on dynamic capabilities. In addition, due to business ecosystems is an emerging theory, there is little written about it, and this work is based on few previous papers about this issue.

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