

Global Management and Politics
CATTERDA Global Organization Design and HRM

A Qualitative Research Study.

**The Open Innovation adoption: a dynamic approach through
competitive advantage**

RELATORE

Luca Giustiniano

CANDIDATO

Federica Boscaino

Matr. 735921

CORRELATORE

Ioannis Kallinikos

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ABSTRACT

Open Innovation is now transforming several companies' business models, which are finally adapting to the changes in the innovation environment. In this regard, it was decided to proceed with an analysis of all the innovation landscape, in order to understand which are the elements that fostered in the past the actual phenomenon of Open Innovation. Understand overall presentation will be provided, it will come with a presentation of the model itself, taking into account all the studies carried out over the OI model, with all the differences with the older model, the Closed Innovation Model. Lately the research will provide both the theoretical and empirical analysis of the effect that the Open Innovation Model has on the company's competitive advantage. The research started with a deep literature review of all the documents regarding innovation, open innovation and dynamic capabilities. The result of the extensive literature review was the identification of competitive advantage as the primary outcome after the Open Innovation implementation within a company. In this context, particular attention has been given to the role of dynamic capabilities within the firm, since their intrinsic correlation with competitive advantage and their importance for the Open Innovation model to succeed. This research was also supported by some empirical evidence, found in more interviewees conducted with experts who experienced the phenomenon of openness, and who knows its strenghts and weaknesses. It was shown, thanks to the qualitative analysis carried out, that all the partecipants agreed on the need for companies to change their business model, through innovation and openness. This was the best solution identified to gain competitive advantage. In fact, this research main aim was to answer the research question '*To which extent the Open Innovation model can lead to competitive advantage?*' All the elements just mentioned lead, in the final pages of the research, to the final proper answer, particularly insisting on the imperative need to embrace the path of innovation and dynamism.

Key Words: *Open Innovation, Dynamic Capabilities, Innovation, Innovation Landscape, Collaboration, Networks, Competitive Advantage*

INTRODUCTION

Innovation can be considered the main mechanism companies can use in order to grow and to create a competitive advantage. In fact, firms are constantly looking for new ways to innovate, transforming their business models and strategies in order to maintain their market position and their superior performances. Traditionally firms, according to the Closed Innovation model, used to emphasize their internal capabilities, focusing on the control over the entire innovation process. In fact, Closed Innovation refers to the model firms adopted where the main focus was on the protection of the internal Research and Development (R&D) functions, and on the development of the internal process for the product innovation. However, phenomena such as globalization, technological development and market volatility, have called attention to the need for a transformation of the traditional model of innovation. The need for a change is imperative, since technological and economic changes and trends suggest that the single firm cannot anymore innovate in isolation. Hence, firms need to open their boundaries, accepting new knowledge and resources flows from the outside. These flows need to be found in the linkages established within the so-called Global networks, networks made of companies, institutions, government incubators, non-profit organizations, and universities. In this context Open Innovation (OI) can be defined, using the words of Henry Chesbrough ' the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively'. Given these developments, the fundamental assumption of this work is that firms are increasingly transforming their organizational internal structure, gradually adopting open models for innovation. This means that companies understand the necessity of developing those capabilities, the so-called dynamic capabilities, which will enable the company itself to survive and maintain its predominance in the market, in this dynamic environment, characterized by a growing number of external factors influencing the firm's performance. For this reason, one of the main aims of this thesis work will be to analyze which are the capabilities a firm needs to possess to gain competitive advantage in the ever-changing environment, and, whether the adoption of the Open Innovation model helps firms to be maintain and grow their competitiveness on the market.

Research Question

As previously introduced, innovation and competitive advantage are crucial issues for modern companies. Thus, in order to develop a valuable analysis of the issue discussed it will be essential to define a clear purpose and the precise barriers of this research. The purpose of the study can be explained as follows. First, given the dimension of the innovation environment, where many entities, both individual and organizational, can participate to the innovation process, it is crucial to identify which are the main elements leading and implementing the innovation development of the firm. In this regard, different definitions and interpretations of innovation strategies will be provided, in this regard we focus on the Open Innovation model, identifying in the latter the best strategy a firm can adopt in order to improve its innovative performance. Therefore, the last step consists in discovering whether or not Open Innovation can represent a competitive advantage for the firm. To develop a proper analysis, a valuable research question needs to be built. In order to do so, two different approaches have been followed. The first refers to the approach presented by Bryman and Bell, which starts with the individuation of a personal area of interest; then deepening down the scope of the research, analyzing determined elements in that area, then finally identifying the most relevant one. The second approach adopted relates to the 'crafting research process' consisting in the 'what, why and how' framework, which will be useful for developing a proper research design and research methods. With this in mind, Open Innovation is the concept that this research will pinpoint. The main reason behind this choice is a particular personal interest in all of the innovation environment, but in particular on the open model for innovation, since it implies a total switching mentality within the business environment, no more focused on the 'take in', but on the 'flows out'. After the initial screening of some documents and books related to the topic, an intriguing aspect of Open Innovation was individuated: the dynamic capability, and in particular, how Open Innovation can lead to competitive advantage under the dynamic capability framework. Therefore, considering both the definition of Open Innovation and Competitive Advantage in the modern business environment, the main research question has the aim to understand the conditions under which Open Innovation can lead to competitive advantage, as you can see below:

RQ: To what extent the Open Innovation can lead to competitive advantage?

However, the focus of the work is also to study which are those capabilities a firm needs to develop in order to maintenance and increase its position on the market and within the innovation environment. Thus, a sub question leading the research has been developed as you can see below:

- Which are the typical capabilities a firm needs to develop in order to gain a competitive advantage?

Research Limitations

Some boundaries during the research were encountered, and for this reason need to be mentioned. One of the main challenges refers to the number of interviewees collected. In fact, only six of twenty potential participants accepted to release an interview. The others showed to be reluctant to share their strategic vision about the issue of innovation and innovation strategy. This is the reason why it was chosen to accurately conduct the interviews, in order to have more insightful testimony, balancing the low number. Another limit encountered during the research is for sure the lack of numerical data underlying the discoveries made. In fact, the research will be a qualitative one, based on a inductive approach. The quantitative analysis would have been impossible to conduct since the lack, or scarcity of relevant numerical and objective observable data.

Thesis Disposition

This thesis work will be organized as follows.

In the First Chapter, the *Industry Dynamics of Technological Innovation*, the theme of innovation was introduced, where with innovation we mean the act of introducing a new device or method for application to commercial or practical objectives. This chapter will focus on the entire innovation environment, starting with an historical and industrial analysis of the innovation impact on society and ending with the enunciation of the innovation's sources. In this chapter it will be presented the importance of the concept of 'linkages'. In fact, innovation, in the modern era, is not a product of single entities, but of the linkages these entities are able to establish with each other's.

The Second Chapter, *The Fuzzy front-end era of Open Innovation*, will be totally around the theme of Open Innovation. Several interpretations of the OI model will be provided, showing several perspectives about the strengths and the weaknesses of the open model of innovation. Moreover, it will present the real difference between the Closed Innovation model, and the Open one. A very important issue emerging in this chapter is how firms acquire knowledge and technological sources from the external environment. In fact, it will be here where we will start talking about the dynamic capabilities a firm needs to possess to maintain its market position.

The Third Chapter, *How Firms benefit from Open Innovation*, will be particularly in line with previous the focus will be on the implementation of the Open Innovation model in global firms, who decide to open up their business models and to adopt a network structure. We will see how a networked business model represents a competitive advantage for the company, and the importance, for the firm, to be able to interact with the external environment. Moreover, we will deep down the relationship between the firm's dynamic capabilities and the firm's competitiveness. From this moment we will consider the Open Innovation model from the dynamic capability's perspective, analyzing their correlation, and their combination leading to competitive advantage.

The Fourth Chapter, the *Theoretical Findings*, will finally provide a theoretical representation of the findings derived by the analysis of the literature review. In this chapter the focus will be on Open Innovation, Product Innovation, Dynamic Capabilities and Competitive Advantage. We will investigate their correlation and the measure in which each of these elements influences each other. In fact, we will come up with different theoretical statements, finalizing our results with the demonstration of the positive effects that Open Innovation has on competitive advantage.

The Fifth Chapter, the *Research methodology*, will explain the research methods adopted during this research in order to answer the main research question 'To what extent can Open Innovation lead to competitive advantage?'. We will provide both the research strategy and the research design, and then we will go through some aspects of the data collection and data analysis, finally getting to an empirical answer which will confirm or not the theoretical

findings already mentioned in the previous chapter. The originality of the chapter lies in the valuable insights we gained through the interviews carried out in the last months; thanks to this we could acquire the qualitative data we needed in order to complete the research.

Finally, the *Conclusions* will be provided. In this last chapter a summary of the previous results will be explained more carefully, with a final answer to the previously mentioned research question.

CHAPTER ONE

TECHNOLOGICAL INNOVATION: THE DYNAMICS

Summary

1. The Importance of Technological Innovation 1.1 Technological Innovation impacting Society 2. Strategy as the main driver of Innovation 3. The Innovation Sources 3.1 Creativity: individual and organizational 4. Creativity generating Innovation. 4.1 The Inventor 4.2 Innovation by Users. 5. Firm internal research: R&D. 6 The Firm Linkages. 7. Innovation in Collaborative Networks. 7.1 Technology Clusters. 7.2 Technological Spillovers

In this chapter we will analyze the importance of Technological Innovation and how innovation can produce positive externalities for all society. Technological Innovation is that element which boosts the growth in the economy and in society. Analyzing this framework will allow us to understand the reasons why firms should embrace innovation, and most importantly the strategies the firm invests in. These ways are the more different, in fact, innovation can arise from very different sources, and from very different linkages. Firms should be aware that, for being competitive on the market, they cannot rely anymore only on their internal capabilities, such as the internal R&D resources, but they need to invest in partnerships, favoring the flows of knowledge to go in and out of the firm's boundaries. Within the Innovation environment, the crucial element that will be highlighted will be the rise of the 'networks' and the 'spillovers'. Such will create a fertile ground for firms to embrace the new model for Innovation, the Open Innovation model, a new strategic tool that later in this research will prove to be essential for the firm's competitiveness and for gaining competitive advantage.

1. The Importance of Technological Innovation

Nowadays, Technological Innovation, '*the act of introducing a new device or method for application to commercial or practical objectives*'¹, is the most important element for getting competitive advantages in many industries.

There are several phenomena that drive the innovation process, such as the globalization of markets. Because of foreign competition, companies are even more eager to innovate in order to bring differentiated products and services to the market. As companies innovated products and services, advances in information technology also played a very important role in the innovation process: computer-aided design and computer-aided manufacturing helped companies speed up the process of developing and manufacturing new products, and all flexible manufacturing technologies also reduced the importance of economies of scale in production².

All of these innovative processes made it easier for firms to produce new products and systems which allow them to differentiate themselves from competitors, meeting the needs of defined groups of customers.

We can take as an example of a successful innovation process, the Toyota Company. Toyota, in fact, in 2018, offered twenty-two different vehicles lines and, within each of these vehicles, the company offered different models with different characteristics and prices, for a total of 193 car models with different prices range. In a similar way, also Samsung, in that year, produced thirty different models of smartphones, ensuring itself to penetrate every kind of market, also the nicest one.

While in the past, a so differentiated production would have been much expensive and time demanding, with the flexible manufacturing technologies, firms are facing the transition from a '*one product model production*', to adjusting production schedules with real-time information

¹ A., M. S. (2023). *Strategic Management Of Technological Innovation, 6TH EDITION*. MC GRAW HILL INDIA..

² Womack, J. P., Jones, D. T., & Roos, D. (1992). The machine that changed the world. *Long Range Planning*, 25(3), 126. [https://doi.org/10.1016/0024-6301\(92\)90400-v](https://doi.org/10.1016/0024-6301(92)90400-v)

on demand. Moreover, companies are reducing production costs thanks to the presence of common components in many models.

Just as the mentioned Toyota and Samsung, many other firms are adopting even more innovative technologies and processes, in order to maintain their position in the market. It is clear that the more companies adapt to innovation, the more competition increases, and the result is, of course, a greater segmentation in the markets³. Innovation is the new strategic imperative across all industries, and a firm which does not innovate will no longer be competitive on the market.

1.1 Technological Innovation impacting Society

If the innovation process led to an even more competitive environment for firms to distinguish, its effect on society is much more positive. It is sufficient thinking about the delivering of goods and services worldwide: the innovation process allowed food and other primary goods to be produced and delivered in a short time range, it yielded all the medical treatment, and it, on the globalization wave, allowed people to travel and communicate around the world in an easier way.

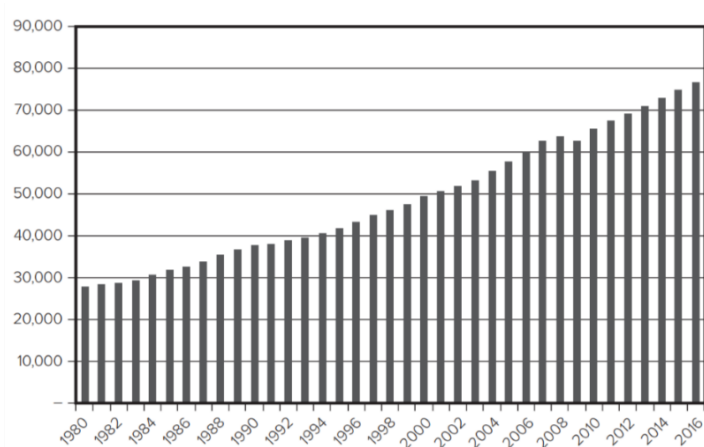
We can measure the positive impact of innovation on society also in another way: looking at the GDP, the Gross Domestic Products, that is '*the total annual production of an economy, measured by its final consumer price*'⁴. Figure 1.1 shows the GDP per capita from 1980 to 2016. As the graphic reports, the GDP per capita has been constantly growing since 1980. Just as some experts of the National Bureau of Economic Research stated, this growth in the GDP could not be sustained only by, for example, a rise in employment and a growth in the industrial

³Qualls, W., Olshavsky, R. W., & Michaels, R. E. (1981). Shortening of the PLC—AN Empirical Test. *Journal of Marketing*, 45(4), 76–80. <https://doi.org/10.1177/002224298104500410>

⁴ M. A. Schilling and C. E. Vasco, "Product and Process Technological Change and the Adoption of Modular Organizational Forms," in *Winning Strategies in a Deconstructing World*, eds. R. Bresser, M. Hitt, R. Nixon, and D. Heuskel (Sussex, England: John Wiley & Sons, 2000), pp. 25–50

inputs. In fact, as the economist Robert Merton Solow argued, 'the main element sustaining this growth was technological change'.⁵

Figure 1.1 GDP per capita 1980-2016⁶



2. Strategy as the main driver for Innovation

As will be shown later in this research, industrial firms are the major players in the technological innovation landscape. Anyway, before innovating companies should have clear in their mind the strategies they want to put into action on the path to innovation. In fact, many companies often choose projects they cannot actually support. While initially, innovations were considered a process dominated by freedom and unconstrained by rules, different studies showed that only those innovators who have a clear innovation strategy in mind, can succeed⁷. As has been lately stated, a well-crafted strategy is essential for a firm which wants to innovate. In fact, a firm should align its resources and objectives before starting an innovation process. In order to achieve an efficient implementation of any innovative projects, the company needs

⁵ Solow, R. M. (1957). Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics*, 39(3), 312. <https://doi.org/10.2307/1926047>

⁶ Source: USDA Economic Research Service, www.ers.usda.gov.

⁷ Brown, S. L., & Eisenhardt, K. M. (1997). The Art of Continuous Change: Linking Complexity Theory and Time-Paced Evolution in Relentlessly Shifting Organizations. *Administrative Science Quarterly*, 42(1), 1. <https://doi.org/10.2307/2393807>

to get to deeply know the innovation's dynamics, to design a valuable innovation strategy, and to efficient the process to the innovation strategy to be implemented.

Now we will go through the study all those industry dynamics of the technological Innovation. In fact, we will explore: the sources of innovation and the roles that individuals, organizations and networks play in the innovation process; the different types and patterns of innovation: the reasons why a dominant design arises and its main drivers. This chapter will represent the starting point for the further analysis of the so-called '*collaborative networks*', the real starting point of the Open Innovation process.

3. The Innovation's Sources

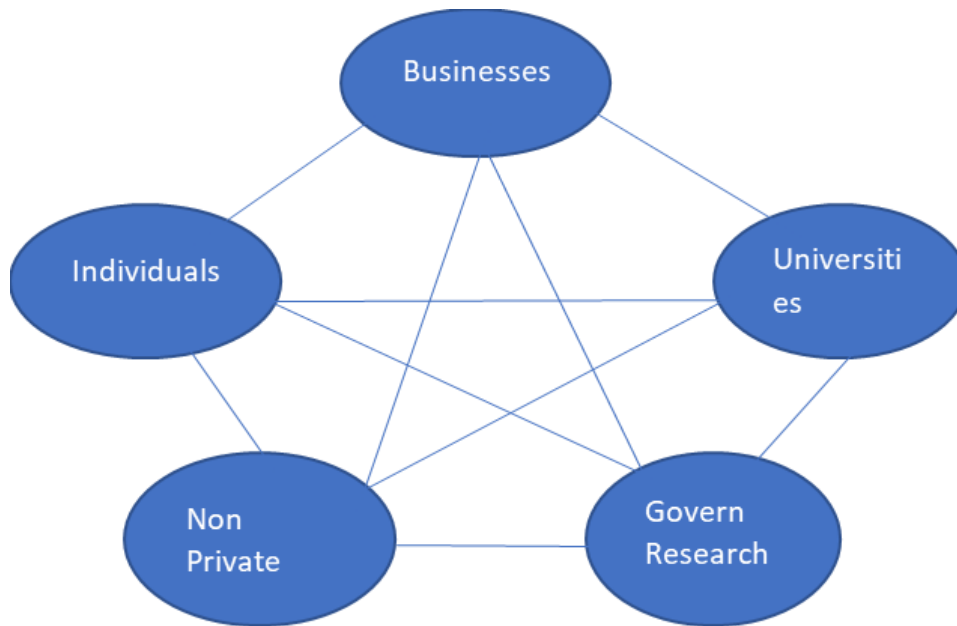
When talking about Innovation we mean "*the practical implementation of an idea into a new device or process*"⁸. Many different sources can generate innovation: individuals, who may design solutions for themselves, universities, government incubators or nonprofit organizations. Of course, firms are the entities well suited for innovation, since they have more resources than the others, and they usually have a greater management system that allows them to use those resources for the company's purposes.

Moreover, firms are even more willing to innovate, since, as we briefly saw in the introduction, nowadays innovation represents a great competitive advantage. But it must be stated that the most important source of innovation does not rely on any of these entities, but in the linkages between them⁹. As you can see by Figure1.2 the most powerful agent of technological innovation is not every single entity described, but the network they together form.

⁸ A., M. S. (2023). *Strategic Management Of Technological Innovation, 6TH EDITION*. MC GRAW HILL INDIA..

⁹ Rothwell, R. (1992). Successful industrial innovation: critical factors for the 1990s. *R&D Management*, 22(3), 221–240. <https://doi.org/10.1111/j.1467-9310.1992.tb00812.x>

Figure 1.2 The network of the Technological Innovation¹⁰



In the next paragraph, we will analyze the role that creativity plays in the innovation process, as a tool for generating novel and useful ideas. We will see also the way in which all the components of the innovation systems (companies, universities, individuals etc.) are able to create linkages in order to transfer innovation.

3.1 Creativity: individual and organizational

Creativity can be surely found at the first stage of the innovation process. We can define creativity as *'the ability to produce novel and useful work'*. When we talk about novel work it must be clarified that it must be different from any previously produced, and it must not be the logical consequence of the previous one, but it must be something different and innovative. It is important to clarify the difference between novel and reinvention. In fact, an idea for being classified as a 'novel' must be recognized as it by the

¹⁰ Compiled by the author

entire community, otherwise it is classified only as a reinvention. We will now distinguish between '*individual creativity*' and '*organizational creativity*'.

Individual Creativity

When talking about individual creativity we mean '*the function of his or her intellectual abilities, knowledge, personality, motivation and environment*'¹¹. Within the intellectual abilities, the most important in an individual, seems to be his or her memory, intelligence, his ability to solve problems in a non-conventional way, and the ability to convince someone else about the validity and the innovation behind the idea. In this field are so relevant the studies conducted by the psychologist Sigmund Freud, such as the professors Mathias Benedek and Aljoscha Neubauer. The first focused his study on the primary process of thinking, '*the ability to let an individual's mind engage in a visual mental activity*'. Freud noticed that individuals having an excellent working memory are more likely to find connections between two or more ideas in their mind, coming to unexpected innovative outputs. In this case, a connection which does not seem to be accurate may not be just random, but simply not comprehensible for the other individuals not following the same chain of associations¹². In line with this thinking, also Benedok and Neubaueur argue that there are some individuals able to manage together more things and connections, which enable them to rapidly explore many more associations.

What about the linkage between creativity and knowledge, this is somewhat '*double-edged*'. In fact, if a person possesses too much knowledge about a certain issue, he or she will probably be trapped in the existing logic and paradigms, and not being able to come up with an innovative solution outside the barriers of knowledge. But, on the other hand, if an individual does not have any knowledge at all, he or she will not be able to make a contribution in a meaningful way. That is the reason why, in general, the ones who usually came up with real innovative ideas, are the ones with a moderate degree of knowledge, the ones who are usually

¹¹ A., M. S. (2023). *Strategic Management Of Technological Innovation, 6TH EDITION*. MC GRAW HILL INDIA..

¹² Schilling, M. A. (2005). A "Small-World" Network Model of Cognitive Insight. *Creativity Research Journal*, 17(2-3), 131-154. <https://doi.org/10.1080/10400419.2005.9651475>

outsiders of the research field. Indeed, on one side outsiders are often victims of skepticism and resistance, but they are the ones who do not get trapped in already existent assumptions and paradigms¹³.

Another trait of personality which is often associated with the creativity concept is the 'openness to new experiences'¹⁴. With openness to new experiences, we identify those people more likely to develop an intellectual curiosity, who are attracted by more unusual ideas, and the ones who are more interested in the concept of newness, so more willing to try new experiences and innovations.

The last component of individual creativity is the 'intrinsic motivation'¹⁵. The intrinsic motivation is the value for which an individual is more willing to work and research on a determined topic and issue, because driven by personal and strong interest. In fact, several studies proved that intrinsic and personal motivation is stronger compared to external motivation (ex. money or awards)¹⁶. Of course, the first question that can come to our mind could be 'is creativity mined within those organizations who offer monetary awards?' On one side extrinsic motivation could obstruct the intrinsic one, for this reason giving little money incentives could push forward the intrinsic motivation, making people offer their ideas in the name of the firm's culture. However, this field needs more research time and effort, to understand which is the best and suitable way for ideas' solicitation.

Organizational Creativity

When talking about organizational creativity we mean the sum of the creativity of each individual within the organization. But organizational creativity is also comprehensive of all those social practices which shape the individual's behavior¹⁷. However, it must be clarified

¹³ Sternberg, R. J. (2014). Expertise and Intelligent Thinking: When Is It Worse to Know Better? *Advances in the Psychology of Human Intelligence*, 167–198. <https://doi.org/10.4324/9781315807768-12>

¹⁴ McCrae, R. R., & Costa, P. T. (1997). Conceptions and Correlates of Openness to Experience. *Handbook of Personality Psychology*, 825–847. <https://doi.org/10.1016/b978-012134645-4/50032-9>

¹⁵ Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357–376. <https://doi.org/10.1037/0022-3514.45.2.357>

¹⁶ Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125(6), 627–668. <https://doi.org/10.1037/0033-2909.125.6.627>

¹⁷ R. W. Woodman, J. E. Sawyer, and R. W. Griffin, "Toward a Theory of Organizational Creativity," *Academy of Management Review* 18 (1993), pp. 293–321

that when we talk about organizational creativity, we don't mean the mere sum of all the single individuals, but of all the practices, routines, and incentives which can influence the individual's creativity. An organization owns different methods and tools to ensure creativity within its boundaries. For example, many companies have always introduced the '*suggestion box*'. In 1985, John Patterson, founder of the National Register, created the first version of the suggestion box with the goal of collecting all the ideas of workers¹⁸.

Employees submitted 7000 ideas, and one-third of those were implemented. Another example of incrementation of the organizational creativity is, of course, the Google Corporation, whose aim was, not only, to collect ideas, but to incorporate mechanisms for selecting, and also implementing those ideas. In fact, Google has implemented an idea management system by which every employee emails his or her idea to a company-wide database, where all the employees can access that idea, leaving a comment and rating it.

The Google Case

Google Corporations works constantly on very different projects: from e-mail and cloud services¹⁹ to the more unexpected, such as self-driving cars and solar energy. Looking for innovation and new ways to innovate, Google uses several, formal and non-formal, methods to encourage its employees to innovate²⁰. Within these methods we can surely find:

1. *20 Percent Time*: all the engineers working at Google are encouraged to spend twenty per cent of their working hours on their personal projects. Google Mail or Google News were created really in this way.
2. *Recognition Awards*: of course, manager use to celebrate their employees and their innovative ideas with some 'recognition awards'
3. *Google Founder Awards*: this is a huge award and teams winning it could get access to substantial stock grants, and some employees were able to become millionaire only with this award

¹⁸ Belliveau, P., Griffin, A., & Somermeyer, S. (2001). The PDMA toolbox for new product development. *Wiley EBooks*. <http://ci.nii.ac.jp/ncid/BA66415656>

¹⁹ Bradbury, D. 2011. Google's rise and rise. *Backbone*, Oct:24–27.

²⁰ Groysberg, B., Thomas, D.A. & Wagonfeld, A.B. 2011. Keeping Google "Googley." *Harvard Business School Case 9:409–039*

4. *AdSense Ideas Contest*: every quarter, the AdSense online sales and operations teams reviewed a huge number of submissions of the Google's employ from all around the world, and the chosen ones can have the possibility to present their ideas at the quarterly contest
5. *Innovation Reviews*: these are formal meetings where managers can present ideas from employees in their departments directly to Google's CEO, Eric Schmid ²¹

4. Translating Creativity into Innovation

We have seen the role creativity plays in the innovation process. However, creativity is not, of course, enough: innovation is much more than the generation of ideas, it is, as we saw at the beginning, the transformation of these creative ideas into new products or processes. Creativity is an essential element in the innovation process, but it must be accompanied by resources and expertise that enable the creative idea to take a useful form. Now we will first look at the role of individuals as innovators, in particular innovation by innovators and users. Second, we will look at the different entities that are entitled to produce innovations: Businesses, Universities, and Institutions.

4.1 The Inventor

We define an *'inventor'*, a person who is interested in theoretical and abstract thinking and who shows particular interest and enthusiasm for problem-solving. Considering a study in cognitive psychology, it was stated that an inventor is an individual who is characterized by several attributes²²:

1. The inventor is specialized in the field he or she is investigating, but that individual has knowledge also in other fields, applying different perspectives to each of them.
2. The inventor is more interested in the problems behind the solutions.
3. The inventor always questions the assumption behind a previous work.
4. The inventor often looks for a general solution, assuming that knowledge is unified.

²¹ Kirby, J. 2009. How Google really does it. *Canadian Business*, 82(18):54–58

²² Woodman, Sawyer, and Griffin, "Toward a Theory of Organizational Creativity"; and Amabile, *The Social Psychology of Creativity*

These are the traits that Dean Kamen, founder of the Segway Human Transporter and the IBOT Mobility System, identified for those individuals known as inventors. These traits are also illustrated by several Nobel laureates such as Sir MacFarlane Burnet who noted that *'it can be dangerous for researchers to be overqualified in the field of study'*²³; Also, Peter Debye, a Prize-winning chemist, noted *'at the beginning of the Second World War, R.R Williams of Bell Labs com to Cornell to try to interest me in the polymer field. I said to him, 'I don't know anything about polymers. I never thought about them.'* And his answer was, *'That is why we want you.'*²⁴

Individuals like these dedicate their all life to innovation and the development of new innovative ideas. Of course, not every inventor has also an entrepreneurial mind: in fact, many inventors do not even ask for a patent for their invention, and in many cases, they do not commercialize their ideas.

However, many of the most-known inventors, such as Albert Einstein, Thomas Alva Edison, Alexander Graham Bell and Benjamin Franklin, they had both the creative and the managerial traits²⁵.

4.2 Innovation by Users

When we talk about *'user innovation'* we can intend to be the primary source of innovation, since it is only driven by a personal and individual satisfying need. In fact, while, for example, manufacturers create their products in order to profit from them, the individual user, usually, creates an innovation only for its own use and for the profit it will bring in its routine²⁶. A fitting example of Innovation by Users is given by the case of the popular sailboat, the Laser. This sailboat was designed with the creative assistance of three Olympic sailors, Ian Bruce,

²³ Sir Frank Macfarlane Burnet, *Changing Patterns, an Atypical Autobiography* (Melbourne and London: Heinemann, 1968), p. 35

²⁴ P. Debye, interview in *The Editors of International Science and Technology, The Way of the Scientist. Interviews from the World of Science and Technology* (New York: Simon and Schuster, 1966), p. 80.

²⁵ B. Z. Khan and K. I. Sokoloff, "Schemes of Practical Utility: Entrepreneurship and Innovation among 'Great Inventors' in the United States, 1790–1865," *Journal of Economic History* 53, no. 2 (1993), p. 289.

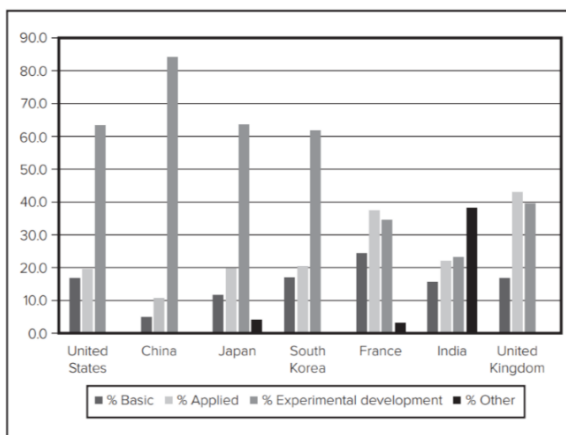
²⁶ E. Von Hippel, *The Sources of Innovation* (New York: Oxford University Press, 1988); S. K. Shah, "Motivation, Governance, And The Viability of Hybrid Forms In Open Source Software Development," *Management Science* 52 (2006), pp. 1000.

Bruce Kirby and Hans Vogt. When designing the boat, the three man just thought about their own preferences: it needed to be simple, high-performing, transportable, durable and low-cost. The resulting sailboat gained huge success, in fact during the 1970s and 1980s, its production reached the highest level of 24 pieces daily produced²⁷.

5. Research and development by Firms

It is recognized all around the world and in the countries that the most natural source of a company's innovation is, of course, its own research and development efforts. In Figure 1.3 the percentage of R&D investments in different countries is shown.

Figure 1.3 Percentage of R&D by country²⁸



The terms '*research*' and '*development*' are often used together, but they actually represent different types of investments in innovation-related activities. In fact, research refers to '*basic research*' and '*applied research*'. When we speak of basic research, we mean "*research aimed at expanding knowledge for its own sake,*" while applied research "*aims at expanding*

²⁷ R. J. Thomas, *New Product Success Stories: Lessons from Leading Innovators* (New York: John Wiley & Sons, 1995).

²⁸ <https://nces.nsf.gov/pubs/nsb20203/cross-national-comparisons-of-r-d-performance>

knowledge for a specific application or need." In business, applied research is usually that which has specific commercial objectives. Development, on the other hand, represents '*all activities in which knowledge is used to produce useful devices, materials, or processes*'. Clearly, these two terms together refer to a broader range of activities: from the initial exploration of an area to its application for commercial purposes.

Research and Development is an activity positively correlated with the growth revenues, sales form new products, and in general, the firm's profitability²⁹.

Table1 shows the effort which some countries put into the R&D activities. The graph shows that in 2015 the countries who invested more in Research and Development, they were China, Japan and Korea.

Table1.1 Countries' effort in R&D activities

	North America (%)	Europe (%)	Japan (%)
Collaborates with:			
Customers	44	38	52
Suppliers	45	45	41
Universities	34	32	34

During the 1950s and 1960s, experts and scholars of the innovation framework really focused on the '*science-push*' approach to the R&D³⁰. The '*science-push approach*' assumed that innovation follows a linear path. It starts with the scientific discovery, continues with the invention, the engineering and the manufacturing activity, and it finally ends with the marketing. Following this approach, innovation starts with a scientific discovery, which becomes an innovative product or service thanks to its commercialization. However, this approach showed itself not to be reliable and applicable in the real world. In the search for an

²⁹ E. Roberts, "Benchmarking Global Strategic Management of Technology," Research Technology Management, March–April 2001, pp. 25–36.

³⁰ M. Dodgson, The Management of Technological Innovation (New York: Oxford University Press, 2000).

alternative approach, a different innovative model gained acceptance in the scientific community in the mid-1960s: the '*demand-pull model*' of R&D.

In this case innovation was not perceived anymore to follow a straight line, but its origins can be found in the demand of potential users. Innovation applied to new products or services is simply the answer to the customers' problems or suggestions. Anyway, also this approach was criticized: that was too simplistic. Rothwell, for example, held that innovation can follow both approaches depending on the individual case, and that it can be characterized, for example, by different degrees of '*science-push*' and '*demand-pull*'³¹.

Nowadays, more researchers suggest that firms characterized by a high level of innovation, utilizes different sources for information and ideas, such as

- In-house R&D, including the basic research
- Linkages with customers, and all the ones who are potential users of innovation
- Linkages with external actors of the firms, such as suppliers, and also competitors
- Linkages to other perpetual sources that provide scientific and technical information, such as universities and government laboratories³²

6. The Firm Linkages

As was previously stated, innovation is a powerful source for a firm to be competitive, and it can arise from different sources. Anyway, the most powerful source of innovation is not a single one, but it comes from the linkages with external actors. Customers, suppliers, complementors, even competitors, they can potentially represent all an added value to the firm's innovation. In fact, it is not rare to find all of these actors working together on specific innovation projects.

³¹ M. Dodgson, *The Management of Technological Innovation* (New York: Oxford University Press, 2000).

³² C. Freeman, "Networks of Innovators: A Synthesis of Research Issues," *Research Policy* 20 (1991), pp. 499–514

Collaboration between these different entities can take various forms: Alliances, participation in research consortia, licensing agreements, contract research and development, and joint ventures. Collaborations promote the exchange of resources, knowledge, and capital, and enable the sharing of the risk of a new product development project.

Looking back at Table 1, we can notice not only which are the countries with the highest rate of R&D diffusion, but also which are the most frequent collaborations that firms prefer to entertain. The favored external actors are, for sure, the customers, suppliers and universities. Several studies, moreover, identified in the customer segment the one preferred by firms to establish collaborations. The use of these collaborations is consistent across North America and Europe. Japanese companies seem more interested in collaborating with their customers.

Firms may be willing to collaborate also with competitors and complementors. By complementors we mean those organizations (or individual) which produce complementary goods, for example chargers for smartphones or lightbulb for lamps. In some industries, it happens that a firm produces a wide range of products, and in that case, it is difficult to differentiate between competitors and complementors. It can happen that a firm is not ready to collaborate with a complementor or competitor for a particular kind of product category.

In fact, Microsoft, for example, competes with Rockstar Games in many video game categories, but at the same time licenses many Rockstar games to play on its boxed models. In this case, Rockstar Games is both a competitor and a complementor for Microsoft. In cases like this, the relationships between companies and outside entities can be very complex and difficult to manage, as the company must be able to balance between its role as a competitor and as a complementor, otherwise the complementors may refuse to cooperate.

When Google bought Motorola Mobility in 2001, manufacturers of cell phones that used Google's Android operating system, such as Samsung and HTC, were watching closely to see if Google would give Motorola devices preferential access to Google software. Many analysts speculated that Samsung and HTC would develop other phones based on the operating system acquired from Microsoft. To avoid an exodus of its complementors, Google announced that Motorola would be considered a separate and autonomous entity that would not have any advantages over the other Android manufacturers. Android should remain an equal opportunity

platform where every phone manufacturer has a chance to develop the next great Android phone.

Critics maintain that firms are nowadays using even more sources of external technological innovation rather than using internal and original research. Anyway, empirical studies suggest that firms have not substitute the internal forms of research and development, in fact the external sources of knowledge and subsequent innovation, now represent only a complementary resource for a company, not a substitute.

In light of what has been previously stated, a firm preferring an internal source of research and development does not represent a good signal in the innovation environment. However, empirical studies demonstrated that the firms which have their own research and development are also the more willing to adopt external collaboration networks. In fact, doing in-house Research and Development helps the firm to build its own absorptive capacity, making the firm capable of better utilizing the information obtained from the external environment³³.

Universities and Government-Funded research

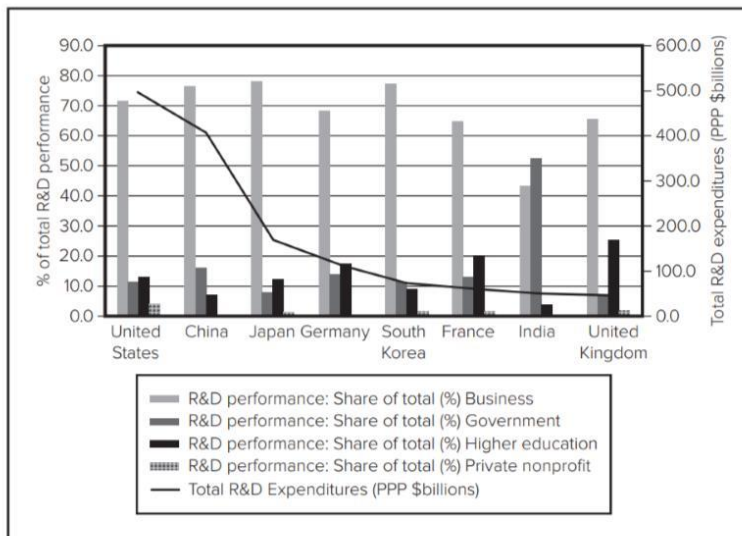
Just as we stated before in this chapter, another external form of knowledge and research comes from the linkages with public and nonprofit institutions, such as universities, government laboratories and incubators.

- Universities: for example, as shown in Figure 1.4, universities in the United States have invested \$64.6 billion in R&D, making them second only to industry in R&D activity and making the United States the country whose universities invest the most in R&D worldwide. Universities in the United Kingdom, on the other hand, contribute the most to R&D, spending \$11.9 billion, or 25.6% of the country's total R&D expenditures. Universities encourage their faculty to invest time, effort, and money in research activities. This occurs because once an innovation is developed, each university can retain sole control over the right to commercialize the innovation. If the invention is

³³ W. M. Cohen and D. A. Levinthal, "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly*, March 1990, pp. 128–52.

successfully commercialized, the university typically shares the revenue with the individual inventor or group of inventors³⁴. Now universities are becoming real actors of the commercial sector³⁵, and they are contributing significantly to the innovation process thanks to the publication of their research discoveries, results of the hard effort and relationship with other organizations and individuals.

Figure 1.4 Universities' effort in R&D activities



7. Innovation in Collaborative Networks

As analyzed in the previous section, successful innovation today is the result of collaborative research and development networks and linkages, the intangibility of which is even more widely recognized³⁶. These collaborations include entities such as joint ventures, research

³⁴ A. Silverman, "Understanding University Patent Policies," JOM 55, no. 1 (2003), p. 64

³⁵ Brady Huggett, "Reinventing Tech Transfer," Nature Biotechnology 32 (2014) pp. 1184–119

³⁶ G. Ahuja and C. M. Lampert, "Entrepreneurship in the Large Corporation: A Longitudinal Study of How Established Firms Create Breakthrough Inventions," Strategic Management Journal 22 (2001), pp. 521–43

associations, government sponsored joint research programs, informal networks, and also those networks for technical and scientific interchange³⁷.

Collaborative research is particularly important in high-technology sectors. In fact, in such sectors, it is very difficult for a firm or a single organization to succeed in the innovation process because of the scarcity of resources and knowledge which are essential for a valuable innovation implementation³⁸.

Indeed, every single firm, once it decides to take part in any collaborative network, it is able to access a wider range of resources it would never reach individually³⁹. For this reason, we can really consider these networks as the real engine of the innovation ecosystem. Moreover, the structure of the network itself can influence the actual flow of information between the individual companies and organizations in the network. For example, in a dense network where there are many potential information paths between two companies, information dissemination should be relatively fast and widespread⁴⁰.

Looking at Figure 1.5 we can see the representation of all the technology alliance network spread all around the world in 1995 and in 2000⁴¹. Figure 1.5 shows a record in alliances in the mid-1990s, because firms were scrambling to give a fast and immediate response to all the changes in the information technologies environment.

Here you can see a network which connects more than 300 organizations, mainly from North America, Japan and Europe. However, at the end of the decade, we can notice a decline in the

³⁷ C. Freeman, "Networks of Innovators: A Synthesis of Research Issues," *Research Policy* 20 (1991), pp. 499–514.

³⁸ M. A. Schilling, "Technology Shocks, Technological Collaboration, and Innovation Outcomes," *Organization Science*, 26 (2015), pp. 668–686.

³⁹ M. A. Schilling, "Technology Shocks, Technological Collaboration, and Innovation Outcomes," *Organization Science*, 26 (2015), pp. 668–686.

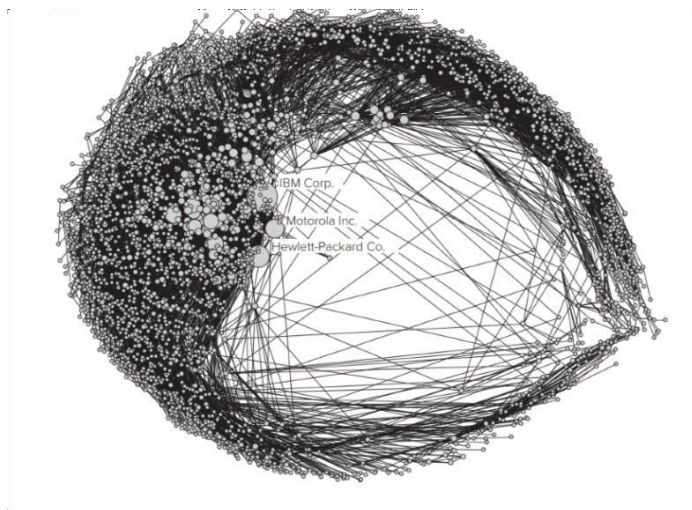
⁴⁰ M. A. Schilling, "Technology Shocks, Technological Collaboration, and Innovation Outcomes," *Organization Science*, 26 (2015), pp. 668–686.

⁴¹ This analysis is from M. A. Schilling, "Technology Shocks, Technological Collaboration, and Innovation Outcomes," *Organization Science*, 26 (2015), pp. 668–686. In accordance with norms in network research, each snapshot shows the aggregate of alliances formed in the previous three years (i.e., the 1995 snapshot aggregates alliances from 1993 to 1995; the 2000 snapshot aggregates alliances from 1998 to 2000). Only large components (those greater than 15 organizations) are shown

alliance activity, which caused not only a diminishing in size of the alliance's network, but also a division before in two large components, then in many others.

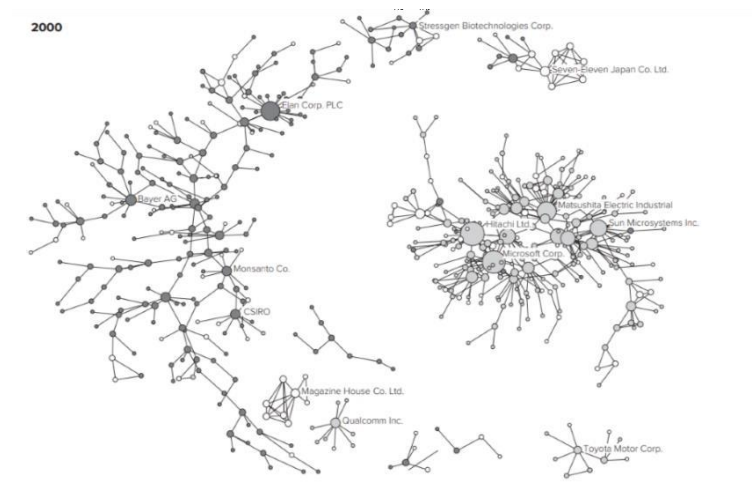
The large component that you can see on the left was mainly made of the network of all the organizations working in the medical and chemical industry, while on the right side you can see those organizations and firms working in the electronic-based industry. As it was stated before, a collaborative network is influenced by the size and the density, since they are positively correlated to the flows of informations and the speed of these ones within the network. The difference between the network for 1995 and the network for 2000 could be due to a consistent change in the transfer of information between companies.

Figure1.5 The Global Technology Collaborative Network 1995⁴²



⁴² M. A. Schilling, "Technology Shocks, Technological Collaboration, and Innovation Outcomes," *Organization Science*, 26 (2015), pp. 668–686.

Figure1.5 (continued) The Global Technology Collaborative Network 2000



7.1 Technology Cluster

The rise of a collaborative network is often favored by geographical proximity, which plays a very important role for their formation. In order to get this point, we can think about some regional cluster: the Silicon Valley's semiconductors firms, the Manhattan's multimedia cluster, or the Italian Umbria Aerospace Cluster. Clustering can be a useful activity for a city or region because it can increase employment, tax revenues, and some other benefits.

Technology clusters⁴³ can span a region as small as a city or as large as a group of neighboring countries. Clusters emerge in all those economic sectors where there are important links between the various companies that operate there, e.g. suppliers, buyers and manufacturers of complementary. Of course, one of the primary *raison d'être* of a cluster is the knowledge exchange between organizations and firms which are relatively close to each other. In fact, even if the new technologies have made communication faster and easier, being able to cooperate with entities who are physically near-by is even more appealing. Indeed, proximity

⁴³ M. E. Porter, "Location, Competition, and Economic Development: Local Clusters in a Global Economy," *Economic Development Quarterly* 14, no. 1 (2000), pp. 15–34.

and interaction can directly affect the firm's ability to share knowledge. First, the distinction between 'complex' and 'tacit' knowledge is important to understand the company's choices⁴⁴. With *complex knowledge* we mean '*knowledge that has many underlying components or many interdependencies between those components*'; with *tacit knowledge* '*the one which cannot be documented in a written form*'⁴⁵.

Companies and organizations may need to dialogue frequently in order to develop a common knowledge system and a common way of understanding. Second of all, another element influencing the firm's willingness to collaborate is the closeness and the frequency of interaction. In fact, firms who are close and interact more frequently they are more like to develop a feeling of trustworthiness: firms who interact over time develop a better knowledge of their partners, and their repeated interactions lead the to a deeper knowledge about the other party way of behaving⁴⁶.

As we just said, it is clear that proximity represents an advantage for firms' cluster, and it can foster innovation productivity. Moreover, the presence of a cluster can represent the starting point of a real re-evaluation of an area (region or city). In fact, a cluster of firms with high innovation productivity attract other investors and entrepreneurs and new start-ups and firms arise. This, of course, generates economic productivity for the area in question⁴⁷.

The increase in employment and revenue in the area helps improve infrastructure (e.g., utilities and roads), schools, and other markets that produce services and products for society.

As firms grow, changes start: internal departments can be spun off into new companies, former employees can become CEO of their own start-up or company, and suppliers and distributors enlarge their client's portfolio to service all the cluster's components.

⁴⁴ P. Almeida and B. Kogut, "Localization of Knowledge and the Mobility of Engineers in Regional Networks," *Management Science* 45 (1999), pp. 905–17

⁴⁵ U. Zander and B. Kogut, "Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test," *Organization Science* 6 (1995), pp. 76–92

⁴⁶ J. H. Dyer and K. Nobeoka, "Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case," *Strategic Management Journal* 21 (2000), pp. 345–67;

⁴⁷ T. Stuart and O. Sorenson, "The Geography of Opportunity: Spatial Heterogeneity in Founding Rates and the Performance of Biotechnology Firms," *Research Policy* 32 (2003), p. 229.

We can definitely affirm that firms who choose to locate in proximity of others, in order to favor the creation of a regional/local cluster, generate benefits known also as agglomeration economies, *'The benefits firms reap by locating in close geographical proximity to each other'*.

Of course, there are also some negative aspects of geographical proximity. Firstly, proximity to other firms operating in the same market could reduce the pricing power of the firm in its relationship with buyers and suppliers. Second, there is a black side of knowledge sharing, which is the danger of sensitive information being taken and used by competitors. Moving forward, considering an environmental point of view, clustering could cause traffic congestion, an increase in the housing costs and higher concentration of pollution⁴⁸.

One of the main reasons why technologies are often regional is that technologies are often in the hands of people, and they are often reluctant to move. Annalee Saxenian has found in her studies, for example, that engineers in Silicon Valley are more loyal to their craft than to their company, but at the same time they prefer to stay in their region, even if that means changing jobs⁴⁹. This was not only due to the specific characteristics of Silicon Valley' labor market, but also because of the changes that moving out causes in their personal lives.

Thus, if for some reason an innovative activity begins in one geographic area, the accumulated knowledge and experience may not readily spread to other geographic areas, resulting in a local accumulation of technological expertise⁵⁰.

Different studies focus on the geographic component behind innovation activities. The extent to which certain innovation activities are geographically clustered depends on various factors, such as:

- The nature of the technology relating the innovation
- The industry characteristics
- The cultural context in which the innovation arises

⁴⁸ M. A. Schilling, "Structure and Governance in Industrial Districts: Implications for Competitive Advantage," *Journal of Management Studies* 48 (2011): 772–803

⁴⁹ A. Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, MA/London: Harvard University Press, 1994)

⁵⁰ P. Almeida and B. Kogut, "Localization of Knowledge and the Mobility of Engineers in Regional Networks," *Management Science* 45 (1999), pp. 905–17.

For example, a study examined not the diffusion of determined technologies, but the spatial distribution of technology. It was observed that, if, for example, the pharmaceutical innovations were particularly clusters in the UK and France, they were also more spatially diffused in Germany and Italy⁵¹. In the same study, it was stated that the clothing manufacturing was high-clustered in Italy, but not in German, not France, either UK. The study has shown that the pharmaceutical development could have been influenced by the national systems that did not favor the access to technological expertise, while the formation of textile clusters could be the result of a cultural peculiarity of the considered country, Italy, characterized by the historical rise of industrial areas.

7.2 Technological Spillovers

Another way to explain the diffusion of knowledge across organizational and regional boundaries is the issue of technological spillovers, '*a positive externality to research and development resulting from the diffusion of knowledge across organizational or regional boundaries*'⁵². They appear when the benefit from the research activity of a company (or whatever other entity) spills over to other companies (or entities). So, we can define spillover as a positive external effect resulting from the company's R&D efforts. It is obvious that spillovers are one of the most important drivers for any innovation process.

Spill and technology cluster represent the real starting point for our discussion on the theme of Open Innovation. As we will see later in this thesis, Open Innovation is the framework by which the internal firm's boundaries are abated in order to complete knowledge sharing, which will bring to a greater and higher innovation perspective. Spillovers and Clusters are the right basis of the hugest and hottest theme research topics in the field of contemporary management, Open Innovation.

⁵¹ S. Breschi, "The Geography of Innovation: A Cross-Sector Analysis," *Regional Studies* 34, no. 3 (2000), pp. 213–29.

⁵² W. Cohen, A. Goto, A. Nagata, R. Nelson, and J. Walsh, "R&D Spillovers, Patents and the Incentives to Innovate in Japan and the United States," *Research Policy* 31 (2002), pp. 1349–67

CHAPTER TWO

THE FUZZY FRONT END OF THE OPEN INNOVATION

Summary

1. Innovation in a Dynamic and Competitive Environment 2. The Open Innovation Paradigm
2.1 The two sides of Open Innovation 3. The Outside-in Dimension: how to get Innovations from External Sources 3.1 The external Sources of Innovation 3.2 Enabling, Filtering and Integrating Innovation from External Sources 3.3 Implications for Capabilities 4. The Business Model: connecting Internal and External Sources 5. Challenges in the Open Innovation research 6. A Dynamic Capabilities Perspective

After the initial presentation of the innovation landscape, with all of its actors and its opportunities for firms to grow, we will now focus on the strategies a firm can implement in order to being competitive in the innovation landscape. In the previous chapter the concept of collaborative networks and spillover was emphasized, two concepts essential in order to understand how the flows of knowledge and resources can positively affect the company's performance. Now we will deepen down these aspects presenting the Open Innovation model and focusing on its capability to make knowledge flow in and out of the company. Hence, in this chapter, the exchange of resources and knowledge will be crucial for understanding the functioning of the Open Innovation model. A crucial point, in this section, will arrive in the last, when we will start the analysis of the Open Innovation model under the Dynamic Capability perspective. In fact, external knowledge is essential for the functioning of the model, but the firm needs to be able to manage these new resources. This is the reason why the company needs dynamic capabilities. This passage will be essential for the entire work, since we will get the first information about the correlation between dynamic capabilities and open innovation, the two elements we will later prove to be the main drivers for competitive advantage.

1. Innovation in a Dynamic and Competitive Environment

In the first chapter of this work, we emphasized the mechanism of innovation as the one that companies use in order to be competitive on the market⁵³. In fact, it was previously stated how firms always look for new paths through innovation to get even higher and better performances.

In the past decades, firms and companies used to adopt a different model for innovation: the Closed Innovation model, which focused on the internal resources of the firms rather than the external to improve the innovation process. In fact, all those firms adopting the Closed Innovation model prefer to invest their resources for the internal Research and Development activities, only relying on their internal process in order to launch new projects⁵⁴.

This means that the company itself becomes the center and place of the innovation process, the first base for the exploration and use of internal technology⁵⁵

However, phenomena like globalization, technological development and the velocity and volatility of markets, made the Closed Innovation model obsolete and not in line with the ever-changing world. For example, when talking about competition, the focus is not anymore on the competitive environment concept, but on the competitive landscape, characterized by the absence of any boundaries (which was an intrinsic characteristic of the competitive environment concept) and the dynamicity, typical element of the landscape, which is always in change compared to the environment which, on the other side, is static and stable⁵⁶. Firms can not anymore innovate on their selves, isolated from the others⁵⁷. In fact, an alternative approach

⁵³ Schumpeter, J., A. (1934). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, Harvard Business Press, Boston, MA

⁵⁴ Chesbrough, H. (2006). *Open Business Models: How to Thrive in the New Innovation Landscape*. Harvard Business School Press..

⁵⁵ Mowery, D. C., Oxley, J. E., & Silverman, B. S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, 17(S2), 77–91. <https://doi.org/10.1002/smj.4250171108>

⁵⁶ Silvio M. Brondoni. (2012). Innovation and Imitation: Corporate Strategies for Global Competition. *Symphonya. Emerging Issues in Management*, 1. <https://doi.org/10.4468/2012.1.02brondoni>

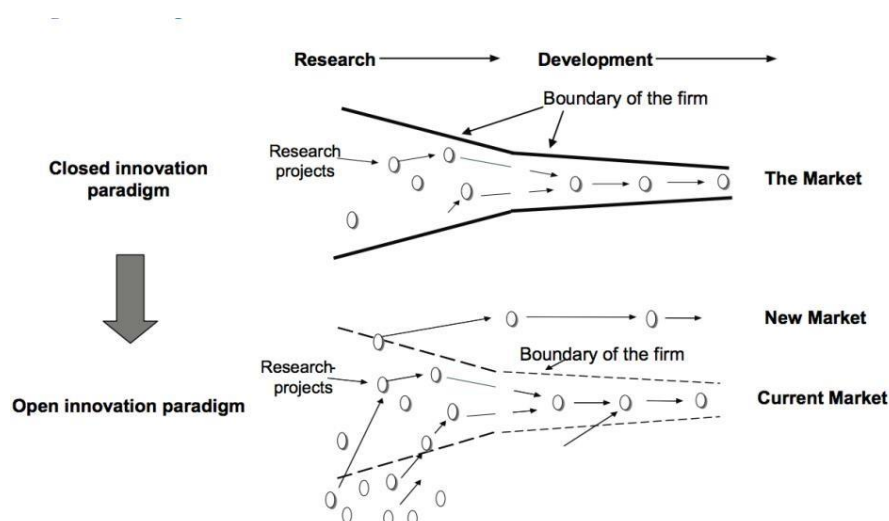
⁵⁷ Davis, J. P., & Eisenhardt, K. M. (2011). Rotating Leadership and Collaborative Innovation: Recombination Processes in Symbiotic Relationships. *Social Science Research Network*.

https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1889846_code1317119.pdf?abstractid=1889846&mirid=1&type=2

for the management of innovation, proposes firms to open their boundaries, enriching their knowledge with the external resources⁵⁸, combining internal and external knowledge in its innovation process and bringing internal inventions to market using innovative and external methods⁵⁹. In this context we can define Open Innovation "*the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the market for external use of innovation, respectively*"⁶⁰.

This concept just expressed is better explained by Figure 2.1, and, in the definition, it is clear that the process of Open Innovation both implies an *outside-in* process and an *inside-out* processes.

Figure 2.1 The Open Innovation Funnel⁶¹



⁵⁸ Chesbrough, H. (2006b). Open Business Models: How to Thrive in the New Innovation Landscape. *Harvard Business School Press*.

⁵⁹ Dahlander, & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709.

⁶⁰ Chesbrough, H. (2003). The Era of Open Innovation. *MIT Sloan Management Review*, 44(3), 35-41.

http://www.humanitarianinnovation.com/uploads/7/3/4/7/7347321/chesbrough_2003.pdf

⁶¹ Chesbrough, H. (2003). The Era of Open Innovation. *MIT Sloan Management Review*, 44(3), 35-41.

http://www.humanitarianinnovation.com/uploads/7/3/4/7/7347321/chesbrough_2003.pdf

When Henry Chesbrough put forward his own definition of open innovation in 2003, it not only became one of the most important topics in management research, but also opened up a discussion about exploring a different and perhaps more diverse definition of open innovation. In fact, many experts gave their contribution to the matter. In Table 2.1 an overview of several definitions of Open Innovation is presented.

Table 2.1 Definitions of Open Innovation

Study	Definition of Open Innovation
Chesbrough (2006) ⁶²	<p><i>“Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology”</i></p>
Gassmann and Enkel (2004) ⁶³	<p><i>“Open innovation means that the company needs to open up its solid boundaries to let valuable knowledge flow in from the outside in order to create opportunities for cooperative innovation processes with partners, customers and/or suppliers. It also includes the exploitation of ideas and IP in order to bring them to market faster than competitors can.”</i></p>

⁶² Chesbrough, H. (2006c). Open Business Models: How to Thrive in the New Innovation Landscape. *Harvard Business School Press*

⁶³ Gassmann, O., & Enkel, E. (2004). Towards a Theory of Open Innovation: Three Core Process Archetypes. *Proceedings of the R&D Management Conference*

Dittrich and Duysters (2007) ⁶⁴	“The system is referred to as open because the boundaries of the product development funnel are permeable. Some ideas from innovation projects are initiated by other parties before entering the internal funnel; other projects leave the funnel and are further developed by other parties.”
Perkmann and Walsh (2007) ⁶⁵	“The system is referred to as open because the boundaries of the product development funnel are permeable. Some ideas from innovation projects are initiated by other parties before entering the internal funnel; other projects leave the funnel and are further developed by other parties.”
West and Gallangher (2006) ⁶⁶	“We define open innovation as the systematic promotion and exploration of a broad range of internal and external sources of innovation opportunities, the deliberate integration of this exploration with the capabilities and resources of the organization, and the comprehensive exploitation of these opportunities through multiple channels.”

⁶⁴ Dittrich, K., & Duysters, G. (2007). Networking as a Means to Strategy Change: The Case of Open Innovation in Mobile Telephony. *Journal of Product Innovation Management*, 24(6), 510–521.

<https://doi.org/10.1111/j.1540-5885.2007.00268.x>

⁶⁵ Perkmann, M., & Walsh, K. (2007). University–industry relationships and open innovation: Towards a research agenda. *International Journal of Management Reviews*, 9(4), 259–280.

<https://doi.org/10.1111/j.1468-2370.2007.00225.x>

⁶⁶ West, J., & Gallagher, S. (2006). Challenges of open innovation: the paradox of firm investment in open-source software. *R and D Management*, 36(3), 319–331. <https://doi.org/10.1111/j.1467-9310.2006.00436.x>

Companies incorporating external sources of knowledge into their innovation process is certainly not an entirely new concept. Indeed, innovation can be viewed as a continuum between closed and open forms of innovation in fact, we can find different views and studies focusing on different degrees of openness. For instance, previous studies concentrated for example on firms using strategic alliances⁶⁷, the co-creation process carried out by both firms and users⁶⁸, and also, the rise of intermediate markets⁶⁹. While in the past such theories presented external knowledge as an alternative way for the company to grow in its innovation process, the distinctive element of the Open Innovation model is that external knowledge is no longer seen as an additional tool, but as a tool to gain an equal role in the innovation process of a company⁷⁰. This is the reason why Open Innovation should not be seen as the opposite of the closed innovation model, but must be placed on a continuum from closed to open, passing through different levels of openness⁷¹.

While Closed Innovation model focuses on the protection of the internal knowledge, firms adopting the Open Innovation model are characterized by a diffused mentality based on the "*outside-in*" and "*inside-out*" way of thinking, which enables them to grow on external sources of innovation and commercialization⁷².

The new paradigm involves all of the external actors to participate in the innovation process: customers, suppliers, universities, competitors, individuals, inventors and start-ups. They all participate to the innovation process following different flexible ways such as collaborative agreements, crowdsourcing, co-creation, external corporate venturing, all of those ways which transcend the traditional notion of innovation alliances.

⁶⁷ Mowery, D. C., Oxley, J. E., & Silverman, B. S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, 17, 77–91

⁶⁸ Bogers, M., Afuah, A., & Bastian, B. (2010). Users as innovators: A review, critique and future research directions. *Journal of Management*. 36 (4), 857-875

⁶⁹ Arora, A., Fosfuri, A. & Gambardella, A., (2001). *Markets for Technology: The Economics of Innovation and Corporate Strategy*. MIT Press, Cambridge, MA.

⁷⁰ Chesbrough H. (2006b). The open innovation model: Implications for innovation in Japan, in Whittaker D. H., Cole, R. E. (Eds.), *Recovering from Success: Innovation and Technology Management in Japan*, Oxford: Oxford University Press

⁷¹ Dahlander, L., & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709

⁷² Chesbrough, H., (2003). The era of open innovation, *MIT Sloan Management Review* 44 (3) 35-41.

In the past year, technical and scientific knowledge were only considered a firm's resource, while nowadays a huge number of external parties can access these resources such as the technical and scientific knowledge, which can be flexibly recombined over time⁷³. Similarly, internal knowledge and technology are increasingly being marketed via external routes to market.⁷⁴ Therefore, businesses have shifted to the upper end of the continuum between closed and open. The result, of course, is a shift in the locus of innovation, as open forms of innovation increasingly displace the more traditional intra-firm innovation.

Firms are even more willing to acquire new innovation sources from the external boundaries of the company, then develop them on the inside, producing even more competitive innovations and imitations. These innovations and imitations are thus the result of a corporate policy geared to competition (market-oriented management) with the common goal of a very short-term increase in performance⁷⁵.

In the following, the most important differences between the two innovation models, the closed and the open model, with their different beliefs and attitudes towards innovation are presented.

Table 2.2 Close vs Open Innovation ⁷⁶

Closed Innovation	Open Innovation
<i>'The smart people in our field work for our company'.</i>	<i>'Not all smart people work for us. We need to work with smart people inside and outside the company'</i>

⁷³ Keupp, M. M., & Gassmann, O. (2009). Determinants and archetype users of open innovation. *R&D Management*, 39(4), 331–341. <https://doi.org/10.1111/j.1467-9310.2009.00563.x>

⁷⁴ Gassmann, O., & Enkel, E. (2004b). Towards a Theory of Open Innovation: Three Core Process Archetypes. *Proceedings of the R&D Management Conference*

⁷⁵ Brondoni, S., M. (2012). Innovation and Imitation: Corporate Strategies for Global Competition. *Symphonya. Emerging Issues in Management*, n. 1, 10-24

⁷⁶ Chesbrough, H. W. (2006). *Open Innovation: The New Imperative for Creating and Profiting from Technology* (First Trade Paper). Harvard Business Review Press.

<i>'To profit from R&D we must discover it, develop it and ship it ourselves.'</i>	<i>'External R&D can create significant value, internal R&D is needed to claim some portion of that value'</i>
<i>'If we discover it ourselves, we will get it to market first'</i>	<i>'We don't have to originate the research to profit from it'</i>
<i>'The company that gets innovation to the market first will win.'</i>	<i>'Building a better business model is more important than getting to the market first'</i>
<i>'If we create the most and the best ideas we will win'</i>	<i>'If we make the best use of internal and external ideas we will win'</i>
<i>'We should control our IP so that our competitors cannot profit from it'</i>	<i>'We should profit from other's use of our IP (license out) and we should license other's IP whenever it advances our business model'</i>

Studies focused on the several factors deemed crucial for a firm to open its boundaries in order to improve its innovation process. For example, there can be found some studies on the factors which operated before the appearance of the open innovation model, such as the scarcity of the internal resource⁷⁷. Moreover, there are not much empirical research investigating the correlation between the adoption of the Open Innovation model and the rise in Research and Development and innovations results⁷⁸.

In particular, a still open question regards not only the way antecedents lead to the developing of the OI model, but more precisely the way companies create and capture value from open innovation. This is the reason why some questions about open innovation arise naturally:

- How can companies develop strategies that enable them to benefit from the open innovation approach?
- Which is the mechanism implemented supporting this new model?

⁷⁷ Gassmann, O., & Enkel, E. (2004c). Towards a Theory of Open Innovation: Three Core Process Archetypes. *Proceedings of the R&D Management Conference*.

⁷⁸ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150

- How many resources are necessary supporting those mechanisms?

For sure, one of the approaches identified as the best for developing a better understanding of this phenomenon is the '*capability perspective*' one. This perspective explains the organizational capabilities and processes that companies must develop to create a valuable innovation process. These capabilities require a combination of resources both inside and outside the organization's boundaries, and they are likely to be different for the traditional ones found in the R&D settings⁷⁹.

This approach explains the way in which firms adopt Open Innovation strategies, and which are the capabilities required in order to adopt those strategies. A crucial question regards how these capabilities represent a competitive advantage in the open environment, where innovation is increasingly distributed and cannot be constrained any more into the firm's boundaries.

For this reason, Open Innovation is considered the result of incorporating external ideas, knowledge and technologies, with the main objective of accelerating the internal innovation processes⁸⁰.

In the following paragraph, indeed, the attention will be on the firm's process perspective regarding the Open Innovation model⁸¹, and it will outline the emerging literature on open innovation with particular attention to the '*outside-in*' aspects. There are for sure some gaps in the existing literature, in particular, regarding the ways in which firms are adapting their organizational structures to the practice of external resources acquisition.

2. The Open Innovation Paradigm

By open innovation, we mean distributed sources of knowledge for innovations in the economy. Since Henry Chesbrough inaugurated this term in 2003, it acquired popularity among

⁷⁹ Dahlander, L., & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709

⁸⁰ Chesbrough, H., (2003). *Open Innovation*. Harvard University Press, Cambridge, MA.

⁸¹ *R&D Management*, 36, 3, 223–226. Gassmann, O., Enkel, E. (2004). Towards a theory of open innovation: three core process archetypes. *Proceedings of The R&D Management Conference*, Lisbon, Portugal, July 6–9

the economic and managerial landscape, as that phenomenon for which companies acquire from the outside environment ideas and knowledge.

In *'The Era of Open Innovation'*, Chesbrough described all the erosion factors which led the Closed Innovation model of the R&D to a fall, opening the doors for the new Open Innovation model. These factors are:

- *The growing mobility of skilled professionals.* The labor market is becoming increasingly dynamic, and skilled workers are no longer tied to a single company or region, but are changing roles and positions more and more frequently⁸². It is clear that, with staff moving, for a firm it is difficult maintaining in-house the knowledge developed, but, on the other hand, knowledge spread out outside of the firm's boundaries.
- *The rise of venture capital funding, incentive the development of new start-ups.* This also had the effect of restructuring industries, intensifying competition, and shifts in market share. All of these new companies played an important role in innovation, entering the market with highly innovative and sometimes disruptive products⁸³.
- *Globalization* of the market also pushed hard for the intensification of competition, as firms, in fact, started to compete not only locally but on a global scale⁸⁴.
- *The need of better specialization*⁸⁵. Indeed, as the complexity of technologies increases, companies must specialize in a narrow area to develop specific skills and competencies. This means that firms should avoid focusing on a wider competencies' portfolio, but they have to insist on a smaller area if they want to keep focus and efficiency.

⁸² Chesbrough, H., (2003). The era of open innovation, MIT Sloan Management Review 44 (3) 35-41

⁸³ Christensen, C. (1997). The Innovator's Dilemma. Cambridge, MA: Harvard Business School Press

⁸⁴ Brondoni, S., M. (2012). Innovation and Imitation: Corporate Strategies for Global Competition. Symphonya. Emerging Issues in Management (symphonya.unimib.it), n. 1, 10-24

⁸⁵ Gassmann, O., Enkel, E., Chesbrough, H. (2010). The future of open innovation. 107 R&D Management, 40(3), 213–221

- *The rise of the Internet*, which has fostered the dissemination of knowledge and the sharing of skills from previously company-specific internal ICT networks to the World Wide Web⁸⁶.

An important definition of Open Innovation focuses on this as a model which emphasizes '*purposive inflows and outflows of knowledge across the boundary of the firm*'. This definition goes back to the relevant economic studies on spillovers resulting from the company's investment in research and development.

Of course, because companies do not know the exact results of investments in advance, research and development lead to results that cannot be predicted in advance. These results are beyond the investing company's ability to profit from them, hence the term "*spillover*"⁸⁷.

However, the literature did not always consider spillover as a positive outcome, but they are considered as a cost for the firm, and they are considered not to be really manageable.

While in the Open Innovation framework, spillovers are considered an additional form of knowledge. Whereas in previous literature they were still regarded as uncontrollable external effects, in the open innovation model they are transformed into knowledge inflows and outflows "*that can be controlled in a targeted manner*". Firms need to develop specific mechanisms in order to better manage these inflows and outflows of ignorations: they generate a process which inhales inflows ideas and exhale outflows ideas, utilizing knowledge spillovers in the surrounding environment. In this way, what was not manageable before, can now be perfectly managed in the open innovation model⁸⁸.

Now we have the elements to formulate another more accurate definition of open innovation. Following the more recent conceptualization of the phenomenon, open innovation can be defined as "*a distributed innovation process based on purposefully managed knowledge flows*

⁸⁶ Chesbrough H., & Bogers, M. (2014). Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation, in Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New frontiers of Open Innovation*, Oxford: Oxford University Press

⁸⁷ Griliches, Z. (1992). The Search for R&D Spillovers, *Scandinavian Journal of Economics*, 94, 29-47

⁸⁸ Chesbrough H., & Bogers, M. (2014). Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation, in Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New frontiers of Open Innovation*, Oxford: Oxford University Press

*across organizational boundaries, using monetary and non-monetary mechanisms according to the organization's business model*⁸⁹.

In this definition we can make a distinction between the concept of innovation and openness. Innovation refers to any development or improvement of products, processes and services. Openness refers to the way in which knowledge flows in and out of the permeable organizational boundary.

In order to adopt efficiently the open innovation model, every company needs to adapt to the changes its business model, as it not only described the value creation system of the company, but also how it is captures by the involved organizations⁹⁰

2.1 The two side of Open Innovation

There are many ways to categorize developments in open innovation, taking into account different points of view, such as schools of thought, actors, or processes⁹¹. From a firm's point of view, two types of knowledge flows are identified. As mentioned in the previous paragraph, we speak of *outside-in flows* (or inbound flows) and *inside-out flows* (or outbound flows). It is well known⁹², that large companies prefer inbound processes, and researchers tried to conduct empirical measurements of the impact of these flows on the firm's performance. For example, West and Bogers⁹³, in a review of 165 articles about Open Innovation, found 118 articles focusing on the outside-in open innovation, while only 50 on the inside-out open innovation processes.

⁸⁹ Chesbrough H., & Bogers, M. (2014). Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation, in Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New frontiers of Open Innovation*, Oxford: Oxford University Press

⁹⁰ Chesbrough, H., Rosenbloom, R.S., (2002). The role of the business model incapturing value from innovation: Evidence from Xerox Corporation's technologyspin-off companies, *Industrial and Corporate Change*, 11(3) 529-555.

⁹¹ Chesbrough, H., & Schwartz, K. (2007). Innovating business models with codevelopment partnerships. *Research-Technology Management*, 50(1), 55–59.

⁹² Bianchi M, Cavaliere A, Chiaroni D, Chiesa V, Frattini F. (2011). Organisational Modes for Open Innovation in the Bio-Pharmaceutical Industry: An Exploratory Analysis. *Technovation*, 31(1), 22-33

⁹³ West, J., Bogers, M. (2014). Leveraging External Sources of Innovation: A Review of Research on Open Innovation. *Journal of Product Innovation Management*, 31 (4), 814-831

It is because, even in an environment inspired by openness, the company has one goal: being profitable. The "outside-in" process enriches the company's knowledge base by integrating other forms of knowledge that come from suppliers, customers, and external knowledge sources. As part of this process, there is a growing awareness of the importance of innovation networks⁹⁴, in - licensing IP, university research programs, new forms of customer integration⁹⁵. While the company's business model establishes a kind of external knowledge that is internalized within the company's boundaries.

On the other hand, the inside-out process requires that the ideas and knowledge of the company flow out of the company boundaries and can be used by others in their business models⁹⁶. Companies that use the inside-out process focus on externalizing their knowledge and enriching the external market. Firms actively participate in the external market through royalties, joint ventures, spin-offs, and c.

The Outside-In and Inside-Out approaches can be classified in two classes: pecuniary and non-pecuniary. As you can see in the Table2.3 the Outside-In innovation can be differentiated in Acquiring and Sourcing, while the Inside-Out can be classified in Selling and Revealing

Table 2.3 Different forms of Openness⁹⁷

	Outside-In	Inside-Out
Pecuniary	Acquiring	Selling
Non-Pecuniary	Sourcing	Revealing

Now we will deep down each of these forms of openness:

- When talking about '*revealing*' we mean the exhibition of internal resources to the external market, without immediate financial rewards. It must be kept in mind that

⁹⁴ Dittrich K, & Duysters G. (2007). Networking as a Means to Strategy Change: The Case of Open Innovation in Mobile Telephony, *Journal of Product Innovation Management*, 24(6), 510-521

⁹⁵ Piller, F., & Ihl, C. (2009). Open innovation with customers. Foundations, Competences and International Trends. Trend Study within the BMBF Project—International Monitoring||. RWTH Aachen University

⁹⁶ Arora, A. & Gambardella, A. (2010). Ideas for rent: an overview of markets for technology. *Industrial and Corporate Change* 19, 775–803

⁹⁷ Dahlander, L., & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709.

openness, deriving from both voluntarily or non-voluntarily spreading of information and knowledge, does not imply a firm not to be successful⁹⁸. The company works out strategies to show that it will select the exact technologies it presents to the market to achieve collaboration, but without contractually guaranteeing that it will happen. Obviously, a firm could find some disadvantages in revealing its internal resources. A clear disadvantage is, of course, the difficulty in capturing benefits from accrue⁹⁹.

- '*Selling*' refers to how the activity of commercialization and go-to-market is carried out by the firm. With the selling of the licensing-out the firm can leverage their investment in Research and development, establishing partnerships with actors adept to bring inventions to the market¹⁰⁰. Licensing-out the firm's invention is becoming such a common practice: in fact, some companies made the licensing-out even a strategic priority¹⁰¹. In this case, there are also some obstacles for companies in licensing. One of these obstacles is based on the so-called '*Arrow's disclosure paradox*'¹⁰². The paradox is built around the concept of risk. In fact, the inventor assumes a risk when giving the specifics of the inventions to the potential licensee. The risk is about the stealing, in an opportunistic way, of the licensee of the original idea. Arrow argued that this problem causes a real market failure, because companies are not willing to accept this risk degree, and they are reluctant to share their ideas and knowledge. In order to avoid and overcome the '*Arrow's disclosure paradox*', firms require inventors to own intellectual property rights before they start any kind of collaborations. These problems immediately make us think about one of the major problems that openness involves: appropriability.

⁹⁸ Henkel, J., (2006). Selective revealing in open innovation processes: the case of embedded Linux. *Research Policy* 35 (7), 953–969

⁹⁹ Helfat, C., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., Winter, S. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Malden M.A: Blackwell.

¹⁰⁰ Chesbrough, H., (2006). *Open Business Models: How to Thrive in the New Innovation Landscape*. Harvard Business School Press, Boston

¹⁰¹ Gassmann, O., Enkel, E. (2004). Towards a theory of open innovation: three core process archetypes. *Proceedings of The R&D Management Conference, Lisbon, Portugal, July 6–9*.

¹⁰² Arrow, K., (1962). Economic welfare and the allocation of resources of invention, in Nelson, R. (Ed.), *The Rate and Direction of Inventive Activity: Economic and Social Factors*. National Bureau of Economic Research. Princeton University Press, Princeton, 609–625.

- 'Sourcing' is a type of openness that refers to how companies can leverage external sources of innovation. Henry Chesbrough¹⁰³ argued that firms, before starting any R&D activity, scan the resources on the external environment. As Lauren and Salter¹⁰⁴ "*openness can be seen in terms of the number of different sources of external knowledge that each firm draws upon in its innovative activities*". For the authors, the greater the number of external ideas and knowledge, the more open the corporate strategy. Academic literature often points out that innovation is primarily about leveraging the discoveries of others. It is a vicious circle, in which synergies created by the interaction of individual companies with all the other entities of the market, are the results of a continuous exchange of relevant information with the external environment, which leads to a general external development¹⁰⁵.
- Finally, '*acquiring*' refers to '*obtaining input for the innovation process through the market*'. In this sense, openness can be considered as the activity of companies in licensing and acquiring expertise from the external environment. Although acquiring external input, such as ideas and technologies, can be beneficial for the firm, this choice needs to be evaluated by expertise. Another point concerns the similarity of knowledge bases and the way they facilitate the integration of ideas from distant domains, as common languages, shared norms, and cognitive configurations make communication possible¹⁰⁶

3. The Outside-in Dimension: how the firm obtain innovation from the outside

Obtaining innovation from external sources requires two steps: first, companies must select the external sources of innovation; second, they must integrate them into the company. In terms of

¹⁰³ Chesbrough H. (2006b). The open innovation model: Implications for innovation in Japan, in Whittaker D. H., Cole, R. E. (Eds.), *Recovering from Success: Innovation and Technology Management in Japan*, Oxford: Oxford University Press

¹⁰⁴ Laursen, K. and A. Salter (2004). Searching high and low: what types of firms use universities as a source of innovation? *Research Policy* 33 (2004) 1201–1215.

¹⁰⁵ Dahlander, L., & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709

¹⁰⁶ Cohen, W. M. & Levinthal, D.A. (1990). Absorptive capacity: a new perspective of learning and innovation. *Administrative Science Quarterly* 35, 128–152

empirical studies, firms who originally focused on the acquisition of external resources they were the high-tech industries: after some studies firms in low-tech industries were conducted¹⁰⁷, and finally, also the medium enterprises attracted the academic research regarding their external resources acquisition¹⁰⁸.

3.1 Searching for External Sources of Innovation

As was just mentioned, the first step for obtaining innovation from the outside environment consists in the identification and the sourcing of such innovations. Researchers have examined the general role of external sources of innovation as a means of expanding or supplementing a company's internal knowledge base¹⁰⁹ There can be identified three main pillars in the external sources research:

- Sourcing from external stakeholders
- Facilitating external searches
- Limits to search

Now we will deep down these three pillars, understanding their correlation with the external knowledge source.

Sourcing from external stakeholders. One way to identify and seek external forms of knowledge and innovation is to collaborate with various external actors or specialists with specific knowledge. External knowledge can be acquired from different stakeholders, such as suppliers, customers, competitors or universities.

Facilitating external searches. While many studies assume that innovations come about via a direct and costless process¹¹⁰, some research has identified specific ways a company can seek

¹⁰⁷ Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&D Management*, 36(3), 229–236.

¹⁰⁸ Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs: An intermediated network model, *Research Policy*, 39(2), 290–300.

¹⁰⁹ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150

¹¹⁰ Dahlander, L., & Gann, D.M. (2010). How open is innovation?. *Research Policy*, 39(6), 699-709

innovation from external sources, such as through technology scouts or intermediaries¹¹¹. There are several factors that really lower the cost of seeking innovation from the external environment. One of these factors is certainly the growing communication capability and speed fostered by the proliferation of the Internet, which plays an important role in the search for external sources of innovation by facilitating technology intelligence, online communities, and crowdsourcing.

Limits to search. Obtaining knowledge and technologies from the external environment is sure to be beneficial for the firm. However, there can be significant costs involved as well. In fact, as Laursen and Salter¹¹² noticed, many firms which invest in searching for external sources, then have decreasing returns in terms of innovation performance.

Moreover, another problem related to external searching is identified in the costs of communication and control¹¹³.

3.2 Enabling, Filtering and Integrating Innovation from External Sources

Research has identified two key mechanisms by which companies are willing to invest in creating innovation outside of their corporate walls. The first mechanism is to encourage external innovators through effective incentives, which can be both monetary and non-monetary¹¹⁴. The second mechanism is to develop formal tools and processes that provide a platform for stakeholders to generate and share innovations. If taken these two mechanisms together, we can imagine a real working engine in the external innovation process¹¹⁵.

Another challenge for companies which rely on the external sourcing of knowledge and technologies, is how to identify and choose the most valuable innovation project. This decision

¹¹¹ Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs: An intermediated network model, *Research Policy*, 39(2), 290–300

¹¹² Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150

¹¹³ Stuermer, M., S. Spaeth, and G. von Krogh. 2009. Extending private- collective innovation: A case study. *R&D Management* 39 (2): 170–91.

¹¹⁴ West, J., Gallagher, S., (2006). Challenges of open innovation: The paradox of firm investment in open-source software. *R&D Management*, 36 (3), 319–31

¹¹⁵ Piller, F.T. & Walcher, D. (2006). Toolkits for idea competitions: a novel method to integrate users in new product development. *R&D Management*, 36, 3, 307–318

could be made within the company, by an intermediary, or even by a community of external people contributing to the project.

Anyway, identifying and procuring innovations from external sources is only the first step. In fact, the firm profits from the acquisition of external sources of innovation, only when it can fully integrate this innovation in its R&D activities. Full integration is only possible when the firm is able to overcome the so-called '*not invented here*' syndrome¹¹⁶.

In this case, organizational culture plays a very important role, and from this culture derives the willingness of all the company to better use the sources that come from the outside. As mentioned earlier, the first organizational cultural barrier to the company's successful use of external sources of innovation is the attitude that innovations were not invented here¹¹⁷. Successfully leveraging innovation from external sources and collaborating with external partners often requires cultural change, especially for organizations with a high level of internal innovation¹¹⁸. Such changes can be used to shift the focus from 'not invented here' to a view that sees the external environment as the company's technology base.

3.3 Implications for Capabilities

Sourcing from the outside of the firm could have an effect on the R&D competence of the firm, affecting it both directly and indirectly. If we consider the direct effect of the external sourcing, the resources allocated for the external source could reduce the sources for the internal capabilities' development¹¹⁹.

¹¹⁶ Chesbrough, H., (2006). *Open Business Models: How to Thrive in the New Innovation Landscape*. Harvard Business School Press, Boston

¹¹⁷ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150

¹¹⁸ Dodgson, M., Gann, D., & Salter, A. (2006). The role of technology in the shift towards open innovation: the case of Procter & Gamble. *R&D Management*,36(3), 333-346

¹¹⁹ Ceccagnoli, M., S. J. H. Graham, M. J. Higgins, and J. Lee. (2010). Pro- ductivity and the role of complementary assets in firms' demand for technology innovations. *Industrial and Corporate Change*, 19 (3), 839– 69

If we consider the indirect effect, Christensen argued that in the age of open innovation, deep technological capabilities will play less of a role in business success; instead, companies will need integrative capabilities to incorporate externally sourced innovation and manage relationships with diverse partners¹²⁰. Also, Cohen and Levinthal¹²¹ studied the effect of the internal R&D capabilities on the adoption of external sources. Some studies argue that higher internal absorptive capacity helps firms capitalize on external sources of innovation. These hypotheses fall into two categories: the first concerns firms with high absorptive capacity that are more likely to capitalize on innovations from external sources, and the second concerns firms that are more successful at doing so.

There is some disagreement about how absorptive capacity affects collaboration: some researchers claim that absorptive capacity reduces their need to collaborate¹²², which others are convinced that the absorptive capacity is one of the reasons why the firm looks for collaborations. Absorptive capacity, however, reinforces the benefits of external innovation sourcing for both innovation capability and financial performance. Namely, it favours the absorption of external sources of knowledge and consequently the commercialization of these sources¹²³.

5. The Business Model: Connecting Internal and External Innovation

The literature shows that due to the growing number of companies adopting the open innovation model, the role of the business model and its need to change and evolve has been highlighted. When talking of business model, we mean '*a framework which links ideas and technologies to valuable economic outputs*'. At the core of every business model, we can find

¹²⁰ Christensen, J.F. (2006). Wither core competency for the large corporation in an open innovation world? In Chesbrough, H.W., Vanhaverbeke, W. and West, J. (eds), *Open Innovation: Researching a New Paradigm* (35-61), Oxford University Press,

¹²¹ Cohen, W. M. & Levinthal, D.A. (1990). Absorptive capacity: a new perspective of learning and innovation. *Administrative Science Quarterly* 35, 128–152

¹²² Barge-Gil, A. (2010). Cooperation-based innovators and peripheral cooperators: An empirical analysis of their characteristics and behaviour. *Technovation* 30(3), 195-206.

¹²³ Lichtenthaler, U., Lichtenthaler, E. (2009). A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity. *Journal of Management Studies*, 46(8), 1315–1338

two key functions: creating value, and capturing a portion of that value¹²⁴. Value creation means, for example, defining a set of activities to create a new product or service that is valued by a group of customers¹²⁵. Creating value refers to companies acquiring a unique resource, asset, or position within those activities where they have a competitive advantage.

Business models are dynamic and need to be adopted to changes in the market, technologies and legal structures¹²⁶. Besides these exogenous factors, business models must also take into account some endogenous factors. The adoption of Open Innovation is one of them. The paradigm of Open Innovation led companies to rethink their business model, which needs to adapt and evolve. A company's permeability is a choice in its business model¹²⁷ and a strategy related issue¹²⁸.

Even if in the definition of Open Innovation there is no mention specifically to the idea of business model, Chesbrough affirms: "*In open innovation, internal and external ideas are combined into architectures and systems whose requirements are defined by a business model. In order to create value, the business model uses both external and internal ideas, while also defining internal mechanisms for claiming some portion of that value.*". The value of a new idea or technology depends on the business model of the company, and we cannot think about open innovation without considering business model innovation. The value of a new idea, technology, or process is determined not by the product itself, but by how it is reached, i.e. the business model used to bring it to market. Chesbrough insists on this point claiming that: "*A mediocre technology pursued within a great business model might be more valuable than a great technology developed within a mediocre business model; business models need to change and, if necessary, to be substituted through extensive experiments*"¹²⁷

¹²⁴ Teece, D. J. (2010). Business Models, Business Strategy and Innovation. Long Range Planning, 43(2-3), 172–194

¹²⁵ Chesbrough, H.W., Vanhaverbeke, W. & West, J. (eds), Open Innovation: Researching a New Paradigm, Oxford University Press, Oxford

¹²⁶ Teece, D. J. (2010). Business Models, Business Strategy and Innovation. Long Range Planning, 43(2-3), 172–194

¹²⁷ Chesbrough, H., (2010). Business Model Innovation: Opportunities and Barriers, Long Range Planning, 43 (2/3) 354-363

As postulated by the open innovation paradigm, openness is associated with an open business model for a firm's R&D activities¹²⁸. Chesbrough argues that *“To get the most out of this new system of innovation, companies must open their business models by actively searching for and exploiting outside ideas and by allowing unused internal technologies to flow to the outside, where other firms can unlock their latent economic potential”*¹²⁹.

Following the reasoning of the author, the concept of business model grows around R&D, and it ensures the company the value creation thanks to the implementation of the open model of innovation.

Open Business Models represent a powerful instrument for the organizational model of the company. In fact, they can reduce the costs and time for innovation, improving in this way, the company's financial performance. In fact, first they allow the company to generate more revenue, second the monetize technologies thanks to the licensing agreements¹³⁰. It is the way open business models are linked to the innovation activities and the external flows of information of the company. In fact, an open business model has the power to enhance internal and external flows of information, knowledge and technologies; in this way it enables the company when it comes to capture and create value¹³¹.

6. Challenges in the Open Innovation Research

After the previous introduction of the paradigm of Open Innovation and its main concept, we will now go through the challenges in the Open Innovation research. Recently, empirical evidence and different case studies focused on the Open Innovation phenomenon, reveal that there are still some themes and topics related to the OI paradigm still not properly addressed.

¹²⁸ Chesbrough, H., & Schwartz, K. (2007). Innovating business models with codevelopment partnerships. *Research-Technology Management*, 50(1), 55–59.

¹²⁹ Chesbrough, H., (2007). Why Companies Should Have Open Business Models. *MIT Sloan Management Review*, 48(2), 22–28.

¹³⁰ Chesbrough, H.W., Vanhaverbeke, W. & West, J. (eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford

¹³¹ Chesbrough, H., (2007). Why Companies Should Have Open Business Models. *MIT Sloan Management Review*, 48(2), 22–28

A first literature stream reveals that firms across different industries are gradually opening their boundaries enlarging their innovation process¹³²; however, on the other side, there are some contingency factors, such as internal impediments to innovation, and industry characteristics, that still influence the firm's decisions toward the openness.

For example, it was studied that the paradigm of Open Innovation is more diffused in the high-tech manufacturing sectors, while there is still reluctance in the financial services and loch-tech manufacturing industry.

Differences in the degree of openness of companies indicate that they need to make strategic decisions about the extent to which they open up their business model and adopt different practices of open innovations¹³³. The degree of openness of a company can be determined by two different aspects: 1) the breadth of openness, which indicates the extent to which companies access different external sources of knowledge, 2) the depth of openness, which refers to how deeply each company accesses and draws from these external sources¹³⁴. The combination of these two dimensions results in the overall effort that each company employs in opening its organizational boundaries in order to access external knowledge, essential for the innovation process¹³⁵. Few studies focus on the performance outcomes deriving from the adoption of the open innovation framework.

For example, it has been shown that large networks of partnerships can be very beneficial for the development of a company's innovation process¹³⁶; but empirical studies also show that the breadth and depth of a company's external search strategies are not linearly related to innovation performance¹³⁷.

Moreover, several case studies in the management field underlined the distinction between those firms being successful in the implementation of the open innovation, and others less

¹³² Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&D Management*, 36(3), 229–236

¹³³ Drechsler, W., & Natter, M. (2012). Understanding a firm's openness decisions in innovation. *Journal of Business Research*, 65(3), 438-445.

¹³⁴ Drechsler, W., & Natter, M. (2012). Understanding a firm's openness decisions in innovation. *Journal of Business Research*, 65(3), 438-445.

¹³⁵ Garriga, H., G. von Krogh, S. Spaeth. 2013. How constraints and knowledge impact open innovation. *Strategic Management Journal* 34 (9): 1134–44

successful in being profitable after the adoption of open innovation strategies¹³⁶. There are more reasons why these differences arise.

One reason can be identified in the extreme necessity of expertise for the evaluation of the external resources to adopt for innovation. In fact, firms, sometimes, engage in the so called '*over-search*', managing too many external relations that are no more relevant in the organizational context¹³⁷. For this reason, looking for strategies and the identification of the necessary and more valuable external knowledge represents a great challenge in the Open Innovation process.

Moreover, if, as we just mentioned, the identification per se of external knowledge does not necessarily mean that the firm is able to integrate it in its existing innovation process. This matter opens a new challenge for firms: the working integration of external knowledge and technologies in the actual existing innovation processes¹³⁸.

In order to achieve this result, firms need to overcome the difficulties encountered between the decision on which external sources to acquire and their implementation and combination in their innovation process. Summing up, it can be affirmed that a functional adoption of the open innovation model is directly correlated to the ability of the firm to identify and integrate the external knowledge sources.

Actually, an explanation about the ways firms react to this challenge is missing. In fact, there is a knowledge gap regarding how businesses may recognize worthwhile open innovation prospects and how they integrate the open innovation idea into fruitful innovation results. In particular, we have little knowledge of the way firms enable the external sources to flow into the firm's boundaries facilitating and innovating its business model. Moreover, if resources are open and available to any incumbent, an open question is '*how can a single company differentiate gaining competitive advantages over competitors?*'. In this case, capabilities developed by the firm play a central role, in particular the dynamic capabilities. The dynamic

¹³⁶ Chesbrough, H., (2003). The era of open innovation, MIT Sloan Management Review 44 (3) 35-41

¹³⁷ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. Strategic Management Journal 27, 131–150

¹³⁸ Lichtenthaler, U., Lichtenthaler, E. (2009). A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity. Journal of Management Studies, 46(8), 1315–1338

capability's view can help understand the paths a firm might take to success in the transfer and changes in capabilities because open innovation is about the transfer of resources translating in an acceleration of capability development.

The Dynamic Capabilities view, indeed, refers to the ability of the firm to adapt rapidly to any change in the environment¹³⁹. In dynamic and ever-changing markets, dynamic capabilities allow the firm to access, transfer, combine and integrate external resources, making the firm able to competitively perform its innovation process.

7. The Dynamic capabilities in Open Innovation Model

As it as just explained in the previous paragraph, Dynamic Capabilities are those developed by a firm, which make it possible for the firm to adapt the environment's dynamics and its changes, making the firm to be even more competitive on the market.

As the theoretical basis for open innovation, dynamic capabilities are now the subject of certain literature that will be reviewed.

The Dynamic Capabilities view (DCV) aims to address the ongoing goal of adding, shedding, renewing, and reconfiguring resources and capabilities in an environment that is continually changing at an accelerated rate¹⁴⁰, and they are built on two different views, the Resource-Based view (RBV) and the Knowledge-Based view (KBV). According to the Resource-Based view, the firm can develop as many resources and capabilities as they prefer¹⁴¹. Resources are firm-specific assets, while the capabilities are the ones used by the firm to utilize those resources on a daily basis¹⁴².

¹³⁹ Teece, D.J., Pisano, G.P. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal* 18, 509–533.

¹⁴⁰ Teece, D.J., Pisano, G.P. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal* 18, 509–533

¹⁴¹ Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1) 99–120

¹⁴² Amit, R. & Schoemaker, P.J.H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14, 33-46.

While, according to the Knowledge-Based view, the firm is considered as an institution for the acquisition and integration of knowledge, which is, in this view, the most important asset that the firm can have. Because of this, it is possible to consider the Knowledge-Based view to be the most crucial component of the Resource-Based view. Integration of external knowledge can also be seen as the core of OI, given the strategic importance of knowledge resources in the innovation process.

Starting from the most common definition of Dynamic capability which is "*the capacity of an organization to purposefully create, extend, or modify its resource base*"¹⁴³, it has been individuated other relevant literature giving other interpretations and definitions. Another definition is provided by Eisenhardt and Martin¹⁴⁴, who argue that resources can be acquired and shed, integrated, and then reconfigured via dynamic capacities. Adaptive, absorptive, and inventive capability are three of the three elements that Wang and Ahmed identify as dynamic capabilities. One of the most recognized definitions¹⁴⁵ who describes DC as:

- *Sensing and Shaping opportunities.* Sensing dynamic capabilities is the '*mobilization of necessary organizational infrastructure and resources to provide opportunities for producing, acquiring, or shedding resources*'.
- *Seizing Opportunities.* Seizing Dynamic capabilities refers to '*the ability of the company to collect value from these opportunities while favoring a proper integration*'.
- *Reconfiguring Intangible and tangible assets.* The ability of the company to continuously recombine resources in response to changes in the market and technology is referred to as reconfiguring dynamic capabilities.

¹⁴³ Helfat, C., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., Winter, S. (2007). Dynamic capabilities: Understanding strategic change in organizations. Malden M.A: Blackwell

¹⁴⁴ Eisenhardt, K. & Martin, J. (2000). Dynamic capabilities: What are they? Strategic Management Journal, 21, 1105-1121

¹⁴⁵ Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal 28(13): 1319-1350

7.1 Sensing, Seizing and Reconfiguring for Open Innovation

As it is shown in Table 2.4, In the context of open innovation, dynamic capabilities can be used to explain how businesses identify, seize, and reconfigure external sources of innovation to obtain competitive advantages in innovation.

Table 2.4 Dynamic Capabilities for Open Innovation¹⁴⁶

DCs for Open Innovation	
Sensing	<p>Monitor and recognize new and emerging markets and technologies</p> <ul style="list-style-type: none"> • Choose appropriately between different resource alteration paths according to strategic and competence-based fit
Seizing	<ul style="list-style-type: none"> • Manage a context that stimulates the use of externally generated resources, • Organize, diffuse and maintain externally generated resources
Reconfiguring	<ul style="list-style-type: none"> • Identify opportunities for new configurations with monitoring the internal resource • Easily combine resources across external and internal sources.

The first class, *sensing and shaping opportunities*, focuses on identifying technological and commercialization potential. As it was previously mentioned, in the Open Innovation context, since the innovation sources are increasingly distributed, the identification of the sources to internalize for the firm is even more difficult¹⁴⁷. For this reason, a firm requires external sensing

¹⁴⁶ Ridder, A., (2013). External Dynamic Capabilities: Competitive Advantage in Innovation via External Resource Renewal, *Academy of Management Journal*

¹⁴⁷ Teece, D.J., Pisano, G.P. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal* 18, 509–533.

dynamic capabilities, in order to identify and recognize the valuable sources from the external environment.

The second class of dynamic capabilities, *seizing opportunities*, deals with all the choices a firm is committed to make after the opportunities are shaped. In fact, once external knowledge sources have been identified, the firm needs to be able to seize these opportunities, and to integrate them into its internal innovation process¹⁴⁸. Given the variety of investment options, these capabilities are particularly important for choosing wisely when making investments in research, development, and commercialization activities. That is the reason why the business model acquires so much importance: it is fundamental for the definition of the firm's commercialization strategy.

The third class, *reconfiguring dynamic capabilities*, refers to the ability of the firm to reconfigure its assets and organizational structure in line with the technology changes and customer needs. It refers to the capacity and capability of the firms to flexible employ and combine external and internal resources¹⁴⁹.

In conclusion, some of the more crucial aspects of open innovation are addressed through dynamic capabilities. In particular, the integration of knowledge from both internal and external sources, the importance of the business model, and the use of open innovation to include outside technologies. Both Dynamic Capabilities and Open Innovation focus on the ever-changing environment, and the strategies a firm needs to adopt in order to stay competitive. And, finally, both approaches focus on the importance of knowledge, and its role in inter-organizational transactions.

¹⁴⁸ Wang, C., Ahmed, P. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9 (1), 31-51.

¹⁴⁹ Ridder, A., (2013). External Dynamic Capabilities: Competitive Advantage in Innovation via External Resource Renewal, *Academy of Management Journal*

CHAPTER THREE

HOW FIRMS BENEFIT FROM OPEN INNOVATION

Summary

1. Open Innovation and the Relational View 1.1 Partner type and Governance mode 2. Networks and Innovation 3. Global Networks for Open Innovation 3.1. Network Relationships 3.2. Benefits and Costs 4. Conditions of Open Innovation Effectiveness

In this chapter the focus will be on the implementation of the Open Innovation model in global firms, who decide to open up their business models and to adopt a network structure. We will see how a networked business model represents a competitive advantage for the company, and the importance, for the firm, to be able to interact with the external environment. In fact, if in the previous chapter we focused on the importance of acquiring external sources of knowledge, now we will investigate the central role of integration with the external environment, in order to successfully integrate external resources. As it was previously stated, this is the reason why we identified a linkage between Open Innovation and Dynamics Capabilities, because thank to DC, firms are able to integrate sources and manage inter-organizational relationships with the external environment, successfully dealing with potential external contingencies such as organizational culture, technologies turbulences and dynamic of competition, finally getting to competitive advantage.

1. Open Innovation and the Relational View

Previously, the company and its business model were the key issues of analysis of open innovation. Now, as Chesbrough¹⁵⁰ suggests, the inter-organizational level, or the network of entities and the value those entities can jointly create, should now be the new focus area. In this

¹⁵⁰ Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&D Management*, 36(3), 229–236

case, the "relational view" offers a useful theoretical framework for the investigation of open innovation.¹⁵¹

As Chesbrough affirmed: *'In open innovation, companies, developing their new products and services, rely on both internal and external resources, and the internal resources can be deployed using inside and outside path to the market'*¹⁵². In this framework, all the firms, even the largest ones, cannot develop the required resources alone, but they need to cooperate, letting resources flow from one company to another. This is the sign that the firm's boundaries are becoming even more permeable, favoring the match between the market opportunities and capabilities, as well as a better allocation of resources¹⁵³.

In contrast with the classic Resource Based View (RBV), for which the tangible resources are the most important asset for a firm, the Relational View emphasizes that the firm's resources should not be protected, neither developed only within the firm's boundaries, but they must be looked for also outside the firm's boundaries¹⁵⁴. Two or more firms who jointly decide to collaborate will be able to combine resources and knowledge, getting competitive advantage over the rivals who choose a stand-alone strategy. The innovative element of the Relational View stands in the perception of the inter-organizational relationships as a form of competitive advantage, which is one of the main assumptions of the open innovation in se, considering external knowledge coming from external partners as a source for gaining competitive advantages. Moreover, the Relational View, focuses on the *'network'* as its unit of analysis, so for this reason, it is no more reasonable thinking about resources in terms of firm's resources, but only as something that goes beyond the control of the individual firm¹⁵⁵.

Studies have shown that firms with external linkages, which are technologically focused, are more inventive than enterprises that operate independently. The network strategy has proven

¹⁵¹ U., Lichtenthaler, E. (2009). A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity. *Journal of Management Studies*, 46(8), 1315–1338

¹⁵² Chesbrough, H., (2003). The era of open innovation, *MIT Sloan Management Review* 44 (3) 35-41

¹⁵³ Arora, A. & Gambardella, A. (2010). Ideas for rent: an overview of markets for technology. *Industrial and Corporate Change* 19, 775–803

¹⁵⁴ Dyer, H. & Singh, H., (1998). The relational view: cooperative advantage and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660–679

¹⁵⁵ Dyer, H. & Singh, H., (1998). The relational view: cooperative advantage and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660–679

to be particularly effective in high-demand industries like biotechnology and electronics in ensuring the diffusion of information and complementary resources¹⁵⁶.

The Relational View claims that businesses will be more inclined to participate in collaborative innovation activities if they have¹⁵⁷:

- Partner-specific *absorptive capacity*
- Complementary *resource endowments*
- Effective *governance mechanisms*

Frist, extending the notion developed by Cohen and Levinthal about absorptive capacity, for which '*the absorptive capacity of a firm is a function of its priori knowledge generated through internal R&D*'¹⁵⁸, the author Dyer & Singh introduce the idea of '*partner-specific absorptive capacity*'¹⁵⁹. They suggested that while a firm's potential to develop innovation collaborations is not dependent on its overall capacity for absorption, it may be significantly impacted by its capacity to absorb a particular source from a particular collaboration partner. Second, proponents of the Relational View believe that the choice of collaboration partners affects each partner's aptitude for openness, investment in *relationship-specific assets*, and protection against opportunism.¹⁶⁰

Essentially, we may distinguish between formal, self-enforcing governance mechanisms, such those that outline the rights and obligations of the collaboration partners, and informal, self-enforcing governance mechanisms, like trust¹⁶¹.

¹⁵⁶ Powell W., Koput K.W. & Smith-Doerr L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41(1): 116-145

¹⁵⁷ Lavie, D. (2006). The competitive advantage of interconnected firms: An extension of the resource-based view. *Academy of Management Review* 31 (3), 638–58

¹⁵⁸ Cohen, W. M. & Levinthal, D.A. (1990). Absorptive capacity: a new perspective of learning and innovation. *Administrative Science Quarterly* 35, 128–152.

¹⁵⁹ Dyer, H. & Singh, H., (1998). The relational view: cooperative advantage and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660–679

¹⁶⁰ Dyer, J. H. (1997). Effective interim collaboration: How firms minimize transaction costs and maximize transaction value. *Strategic Management Journal* 18 106 (7), 535–56.

¹⁶¹ Carson, S. J., Madhok, A. & Wu, T. (2006). Uncertainty, opportunism, and 104 governance: The effects of volatility and ambiguity on formal and relational contracting. *Academy of Management Journal* 49 (5), 1058–77

1.2 Partner Type and Governance Mode

The main aim of the Relational View was identifying a theoretical framework providing meaningful contingencies that could affect the firm's progression in its open innovation activities. In light of all the arguments advanced above, and previous research in open innovation, it is clear that the '*partner type*' and the '*governance mode*' are the most salient factors in innovation collaborations. '.

This dimension considers the '*value creation potential*' and '*value appropriation hazards*' of each collaboration partner, including customers, universities, suppliers, and research organizations¹⁶². Depending on the nature of the knowledge companies employ in their relationships, collaboration partners can be divided into two categories: '*market-focused*' and '*science focused*'¹⁶³.

- Market-focused Innovation Partners. They are, for example, partners as suppliers and customers. In this way, they are expected to provide a better understanding of the potential of the focal firm, such as the application of its technologies, and how to put in practice valuable go-to-market strategies. For example, interacting with customers can be beneficial for the focal firm in order to directly understand the customers' needs and preferences¹⁶⁴.
- Science-focused Innovation Partners. In particular, universities and research institutes are valuable partners because they can assess technologies that differ from those of the focal firm¹⁶⁵.

The second dimension, the governance mode, is at the core the relational view, and it is important to note that this can have a significant impact on the transaction costs of collaborative

¹⁶² Bercovitz, J. E. & Feldman, M. P. (2007). Fishing upstream: Firm innovation strategy and university research alliances. *Research Policy* 36 (7), 930–48.

¹⁶³ Bogers, M., Afuah, A., & Bastian, B. (2010). Users as innovators: A review, critique and future research directions. *Journal of Management*. 36 (4), 857-875

¹⁶⁴ von Hippel, E. & Katz, R. (2002). Shifting innovation to users via toolkits. *Management Science* 48 (7), 821–33.

¹⁶⁵ Bercovitz, J. E. & Feldman, M. P. (2007). Fishing upstream: Firm innovation strategy and university research alliances. *Research Policy* 36 (7), 930–48

arrangements as well, but also the partners behavior and their willingness to cooperate and to share relevant knowledge¹⁶⁶. Starting from the transaction costs economics¹⁶⁷, two main approaches have been identified for the safeguard of any collaborative network form any opportunistic behavior such as shrinking, failing to fulfil obligations and holding valuable informations. These two approaches are:

- A *relation-based approach* which emphasizes trust. This approach is typical of those informal collaborations which rely on self-enforcing mechanisms, such as trust and reciprocity¹⁶⁸. Under many conditions, this government form is considered more effective and, most importantly, less costly than the *contract-based*¹⁶⁹ approach which emphasizes control¹⁷⁰.

2. Networks and Innovation

Networks and innovation are closely related concepts, as networks can play a significant role in the creation and spread of new ideas and technologies.

Networks can refer to a variety of different things, but in the context of innovation they generally refer to connections between people, organizations, or other entities that can facilitate the exchange of information and ideas. These networks can include formal organizations such as research institutions and companies, as well as informal networks such as communities of experts or hobbyists.

There are various definitions of '*network*'. Freeman defined network as '*a pattern of organizing involving more and more connections: networks involve collection of nodes (individuals, teams, organizations etc.) which are linked to each other's by relationships. If these*

¹⁶⁶ Duschek, S. (2004). Inter-firm resources and sustained competitive advantage. *Management Revue* 15 (1), 53–73

¹⁶⁷ Williamson, O. E. (1985). *The economic institutions of capitalism*. New York, Free Press.

¹⁶⁸ Poppo, L., & T. Zenger. (2002). Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal* 23 (8), 707– 25.

¹⁶⁹ Dyer, H. & Singh, H., (1998). The relational view: cooperative advantage and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660–679

¹⁷⁰ Carson, S. J., Madhok, A. & Wu, T. (2006). Uncertainty, opportunism, and 104 governance: The effects of volatility and ambiguity on formal and relational contracting. *Academy of Management Journal* 49 (5), 1058–77.

*relationships take place within groups of firms or public-sector institutions, they can be addressed as innovation networks*¹⁷¹.

Today, networks play a central role in the innovation process. First, the formation of networks is the direct result of the globalization phenomenon. On the one hand, globalization has led to the expansion and strengthening of networks by providing new opportunities for trade, investment, and collaboration across borders. The growth of international trade and investment, for example, has led to the creation of new networks of suppliers, customers, and partners for companies operating in global markets. Additionally, advances in technology and transportation have made it possible for people and organizations to connect and collaborate across borders more easily than ever before.

Globalization has also led to the formation of new types of networks, such as transnational corporations and international organizations, which have the capability to operate across borders and play a significant role in shaping the global economy and politics.

Overall, networks are considered one of the key drivers of innovation, which is why it's critical for companies and organizations to focus on building and maintaining strong networks both internally and externally to drive their growth and success.

Referring to the literature, the picture that Schumpeter described of the '*lone entrepreneur*' has been replaced: now we have different actors working together in an iterative environment with the main aim of a successful exploitation of a new idea¹⁷². These new models of innovation enhance the role of interactions and their importance within the innovation process, in fact, innovators rarely innovate alone¹⁷³.

For sure, one of the main strengths of networks is that they allow firms to reach goals that alone they could not reach. For example, firms can take part in any collaborative R&D project, because costs and risks are shared, otherwise, it would have been impossible to take the responsibility of such investment alone.

¹⁷¹ Freeman, C. (1991). Networks of innovators: a synthesis of research issues. *Research policy*, 20(5), 499-514.

¹⁷² Tidd, J. & Trewhella, M. (1997). Organisational and technological antecedents for knowledge acquisition and learning. *R&D Management*, 27 (4), 359–375.

¹⁷³ von Hippel, E. (1988). *The Sources of Innovation*. Oxford University Press, New York

Additionally, networks enable extensive self-help through experience sharing and learning. In fact, cooperative networks in Europe allow small businesses to compete globally as well¹⁷⁴.

What is clear, and the most important element behind any network formation, is not in reference to the costs saving, but relies in the strategic behavior (appropriation of knowledge, technological complementarity, trust, ethics cooperative mind) that each company decide to adopt, a behavior even more in line with the open innovation framework, that firms are adapting to. The challenge for managers consists in matching these eternal relationships with the internal capabilities. This is the way for the firm to create value¹⁷⁵.

3. Global Networks for Open Innovation

Chesbrough gave a fine distinction between closed business models and open business models¹⁷⁶. The first one focused entirely on the internal value creation with the firm's own resources, while the second one focused on external resources as the key for the value creation process. In fact, for Chesbrough, real value is created not by a single actor, but in a network of actors. This element represents the real linkage between networks and Open Innovation: collaboration with partners, customers, competitors and suppliers is the essential driver of the value creation for companies¹⁷⁷. Close partner collaboration allows companies to access greater markets and knowledge, thanks to the sharing of resources and capabilities¹⁷⁸.

Linkages and eternal partnerships, indeed, are two of the main conditions for the implementation of the open business model, but, at the moment, this filed of management

¹⁷⁴ Dodgson, M., Gann, D. M., & Salter, A. (2008). *The management of technological innovation: strategy and practice*. Oxford University Press

¹⁷⁵ Dodgson, M., Gann, D. M., & Salter, A. (2008). *The management of technological innovation: strategy and practice*. Oxford University Press

¹⁷⁶ Chesbrough, H., (2007). Why Companies Should Have Open Business Models. *MIT Sloan Management Review*, 48(2), 22–2

¹⁷⁷ von Hippel, E. (2005). *Democratizing Innovation*. The MIT Press, Cambridge, MA

¹⁷⁸ Sandulli, F. D., & Chesbrough, H. W. (2009). The two faces of open business models. SSRN working paper series (no. 1325682), 1–25

discipline lacks a systematic approach for the identification of the necessary patterns underlying open business models¹⁷⁹.

Open Innovation can be the right alternative to the vertical integration system, for the firm's value creation. In the Open Innovation context, companies are even more likely to build distributed global networks, in order to access new knowledge and new sources of technology. In order to match the growing number of customers, suppliers etc. asking for new forms of innovation, with the global supply of science and technology, companies are increasingly adopting new ecosystems of innovation, linking networks of people, institutions and organization, with other companies¹⁸⁰. Having access to this kind of network means, for the company, having easily access to huger sources of knowledge in a time and cost-saving way. In fact, networks can help businesses that are trying to commercialize their own technology, whether it be through starting new start-ups or forming joint ventures.¹⁸¹

Moreover, firms participating in business network can evolve capabilities around new forms of innovation, due to the number and variety of the network components, who bring and share with the others their expertise. In this way cross-functional cooperation and interaction with all the different entities such as, R&D units, manufacturing, services and marketing companies, make the company able to acquire new capabilities, enhancing also interaction with third parties, both in the private and public sector.

This image of global network deals with the theoretical framework of the Relational View¹⁸², claiming that companies which cooperate and collaborate combining resources and knowledge are more likely to gain competitive advantages on the market, than those companies implementing a standing alone strategy.

¹⁷⁹ Zott, C., & Amit, R. (2010). Business Model Design: An Activity System Perspective. *Long Range Planning*, 43(2-3), 216–226.

¹⁸⁰ OECD (2008). *Open Innovation in Global Networks*

¹⁸¹ Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&D Management*, 36(3), 229–236

¹⁸² Vanhaverbeke, W., & Cloudt, M. (2006). Open innovation in value networks. In Chesbrough, H.W., Vanhaverbeke, W. & West, J. (eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford.

Explaining the meaning of the '*networking behavior*' in the open innovation context will need to focus on the theory of the value networks, more precisely the '*value constellations*'¹⁸³. The '*value constellations*' are inter-organizational networks which link companies characterized by very different resources and capabilities together, in order to respond to or anticipate a new market opportunity. We can find many linkages between the inter-organizational networks and the practice of open innovation. In fact, one of the motivations behind the establishment of a '*value constellation*' relies on the products and services' complexity, together with the compounded supply chains and market pressures. Moreover, networking behavior proved to be beneficial in particular for the smaller enterprises. In fact, it was shown¹⁸⁴ that within small firms, innovation is also hampered by the lack in financial resources. This lack can be fulfilled by the creation of a business ecosystem with the aim of sharing costs and risks to collaborate on innovation projects. Since value is '*co-produced*', the total value's production directly depends on the willingness of different partners to cooperate, and whether their objectives are aligned to each other's¹⁸⁵. As a result, all the relationships that the single firm establishes within the network have a direct effect on its competitive advantages.

3.1 Network Relationships

We can identify different types of network relationships: they can be classified in deep ties and wide ties¹⁸⁶.

The first one, *deep network ties*, enable a firm to capitalize on existing knowledge and resources. They are characterized by partners who are in the same geographical area, and who entertain relationships built on trust. On the other hand, *wide network ties* give access to a wider number of opportunities and resources. A main difference between the two kinds of networks is that the first ones, usually, are limited to the generation of incremental innovation, while the

¹⁸³ Normann, R., & Ramirez, R. (1993). From value chain to value constellation: designing interactive strategy. *Harvard business review*, 71(4), 65-77.

¹⁸⁴ Vossen, R. W. (1998). Relative strengths and weaknesses of small firms in innovation. *International small business journal*, 16(3), 88-94.

¹⁸⁵ Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy* 15 (6), 285– 305.

¹⁸⁶ Chesbrough, H., Vanhaverbeke, W. West, J. (eds), (2006). *Open Innovation. Researching a New Paradigm*. Oxford University Press

second one tends to stimulate creativity which results in more radical innovations. Of course, Open Innovation benefits from the right balance between these ties¹⁸⁷.

Another useful distinction in networks is between the ones characterized by formal and informal relationships¹⁸⁸. *Formal relationships* refer to organizations which exchange information as a part of a formal contract or agreement, while *informal ties* often rely on personal relationships associated with the sharing of implicit knowledge. Also, in this case Open Innovation benefits from the right balance of these two types of networks. In fact, formal ties could be the result of a planned open innovation strategy, while informal ties open new opportunities for spontaneous knowledge sharing¹⁸⁹. Also, Chesbrough recommended that 'a *valuable Open Innovation Strategy results from the adoption of different relationships to diverse set of institutions*'. Moreover, a good balance needs to be achieved also between the activities of exploration and exploitation¹⁹⁰, where for exploration we mean '*searching for new opportunities and developing new products and technologies through alliances*', and for exploitation '*the capitalizing of existing resources and knowledge*'.

In Open Innovation Networks, companies have numerous options for obtaining, sourcing, and assimilating outside knowledge. Within these options there are the licensing, joint venturing and alliances, joint development, contract Research and Development, collaborations with universities, or equity in university spin-offs¹⁹¹. As it is shown in the Figure 3.1, a firm can choose between a great number of network options, and this choice will affect its strategic dimension, affecting the future trade-offs between the autonomy of the firm and the acquisition of external and additional knowledge.

¹⁸⁷ Simard, C., & West, J. (2006). Knowledge networks and the geographic locus of innovation

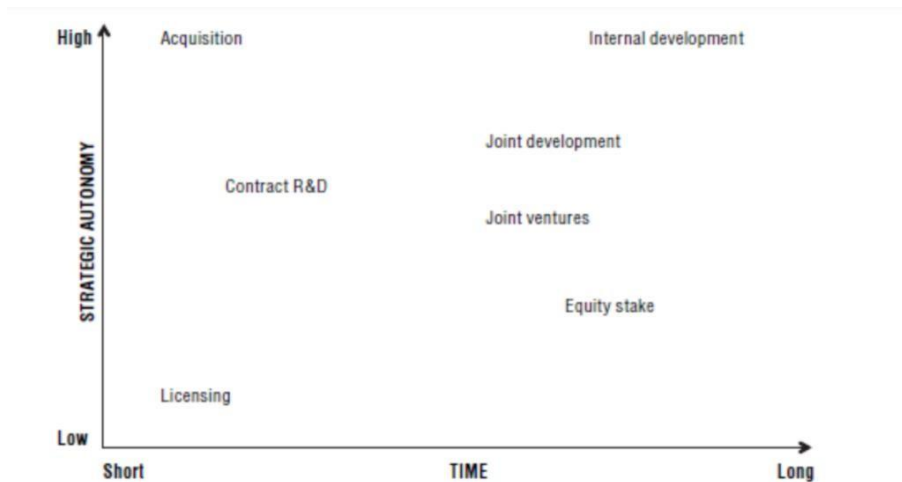
¹⁸⁸ Chesbrough, H., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. *R&D Management*, 36(3), 229–236.

¹⁸⁹ Simard, C., & West, J. (2006). Knowledge networks and the geographic locus of innovation. In Chesbrough, H.W., Vanhaverbeke, W. & West, J. (eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford.

¹⁹⁰ March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization science*, 2(1), 71-87.

¹⁹¹ OECD (2008). *Open Innovation in Global Networks*

Figure 3.1 Different Options to access knowledge in Open Innovation Networks (OECD 2008)



In this scenario a firm will choose the way to access knowledge and resources depending on the market and the core technologies it is related to.

3.2 Benefits and Costs

Starting from a firm's perspective, the main reason why a firm should join a network is, as we already said, to improve its technological knowledge and skills. Obviously, there are some other motivations why firms join networks. First, there is the belief that a network institution can of course generate common knowledge. Second firms are aware that joining a network is a condition for gaining benefits, not possible to reach autonomously. Such benefits are for example:

- *Shared Costs and Risks.* Firms joining a network can share costs and also the high risks of technological development.
- *Increased scale and scope of activities.* Firms joining a network could be able to expand their individual customers' bases (increased scale)¹⁹².
- *Improved ability to deal with complexity.* Network formation allows, for example, the transfer of implicit knowledge, which relies on the individual ability of each

¹⁹² Dodgson, M., Gann, D. M., & Salter, A. (2008). The management of technological innovation: strategy and practice. Oxford University Press.

organization or person involved in the network. Sharing implicit knowledge would not be possible in the external environment without any group formation¹⁹³.

A second consideration regarding these networks regards the way in which they interact with the external environment. In fact, the external environment is characterized by a growing number of complexities, such as *demanding customers*, *growing competition*, *globalization of the markets* and *disruptive technologies*. For a firm it would be much easier to deal with all of these elements in a collaboration network than in isolation¹⁹⁴.

Finally, open innovation networks need to be valued in terms of flexibility and efficiency. Collaboration, in fact, represents a valuable alternative to the classic merger and acquisitions practices, which are more intrusive and binding for the firm. In fact, cooperation is a more flexible way for a firm to acquire another firm's assets, without any legal constraints¹⁹⁵.

If all of these assumptions were applied, there would be many advantages for a firm to join an open innovation network. First of all, every firm could complement its knowledge with the others' one, in order to innovate more efficiently. Moreover, every firm would be cost saving, thanks to the costs and risk sharing, and it would benefit from a more complete knowledge of the market dynamics and time of entry¹⁹⁶.

However, at the same time, also some adverse aspect could be identified in the network establishment. Firms who take part of these open innovation networks should be able to balance the open behavior among partners, while taking proactive actions in order to protect their core competences¹⁹⁷. Furthermore, another strategic danger for a firm joining an open innovation network is to be too reliant on external sources than the internal generated technology¹⁹⁸.

¹⁹³ Mowery, D. C., Oxley, J. E., & Silverman, B. S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, 17, 77–91

¹⁹⁴ Freeman, C. (1991). Networks of innovators: a synthesis of research issues. *Research policy*, 20(5), 499-514.

¹⁹⁵ Dodgson, M., Gann, D. M., & Salter, A. (2008). *The management of technological innovation: strategy and practice*. Oxford University Press

¹⁹⁶ Tyrrell, P. (2007) Sharing the Idea. The Emergence of Global Innovation Networks, The Economist Intelligence Unit.

¹⁹⁷ Muller A., Hutchins N. & Cardoso Pinto M. (2012). Applying Open Innovation where Your Company Needs it Most, *Strategy and Leadership*, vol. 40 (2), 35-42.

¹⁹⁸ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150

Finally, another cost for the implementation of an open innovation network is about the management of the network itself. In fact, sourcing and deciding all the collaboration partners, scanning and monitoring all the technological sources requires financial and time resources¹⁹⁹.

4. Conditions of Open Innovation Effectiveness

The Open Innovation model is based on the idea that linkages between more entities and external parties can represent more valuable resources than the internal and vertical integrated ones. In fact, firms adopting open innovation models integrate these external resources into their innovation process and business models²⁰⁰. In this environment, the network of relationships that the firm can build can play a very important role in shaping the firm's performance. Different studies focused on this correlation:

- A first study²⁰¹ investigated the previous correlation within the biotechnology start-up firms.
- A second study²⁰² found that the effectiveness of the indirect ties depends on the number of the firm's direct ties
- A third study²⁰³ focused on the interorganizational collaboration in the biotechnological industry, showing the higher probability for firms which join benefit-rich open networks, to get better and higher performances in innovation

Together these studies focus on the role of strategy behind the company's performance in the innovation process: they suggest that there are some explanatory variables, such as the firm's size and its R&D expenditure, which need to be complemented with a greater effort in the

¹⁹⁹ Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1) 99–120.

²⁰⁰ Chesbrough, H., (2003). The era of open innovation, *MIT Sloan Management Review* 44 (3) 35-41.

²⁰¹ Shan W., Walker G. & Kogut B. (1994). Interfirm cooperation and startup innovation in the biotechnology industry. *Strategic Management Journal* 15(5), 387– 394.

²⁰² Shan W., Walker G. & Kogut B. (1994). Interfirm cooperation and startup innovation in the biotechnology industry. *Strategic Management Journal* 15(5), 387– 394.

²⁰³ Powell W., Koput K.W. & Smith-Doerr L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41(1): 116-145.

strategy studies. This is one of the most valuable ways a firm can achieve performance heterogeneity.

Despite its growing importance, firms continue experiencing some difficulties in the full implementation of the Open Innovation model. In fact, the open innovation model requires, for being successful, firms to be able to absorb external ideas and knowledge, capturing value from them²⁰⁴. Hence, the real question regards the nature of the organizational elements who can affect the Open Innovation model implementation.

Research suggested that, for example, external knowledge can represent a positive added value only if the firm has already shaped its organizational structure to facilitate open innovation²⁰⁵. This highlights the importance of a firm's structural composition in the context of knowledge search and integration, and innovation. Indeed, a firm can support open innovation only if it possesses an appropriate organizational design²⁰⁶. Several studies also investigated the influence that the firm's organizational structure on its search behavior, finding that a higher degree of centralization of the R&D organizational structure is associated with increased openness.

Identifying and sourcing for external knowledge is not enough: in fact, firms also need to develop and deploy external knowledge internally in a '*re-generating manner*'²⁰⁷. And, even if there is a great consensus that Open Innovation strongly depends on the knowledge transaction between organizations²⁰⁸, organizational capabilities for dynamic knowledge management are also vital for the firm to integrate the external knowledge resources within its organizational structure²⁰⁹. Therefore, another element affecting the implementation of the open innovation

²⁰⁴ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150.

²⁰⁵ Bianchi M, Cavaliere A, Chiaroni D, Chiesa V, Frattini F. (2011). Organisational Modes for Open Innovation in the Bio-Pharmaceutical Industry: An Exploratory Analysis. *Technovation*, 31(1), 22-33

²⁰⁶ Piller, F. (2009) The future of open innovation. Proceedings of The R&D Management Conference, Vienna, Austria, June 21–24

²⁰⁷ Dyer, H. & Singh, H., (1998). The relational view: cooperative advantage and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660–679

²⁰⁸ Chiaroni, D., V. Chiesa, and F. Frattini. 2011. The open innovation journey: How firms dynamically implement the emerging innovation management paradigm. *Technovation* 31 (1): 34–43

²⁰⁹ Foss, N.J., Laursen, K., and Pedersen, T. (2011). Linking customer interaction and innovation: the mediating role of new organizational practices. *Organization Science*, 22 (4), 980-999

model is the firm's ability, depending on its organizational structure, to manage and integrate external knowledge. This firm's capability is also known as the '*inward-looking component*'²¹⁰ of the firm's absorptive capacity. In this regard, the capability of the firm to manage and integrate external knowledge is also important for effective organizational learning, as it facilitates an efficient mechanism for the internal knowledge processing. Following this approach, external search strategies are ineffective in the firms can not properly integrate the external flows of knowledge. In other words, internal knowledge-processing capabilities can be defined as a '*conditio sine qua non*' for a firm to achieve high levels of innovation performance. It is not enough for the firm to search for knowledge from the outside and establish external relationships, it must be prepared to internalize these relationships in its organizational structure.

This integrative capacity determines whether or not the firm can manage efficiently external capabilities across its boundaries and how additional knowledge and resources can be productively utilized. This ability can be considered a dynamic capability, and it refers to the previously mentioned class of DCs, '*seizing opportunities*', since it refers to the capacity of addressing opportunities and integrating them within the organization.

However, another element affecting the implementation of the Open Business model is the external environment. In fact, as the organizational structure of the firms, also the external environment plays an important role in the Open Innovation performance of the firm. The contingency perspective affirms that environmental conditions affect the relationship between strategies and performance²¹¹. This means that the environment represents a crucial element for the creation of an open innovation strategy.

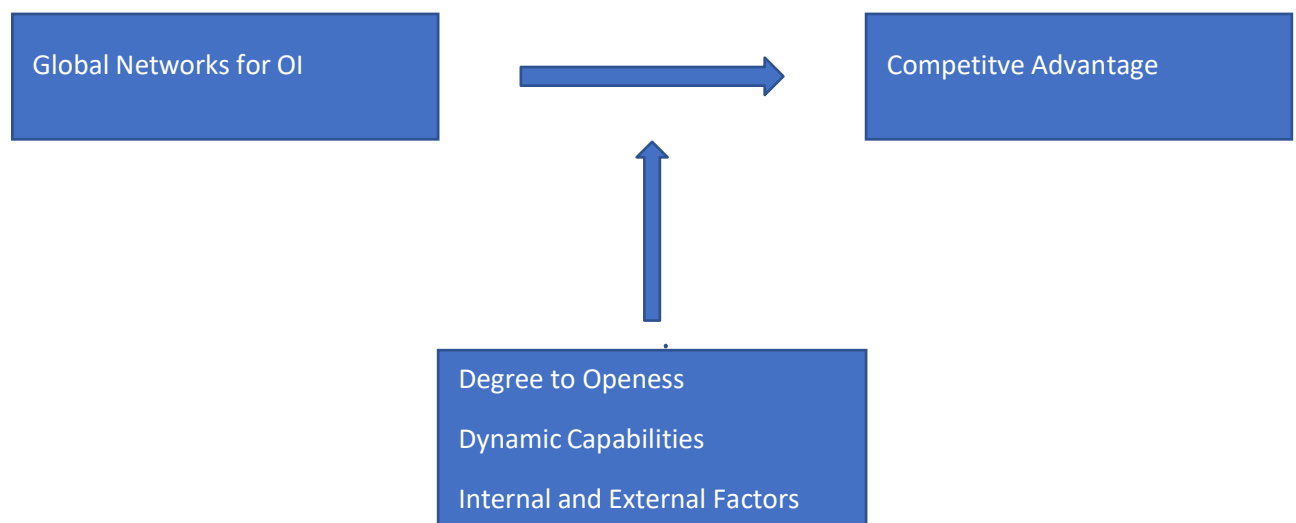
Summing up, we can affirm that there are two external aspects and one internal aspect which can affect the incorporation of external resources and knowledge, so the implementation of the Open Innovation model. First, some research really focused on the degree of turbulence in the

²¹⁰ Cohen, W. M. & Levinthal, D.A. (1990). Absorptive capacity: a new perspective of learning and innovation. *Administrative Science Quarterly* 35, 128–152

²¹¹ Arora, A., & Nandkumar, A. (2012). Insecure advantage? Markets for technology and the value of resources for entrepreneurial ventures. *Strategic Management Journal*, 33(3), 231-251

technological landscape of the firm²¹²; second, open innovation model implementation has been associated with highly correlated costs and benefits based on different levels of competition²¹³. As a result, for the evaluation of external contingencies, we can look at different levels of technological turbulence and competition dynamics. Regarding the internal dimension we can consider the organizational culture, as it has often been addressed as one of the determining factors for the implementation of the OI model²¹⁴. Taking this into account, we can conclude that open innovation-based competitive advantage depends on three factors: openness, dynamic capabilities, and contingencies such as organizational culture, technological turbulence and competitive dynamics. Table3.2 represents the connection in the Open Innovation environment which leads to competitive advantage.

Table3.2 Conditions for Open Innovation Effectiveness²¹⁵



4.1 The Degree of Openness

When working in an Open Innovation environment, the network structure adapts easily to changes in needs, information and knowledge flows within and outside the organization. In a

²¹² Christensen, J.F. (2006). Wither core competency for the large corporation in an open innovation world?

²¹³ Chesbrough, H., (2007). Why Companies Should Have Open Business Models. MIT Sloan Management Review, 48(2), 22–28.

²¹⁴ Gassmann, O., Enkel, E., Chesbrough, H. (2010). The future of open innovation. 107 R&D Management, 40(3), 213–221

²¹⁵ Compiled by the author

global network knowledge comes from very different directions, and this configuration enhances all of these knowledge sources²¹⁶. Within global networks, collaboration between partners is the main element and engine of the open innovation model. In fact, the thematic of collaboration has been deeply analyzed under two dimensions: the *breath* and the *depth* of the interaction with partners. Both these dimensions can be used for measuring the openness of the firm, and both can have an effect on the Open Innovation strategy of the same firm. When talking about the Open Innovation performance we mean *'the extent to which knowledge acquired externally can affect the quality and the speed of the innovation process within the company'*²¹⁷. From the network theory and the previous distinction between strong and weak linkages, we can assume that search breadth and depth produce similar effects. The breath dimension can be defined as *'the number of different search channels that a firm draws upon in its innovative activities'*²¹⁸. Hence, the search breadth describes the way the firms diversify their search activities. Some scholars affirm that the search breadth provides more flexibility, and, therefore, offers a wider and more comprehensive view of all the available opportunities for the firm. Also, researchers focusing on interorganizational networks argue that this kind of search is necessary for the firm to achieve competitive advantages. Hence, the number of network linkages and their diversity degree, is seen as a salient predictor of the firm's degree of innovation performance²¹⁹.

Even though external search breadth is considered important for a firm's innovation performance, *'over-searching'* may have some detrimental effects²²⁰. In fact, over searching may have negative influence on the firm's performance, producing non-desirable effects such as:

²¹⁶ Arrigo, E. (2012). Alliances, Open Innovation and Outside-in Management, *Symphonya. Emerging Issues in Management* (symphonya.unimib.it), n. 2, 53-65

²¹⁷ van de Vrande, V., de Jong, J.P.J. Vanhaverbeke, W., de Rochemont. M. (2009). Open innovation in SMEs: Trends, motives and management challenges. *Technovation* 29 (6–7), 423–37

²¹⁸ Laursen, K., Salter, A.J., (2006). Open for innovation: the role of openness in explaining innovative performance among UK manufacturing firms. *Strategic Management Journal* 27, 131–150.

²¹⁹ Powell W., Koput K.W. & Smith-Doerr L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41(1): 116-145.

²²⁰ Powell W., Koput K.W. & Smith-Doerr L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41(1): 116-145.

- Too many ideas to manage for the firm and to choose between
- Wrong time and place for the valuable exploitation of ideas
- Problems in in attention and allocation of resources due to information overflow

However, openness does not only involve access to a wider number of resources, but it is also about a deep knowledge and consciousness of these ones. In fact, the second aspect we will consider is the *depth* of the relationships within global networks. The depth dimension refers to *'how deeply or intensively firms adopt the external knowledge resources'*²²¹. Hence, depth refers to the ability of the firm to deeply integrate these external entities in its innovation activities, building a common way to work together. Firms who succeed in building strong and deep relationships with the external sources are, for sure, more innovative, since they can sustain collaboration with external actors. However, as in the case of the breadth dimension, also for this dimension, there could be some risks and negative outcomes related to the overuse of this function. One of the major risks for the firm is being too reliant on external sources of innovation, lacking in the development of its internal sources and capabilities.

Both these two dimensions are important for the firm's innovation performance. While the breadth dimension, referring to the weak ties, allows access to a broad range of information sources, the depth dimension, referring to the strong ties, can help to build trust and foster innovation within certain networks²²². Of course, they are correlated, in fact the firm, in order to invest in its depth dimension, needs to reduce the number of partners it is investing in²²³. Thus, the breadth dimension promotes the access to many sources of knowledge with a high novelty potential, whereas the depth dimension promotes the development of trustworthy relationships that may lead to specific knowledge creation. Considering the fact that firms involving in more types of relations, so investing in its breadth dimension, than those who

²²¹ Drechsler, W., & Natter, M. (2012). Understanding a firm's openness decisions in innovation. *Journal of Business Research*, 65(3), 438-445

²²² Rowley, T., Behrens, D., & Krackhardt, D. (2000). Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, 21(3), 369–386

²²³ Hansen, M. T. (1999). The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits. *Administrative Science Quarterly*, 44(1), 82–11

invest in a lower number of ties²²⁴, and that these networks are dynamic and changes dependently on the market conditions, two key factors emerge:

- There is a need for a system that can manage significant information about network partners
- Investments in figures who can identify the potential of relationships; the ones which can be efficient and effective in the long run from an entrepreneurial point of view²²⁵

These choices depend on the business model that the firm decides to create.

Summing up, it can be stated that openness to external sources allows a firm to improve its innovation process. However, the search for these external ties and partners is not cost less, and just as Laursen and Salter underlined, the 'over-search' may hinder the innovation performance. Generally, the literature suggests that openness should be tempered by analyzing the costs involved. In fact, external resources need to be managed carefully so that efforts do not dissipate.

4.2 Critical Internal and External Factors

As was just stated in the previous chapter, the firm's capabilities, and its degree to openness are crucial factors to establish the value of acquiring new sources. However, environmental conditions, both internal and external, must be taken into account in this consideration. The contingency perspective suggests that the strategies the firm adopts, and its performance differ depending on the different environmental conditions²²⁶. As the environment changes and varies in uncertainty and liberality, as these conditions can affect the potential creation of value from external knowledge sources, the integration of this external knowledge will be affected by these

²²⁴ Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs: An intermediated network model, *Research Policy*, 39(2), 290–300.

²²⁵ Corniani, M. (2013). Business Networks and Local Partners in Global Competition, *Symphonya. Emerging Issues in Management* (symphonya.unimib.it), n. 2, 47- 66

²²⁶ Arora, A., & Nandkumar, A. (2012). Insecure advantage? Markets for technology and the value of resources for entrepreneurial ventures. *Strategic Management Journal*, 33(3), 231-251

changes. This means that analyzing the environment, with its dynamics and changes, is crucial to understand which Open Innovation strategy is better to implement. As we already saw, in the relevant literature on Open Innovation, three contingent factors affecting open innovation strategies have been found, one internal and two externals. For the internal contingency we will focus on the organizational culture, for the external ones we will go through the degree of turbulence in the firm's technological environment and the potential costs and benefit of OI.

- *Internal Contingency Factor.* Organizational culture plays a very important role in the Open Innovation performance, and, in this regard, particular attention was given to elements such as communication and attitude towards external knowledge²²⁷. Organizational culture influences the firm's willingness and ability to identify, assimilate and exploit external sources of knowledge. Hence, creativity and innovation will be favored by an organizational culture which is characterized by open communication, team cooperation and risks handling. Also, the market-driven organizations, so the ones who better serves the market and its customers, are by '*an externally oriented culture with dominant beliefs, values and behaviors which emphasize the continuous search of new sources of advantage*'²²⁸. To sum up, the organizational culture is crucial to ensuring the spread of knowledge within the firm. It creates favorable ground for the communication and knowledge trader, making the firms oriented toward new ideas and market opportunities.
- *External Contingency Factor.* Technological turbulence, '*the rate of technological change*', reduces the chances for a firm to profit from its own product developments, since technologies become quickly obsolete. Companies which go through high technological turbulences should profit further from openness due to the reducing invention costs and the large range of knowledge which will allow companies to abreast the quick technological change. In addition to the technological turbulence contingency, also implicit costs and benefits of Open Innovation depend on the changes in the environment. In fact, Chesbrough insisted that, although there are some risks

²²⁷ Arora, A., & Nandkumar, A. (2012). Insecure advantage? Markets for technology and the value of resources for entrepreneurial ventures. *Strategic Management Journal*, 33(3), 231-25

²²⁸ Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), 53–70

associated to the cooperation in the innovation process, benefits are higher, since the company will be able to abate the R&D costs, and the time to market. This is why we are discussing a global network environment. In this environment companies are stimulated to act '*before and better than competitors*'²²⁹. Companies make their strategic choices following the market-driven logic. Companies move following a logic that is market-driven, and they manage innovation from a strategic point of view, always monitoring innovations introduced by competitors. As a consequence, these firms are more successful in responding to environmental trends and in developing new capabilities that lead to competitive advantage²³⁰. Hence, in global markets, characterized by accelerating degrees of competition, firms optimize their performances thanks to Open Innovation.

We can conclude that Open Innovation can be considered a valuable and more efficient alternative to vertical integration as a value-creation strategy. In this context firms decide to join global networks in order to sense the future market trends, to reduce the entry time to markets and to tap into new knowledge and external knowledge sources. However, as it was presented, external technological sources are not enough for the innovation process to succeed. In fact, there are other factors which can influence the firm's innovation process, such as the environmental dynamics and the firm's capability to internalize the external sources of knowledge. Consequently, the success of Open Innovation depends on dynamics capabilities (the ability to integrate sources and manage relationships with partners with critical resources) as well as environmental factors, including organizational culture, technological turbulences, and competitive dynamics. Once the conditions are realized the firm will be able to get a competitive advantage from the Open innovation model implementation

²²⁹ Brondoni, S., M. (2015). Global Networks, Outside-In Capabilities and Smart Innovation, Symphonya. Emerging Issues in Management (symphonya.unimib.it), n. 1, 6 – 21

²³⁰ Arrigo, E. (2012). Alliances, Open Innovation and Outside-in Management, Symphonya. Emerging Issues in Management (symphonya.unimib.it), n. 2, 53-65

CHAPTER FOUR

THEORETICAL FINDINGS: OPEN INNOVATION LEADING TO COMPETITIVE ADVANTAGE

Summary

1. Competitive Advantage and Dynamic Capability view 2. Open Innovation and Dynamic Capability 3. Dynamic Capability and Competitive Advantage 4. Product Innovation and Competitive Advantage

In the Second Chapter, in its last paragraphs the research focused on the firm's Dynamic Capabilities, particularly focusing on the Dynamics Capabilities developed in the context of Open Innovation. Now, after the analysis of all the factors, internal and external of the firm's boundaries, we can finally use the dynamic capabilities perspective for gaining the theoretical foundation of the open innovation leading to competitive advantage. We will first distinguish between Dynamic Capabilities, Open Innovation and Competitive Advantage. Then we will go through the correlation between Dynamic Capabilities and Open Innovation; second between Dynamic Capabilities and Competitive Advantage; finally, we will show the correlation between the adoption of the Open Innovation Model and Competitive Advantage.

Open innovation involves establishing networks of partners with critical resources to create and market innovative products that enable a company to overcome its internal limitations and respond to external changes effectively²³¹. One of the main goals of Open Innovation is for the firm to gain a competitive advantage, as it is one of the strategies a firm can adopt for survival. As viewed from an Open Innovation perspective, competitiveness is determined by a firm's ability to rapidly adapt to changes in the entrepreneurial environment (internal and external)²³². The previous findings in this research on the firm's Dynamic Capabilities will permit us to

²³¹ Chesbrough H. *Open Innovation: The New Imperative for Creating And Profiting from Technology*. Boston: Harvard Business School Press; 2003

²³² Michael PE. *Competitive advantage: creating and sustaining superior performance*. New York: FreePress; 1985

understand the Open Innovation implementation in terms of dynamic capabilities, in order to get competitive advantage.

1. Competitive Advantage and Dynamic Capability view

Competitive Advantage refers to *'the ability gained through attributes and resources perform better than competitors in the same industry'*²³³. Within the corporate competitive advantage three set of theories have been identified:

- *The Industrial Organizational View (IOV)*. A competitive advantage can be gained through the structure of industrial competition according to this theory.
- *The Resource Based View (RBV)*. This theory insists on internal capabilities and resources.
- *The Dynamic Capability View (DCV)*. This theory explains that the ability to consolidate, structure and reconfigure capabilities exists both inside and outside of the firms and thanks to this ability the firm can adapt to the environmental changes.

Within these three theories we will focus on the last one, since it can better explain how the business performance changes depending on the capability of the firm to consolidate, integrate and reconfigure internal and external competencies in line with changes in the environment²³⁴

2. Open Innovation and Dynamic Capability

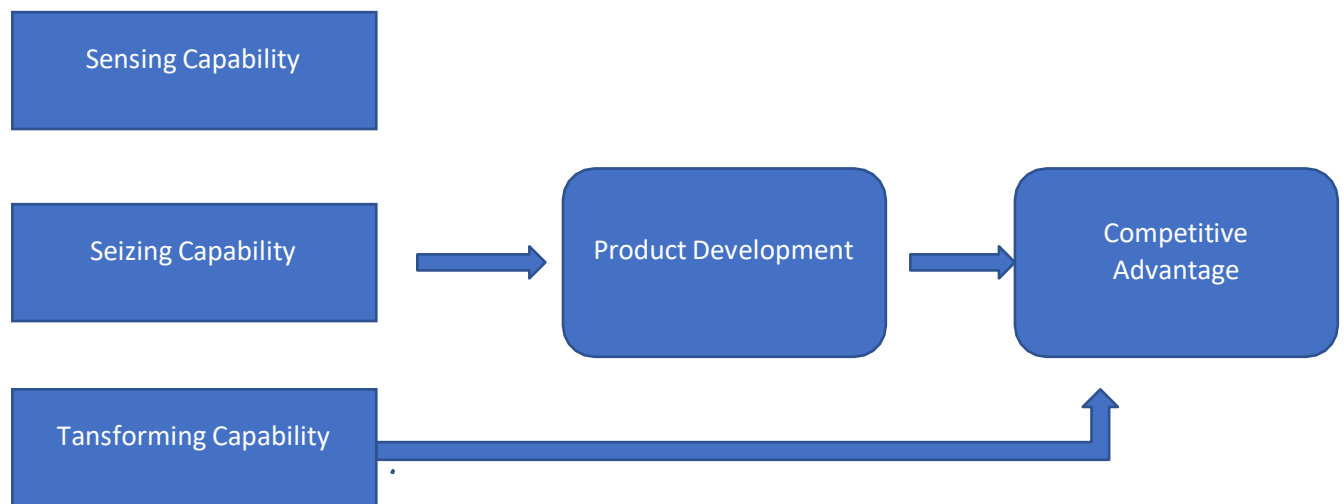
As was previously stated, every firm needs to own three different kinds of dynamic capabilities in order to be successful in the open innovation implementation. According to Teece these

²³³ Michael PE. *Competitive advantage: creating and sustaining superior performance*. New York: FreePress; 1985

²³⁴ Teece DJ, Pisano G, Shuen A. Dynamic capabilities and strategic management." *Strategic Management Journal*. 1997; 18(7): 509–533

dynamic capabilities are sensing, seizing and transforming²³⁵. As it is shown in the Figure4.1 these capabilities affect the firm's product innovation, which leads to a competitive advantage. But at the same time, the same capabilities developed in the Open Innovation perspective led to competitive advantage

Figure4.1 Dynamic Capabilities for Open Innovation²³⁶



- *Sensing Capability*, the 'firm's capacity to identify new opportunities for product innovation, and companies which are not able to recognize changes in the dynamic environment cannot survive'. This is the reason why companies must perform external knowledge sourcing. They collect rapidly information from the outside (mainly from global networks) and use these skills and knowledge for product innovation. As such, the external sensing capability secures the acquisition of technological sources through collaboration with external partners. That is why we can assume that the Sensing capability can have a positive effect on the seizing capability and on the product innovation performance²³⁷. As you can see in the Table4.1 we ca state:

²³⁵ Teece DJ. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 2007; 28 (13): 1319–1350

²³⁶ Compiled by the autho

²³⁷ Vega-Jurado J, Gutiérrez-Gracia A, Fernández-de-Lucio I. Does external knowledge sourcing matter for innovation? Evidence from the Spanish manufacturing industry. *Industrial and Corporate Change*, 2009; 18 (4): 637–670

Statement n.1	Sensing Capability positively affects Seizing Capability
Statement n.2	Sensing Capability positively affects the Production Innovation performance

- *Seizing capability, 'the ability to seize the sensed opportunities: selecting a business model to develop a new product, develop or allocate the necessary resources and commercialize the product'²³⁸. A firm needs to increase the product development and vertical integrated strategies; needs to have clear strategic goals and leadership and needs to have a fast-decision-making process²³⁹. A company with a strong seizing capability is able to select in the more appropriate moment the best opportunity and create innovative results which will affect positively product innovation. Now it is presented the third statement in Table4.2 :*

Statement n.3	Seizing Capability positively affects the product innovation performance
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- *Transforming capability, 'the ability to transform the sources of competitiveness in order to respond to environmental changes; the ability to integrate, recreate and renovate the existing capabilities for the product innovation'²⁴⁰. Transforming capability is a prerequisite that ensures that the internal and external innovation activities of the firm are well performed; a prerequisite for the firm to carry out its sensing and seizing activities. Table4.3 shows the effect of transforming capabilities son sensing and seizing:*

Statement n.4	Transforming Capability will positively affect the sensing capability
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²³⁸ Cepeda G, Vera D. Dynamic capabilities and operational capabilities: A knowledge management perspective. *Journal of Business Research*. 2007;60: 426–437

²³⁹ Eisenhardt KM, Martin JA. Dynamic capabilities: what are they? *Strategic Management Journal*. 2000

²⁴⁰ Teece DJ. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 2007; 28 (13): 1319–1350

Statement n.5	Transforming Capability will positively affect the seizing capability
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As we stated that sensing and seizing capabilities both have positive effect on the product innovation performance, we can firm that also the Transforming capability will affect positively the product development performance. Table 4.4 :

Statement n.6	Transforming Capability positively affects the product innovation performance
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3. Dynamic Capabilities and Competitive Advantage

Firms, in order to achieve and maintain high performances need to recognize and respond quickly to the opportunities and changes form the industrial environment²⁴¹. Dynamic Capabilities play a crucial role for the competitive advantage of the company, since they allow to find and utilize new resources by enhancing the firm's responding power²⁴². Moreover, the firm's ability to control the flow of knowledge is one of the key factors for achieving competitive advantage. Therefore, dynamic capabilities are expected to positively impact the competitive advantage of the firm. Hence, following the same reasoning we adopted before, we can set three statements regarding the relationship between dynamic capabilities and competitive advantage, showed in Table4.5 :

Statement n.7	Sensing Capability positively affects competitive advantage
Statement n.8	Seizing capability positively affects competitive advantage
Statement n.9	Transforming Capability positively affects competitive advantage

²⁴¹ McGahan AM. How industries evolve. *Business Strategy Review*. 2000; 11(3): 1–16

²⁴² Eisenhardt KM, Martin JA. Dynamic capabilities: what are they? *Strategic Management Journal*

Product Innovation refers to '*the development and release of goods and services based on the market demand*'. Product Innovation activities are aimed and the continuous survival and growth of the company and determine the superior value of the product offer in a competitive environment. The result of this competition is, hence, the competitive advantage²⁴³. As we mentioned before, one of the keys of competitive advantage is the innovation results a firm can obtain. For these reasons, as Tabale4.6 show, we can state:

Statement n.10	Product Innovation will positively affect competitive advantage
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Therefore, the firm's performance is determined by the amount of assets the firm owns and how the firm effectively uses them. In particular, the sensing and seizing capability is essential for acquiring intangible and tangible assets from the external environment, and transforming capability is crucial to transform the existing knowledge whether environmental changes verify. These are all key resources for the creation and the maintenance of competitive advantage. These three dynamic capabilities are essential for every firm to carry out Open Innovation, and they need to act together, in a comprehensive manner in order to affect the product innovation performance and competitive advantage. The research we took into consideration helped us understand the interrelation between the adoption of the Open Innovation model and competitive advantage. In fact, open innovation faster the firm willingness to innovate and to adopt dynamic capabilities that are essential for the survival of firm in the ever-changing environment. Hence, Open Innovation is one of the key resources for competitive advantage.

²⁴³ Morgan NA, Kaleka A, Katsikeas CS. Antecedents of export venture performance: A theoretical model and empirical assessment. *Journal of marketing*. 2004; 68 (1): 90–108

CHAPTER FIVE

RESEARCH METHODOLOGY

Summary

1. Research Strategy 2. Research Design 3. Research Methods 3.1 The Participants 3.2 The Interview Guide 3.3 The Interview Process 4. Data Analysis 5. Findings 6. Discussion 6.1 Providing an answer 6.1 Recommendations

In the following chapter we will explain the research methods adopted during this research in order to answer the main research question '*Can Open Innovation lead to competitive Advantage*'. We will provide both the research strategy and the research design, and then we will go through some aspects of the data collection and data analysis, finally getting to an empirical answer which will confirm or not the theoretical findings already mentioned in the previous chapter.

1. Research strategy

The initial doubt about the research strategy was about the choice between a *quantitative approach* or a *qualitative approach*. It was decided to follow a *qualitative approach* since the field of study and the research question appeared to be more suitable for a descriptive outcome for the observation of the phenomenon. In fact, the most suitable approach for giving an answer to our research question appeared to be the *inductive approach*, which aims to generate a theory starting from observations of the field of study chosen²⁴⁴. This choice was also given by the scarcity of data around the application of the Open Innovation model within the entrepreneurial environment; in fact, the adoption of a deductive approach would have been ineffective since the low number of observations and findings within the open innovation framework. This makes the inductive approach more appropriate.

The next step for the definition of a valuable research strategy is strictly linked to the choice over the indicative approach. The choice regarded adopting a quantitative or qualitative

²⁴⁴ Bryman A. and Bell E., 2011. Business Research Methods. 3rd ed. New York: Oxford Univ. Press

approach. In order to better show the reasons behind this choice the differences between the two strategies must be clarified.

- The *Quantitative Strategy* implies the collection of numerical data and it deals with numbers, which are more subject to objective interpretations. Here a first difficulty appears for the application of the quantitative strategy to our field of study, which always relies on the scarcity of data around the topic of open innovation and competitive advantage. In fact, as already mentioned, the adoption of a quantitative strategy based on a deductive approach could not be easily adopted. Moreover, it must be said that all of the quantitative strategies are based on the '*Natural Science Model*', which refers to the experimentation on the hypothesis testing relative to the data found.
- The Qualitative Strategy is based on the several insights furnished by the actors, and the various settings that a company can adopt, to then develop a final theory around the field of study. This kind of strategy is based on the '*Interpretation Model*' which focuses on the analysis of the social world, giving particular importance to the insights of its actors (in our case companies and other entities).

Hence, for our research, because our data source is represented by companies and physical entities, not by any numerical findings, the qualitative approach seems to be the right strategy to properly answer our research question.

2. The Research Design

After choosing to apply a qualitative analysis based on an inductive approach, we had to evaluate which research design better fits this research. Hence, we took into consideration the five designs described by Bryman and Bell, and among the various designs, the most suitable for this research appeared to be the '*cross-sectional design*'. In fact, following this approach it is possible to collect more data and information at the same time, which analysis will lead to the discovery of the so called '*patterns of association*' (Bryman and Bell 2011). This choice has been made after the comparison with the other research design that the authors proposed. In fact, while the *experimental* and *longitudinal* designs were immediately excluded from the different alternatives of our choice, more difficulties arise when it came to deciding whether or not to adopt a *comparative* and *multiple-case* study design. The comparative had been excluded

because, even if it provides a valuable design for the comparison of different entrepreneurial situations, it does not fit our research purpose. In fact, the research is focused on the findings of a general framework to identify the application of the open innovation model and its potential for competitive advantage, instead of delivering a pure comparison between the entities considered. On the other hand, also the multiple-case study design was excluded because, as the name affirms, this design is effective if taken into consideration multiple cases, while our research focused on a little number of entities. Therefore, the cross-sectional design is the most suitable for this research. This is proved by the fact that the aim of our research is not the deep exploration of specific companies, but providing a general theory based on the analysis of our candidates.

3. Research Methods

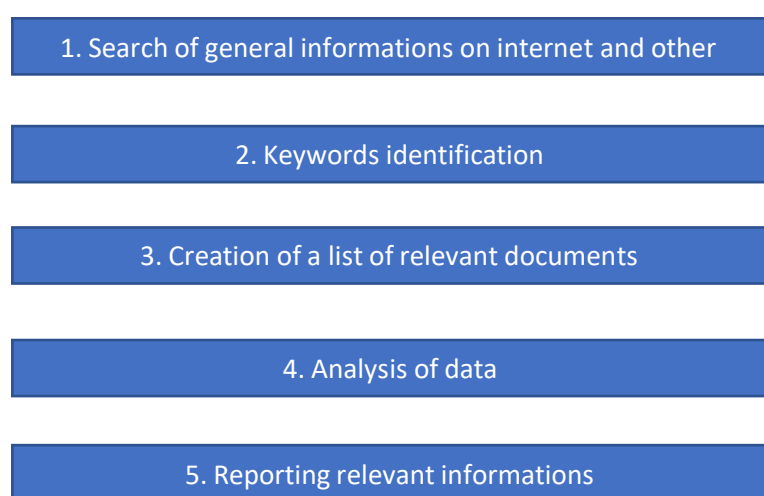
After the identification of the right research strategy and design, now we will go through the research methods adopted in this research. We adopted two main sources of data gathering. The first concerns the *secondary data collection*, which was carried out through a systematic literature review that made possible to identify the most relevant theoretical findings regarding the adoption of open innovation and its effect on competitive advantage. The second source concerns the *primary data collection*, gathering insights from qualitative interviews with companies and academics.

Secondary Data Collection

The first activity performed for the secondary data collection was the search of information regarding the Open Innovation model implementation, in order to get knowledge about the issue and the areas where to focus more precisely. Hence, we proceeded with an initial screening of the relevant studies, books, reports and websites to identify the keywords we were interested in. More precisely, the most relevant areas where the literature focuses on refers to *'the concept of open innovation under the dynamic capability point of view, in order to get competitive advantage'*. The most frequent keywords we identified were *'open innovation'*, *'Dynamic Capability'*, *'dynamic environment'*, *'external knowledge sources'*, *'global networks'*, *'collaboration partners'* and *'competitive advantage'*. For what concerns the literature adopted for this study, several works, such as books and academic papers, were identified for building

a valuable theoretical framework. After the creation of an extended list of documents, the most insightful and aligned with the purpose of the research, were identified and selected. Lastly, we began our literature review, providing evidence about the Innovation Ecosystem, the Open Innovation Model in comparison with other antecedent, and the Open Innovation model under the Dynamic Capabilities framework. In Figure5.1 it is shown the entire process for the secondary data collection.

Figure5.1 Visual Representation of the process followed



Primary Data Collection

After the secondary data collection, essential for the definition of a clear theoretical framework, now we will discuss the primary data collection.

The primary data collection was carried out through *qualitative interviews* with both entrepreneurial and academic entities. The adoption of this approach was perceived to be the most suitable in order to give a valuable answer to the research questions, in line with the explanatory and exploratory nature of the research itself. In fact, the main aim of the research was gathering insightful information about open innovation and its correlation with competitive advantage, in order to derivate a theory as a result. *Qualitative interviews*, hence, represent the best way to get the result. It must be noticed that *qualitative interviews* must not

be confused with *structured interviews*: the difference is crucial. In fact, qualitative interviews are useful to get knowledge from the interviewee's point of view, while the structured interviews are more suitable for a quantitative type of analysis, since they are based on a more rigid approach.

Interviews were conducted following the Interview Guide that you can see down below in Table5, which provides, first, a good structure to address the main concepts this research wants to analyze, second give enough space to each interviewee to express his/her opinion with no limitations. In fact, the *semi-structured interview* gives much freedom to the interviewees to argument their answers. Moreover, even if the Interview Guide follows a specific order in the questions, semi-structured interviews give the opportunity to the interviewer to change the order of the questions, depending on each interview, following its flow. Indeed, all the questions asked were of a '*low degree of structure*', in this way each interviewee was left free to express his vision clearly, but without compromising the comparability with the others.

3.1 The Participants

In order to increase the quality of this study, six participants were identified, both from entrepreneurial and academic environments. To get more information and insights about the topic studied, we identified five different companies which differ in size, each of which is represented by people with different roles. This choice was made in order to create an heterogenous environment for the research. In regards of the academic environment, we choose to interview Professor Henry Chesbrough, the one who in 2003 elaborated the very first real definition of Open Innovation. This choice was due to the fact that this study wants to research whether Open Innovation can lead to competitive advantage, and nobody better than Henry Chesbrough studied the phenomenon.

Hence, the type of sampling adopted within the study is the *purposive sampling*. Infact, the term purposive sampling is strictly related with qualitative research. Its main objective is, indeed, to strategically individuate the most relevant participants for the purpose of the research.

3.2 The Interview Guide

As already mentioned, due to the approach followed for the primary data collection based on semi-structured interviews, we have developed an Interview Guide, shown in Table 5.1. As you can see, each question of the Interview Guide is short and general, avoiding being detailed and strongly structured. One of the main benefits coming from the Interview Guide is that it gave the possibility during all the interviews of taking in consideration different point of views enjoying a great level of flexibility but avoiding the risk of not getting valuable answers regarding the main issue. This flexibility allows us to deepen some aspects with some follow-ups questions and other questions needed according to the nature of each interview.

The process of creation of the Interview Guide based on the theoretical framework of the Open Innovation and on the research question, in order to be sure to include all the topics needed for getting valuable insights on the correlation between open innovation and competitive advantage. Therefore, when working on the Interview Guide, the topic of Open Innovation has always been kept in mind, together with the internal capabilities and the external environment influencing the competitive advantage.

Table5.1 The Interview Guide

<p>Topic Guide</p> <p><i>Introduction</i></p> <p>• The research is being conducted to know how the Open Innovation Model can lead to Competitive Advantage. I am conducting this research for my master's Thesis in "Global Management and Politics" at the university LUISS Guido Carli in Rome. As for the content of the interview, it is not going to be published. Instead, it is going to be used for internal purposes, namely for collecting insightful information for my thesis. Thus, everything you tell us will only be used for this research project and will not be shared with anyone outside the research. Before we begin, do you have any questions?</p> <p><i>Opening questions</i></p> <ul style="list-style-type: none">• How long have you been working for the company?• What is your position within the company? What does it consist in? <p><i>Main questions</i></p> <ul style="list-style-type: none">• In your worlds, how would you define the Open Innovation model?• What strengths and weaknesses can you identify for Open Innovation?• In Open innovation, how important is the adoption of a multidisciplinary approach that combines classical knowledge with new skills?• Do you think this model is more suitable for young people, or could it be understood and employed by everyone? [Probe] Why?• Can you give me a definition of competitive advantage?• Which capabilities are necessary for a company to own in order to get competitive advantage?• What is the role of the external environment? Does it influence the company's competitiveness?• Do you find a correlation between the implementation of the Open model for innovation and the gain of competitive advantage?• How can a company maintain its competitiveness in an ever-changing environment? <p><i>Other more specific questions were posed to the interviewee. They referred to specific projects/research of the company.</i></p> <p><i>Closing questions</i></p> <ul style="list-style-type: none">• How crucial is it for a company to adopt the Open Innovation Model? Is there any chance for companies not adopting it to maintain their position on the market?• Open Innovation not only represents a competitive strategy a company can adopt, but it is a state-of-mind. What do you think about it? <p><i>Conclusion</i></p> <ul style="list-style-type: none">• We have finished. Thank you for your time. If you want, we will keep you informed of the research

3.3 The Interview Process

For what concerns the interview itself, we tried to accommodate the participants' necessities. In fact, the interviewee was given free choice to choose the way he/she preferred to conduct the interviews. In this regard, as you can see in the Table5.2, the interviews were carried out by telephone and video call, while face-to-face interviews are missing for a time-saving reason.

Table 5.2 Sample overview of the participants²⁴⁵

Name	Company	Position/Role	Interview Date	Interview Structure
Aleardo Furlani	Innova	Founder&CEO	October 2022	Skype Videocall
Filippo Mori	Kedrion Biopharma	Co- founder&CEO	October 2022	Telephone call
Lorenzo Abeni	Isinnova	Senior Consultant	November 2022	Skype Videocall
Antonio Zangrilli	Mediapharma	President	November 2022	Skype Videocall
Enrico Bassi	Open.dot	Coordinator and Designer	December 2022	Telephone call
Henry Chesbrough	Researcher and Professor	Open Innovation Lead	January 2023	Telephone call

During the interviews, one of the main aims was the establishment of the so-called '*rapport*' with the respondents. In fact, building a relationship with the interviews was demonstrated to be essential in order to let the interviewees continue the conversation and actively participate in the discussion. Once a good level of involvement was reached (mainly through the introductory questions), we followed the Interview Guide order, but, if necessary, carrying out some follow-ups questions not mentioned in the guide, if the situations needed. Although most of the participants were Italians, the interviews were carried out in English. This choice was because most of the technical language used in the interviews does not have a proper translation in Italian; hence, the translation would have modified the real essence of the question.

²⁴⁵ Compiled by the author

4. Data Analysis

The aim of the study is to verify whether the implementation of the Open Innovation Model led to competitive advantage. The research was not oriented to the verification of the existing literature about the topic, but to the employment of data for the development of theoretical implications. In this regard, it was decided to apply a *grounded theory methodology*, through the application of codes and categories deduced from data. Indeed, all the relevant data were translated into words or short phrases, then, the resulting codes have been grouped into categories whose interconnections generated theoretical propositions. Then we proceeded importing the relevant data on the Computer-Assisted Qualitative Data Analysis Software NVivo, which proved to be crucial to gain the quality for the analysis of data.

The first step of the analysis consisted in the analysis of the ideas proved by the interviewees, with the identification of 50 codes, the ones which best suited the research. After, thematical macro-categories comprehensive of more codes were created. For the first analysis, we started from the general codification of Open Innovation, identifying Open Innovation itself as selective code. Hence, the first derived axial codes were about the *strengths* of the Open Innovation model, meaning its benefits compared to the Closed Innovation model. According to the answer we received from the participants, one of the major strengths of Open Innovation is for sure the *interdisciplinary*, thanks to which companies and start-ups can access different sources of knowledge from the outside. Following the same logic, another identified benefit was the *outsourcing* from global networks, which allow firms to invest in huger projects in a risk-sharing environment. Of course, the subsequent axial code was about the *weaknesses* of the Open Innovation model, such as the *existence of some legal constraints* which, sometimes, do not legally allow firms to take part in global projects in an open innovation environment, By the analysis of the two axial codes, and their relative open codes, it can be noticed that within the strengths of open innovation, 18 different codes have been identified, against the 7 codes under the axial code of the weaknesses. However, despite the disadvantages identified, companies, startups and the academic community agree on the beneficial effect of the Open Innovation. The second selective code identified was about the *Open Innovation model and its effects on Competitive Advantage*. Also in this stage, two axial codes were identified. The first

was the *product innovation*, while the second was the *dynamic capability approach*. Among these it emerged that participants are even more aware of the fact that with the market opening to the globalization world, for a firm it is impossible continue working and innovating in isolation; open innovation is the only organizational model applicable if a company want to survive and being competitive on the market.

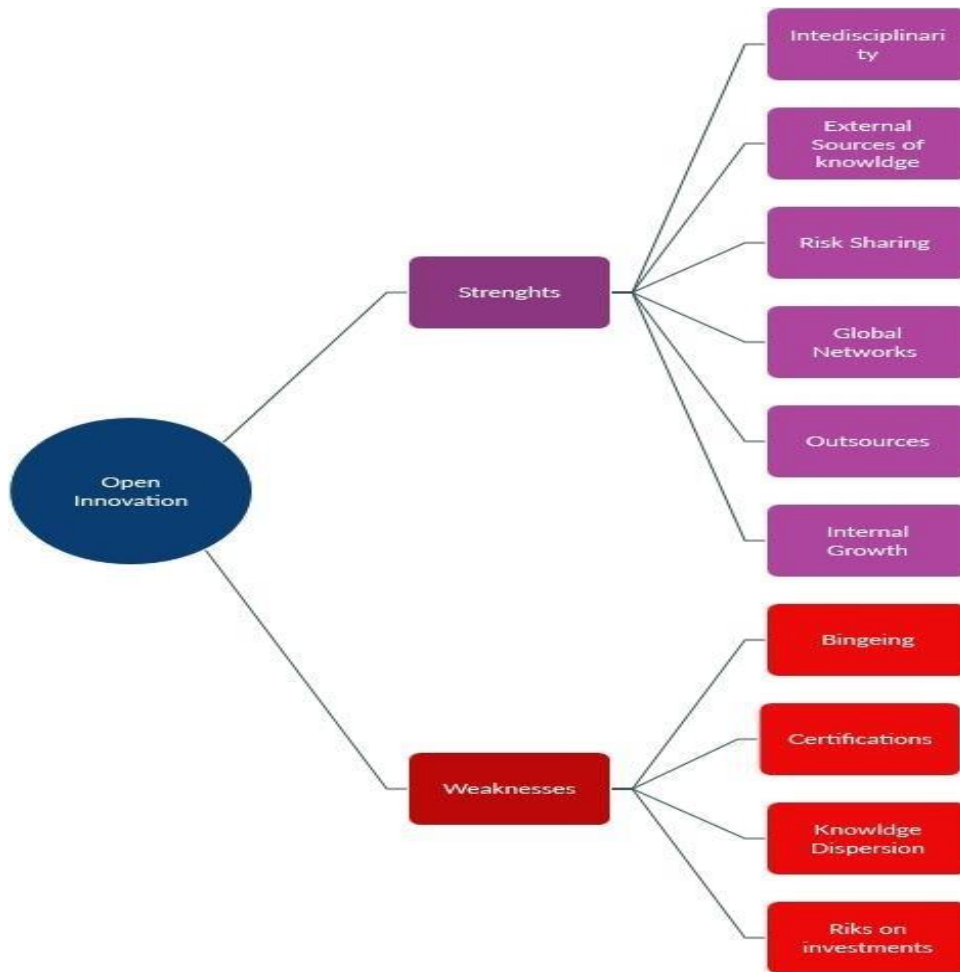
Looking at the results, it seems more widespread the opinion of those who believe that opening the firm's boundaries and create valuable linkages between the more different entities (entrepreneurial, academic and political) is the only way to gain competitive advantage and conquer the market predominance.

In order to facilitate the interpretation of the data presented, the above categories *Open Innovation Strengths*, *Open Innovation Weaknesses*, *Product Innovation* and *Dynamic Capability*, have been grouped into a coherent framework, codified into two counted core categories which reflect the main purpose of the research. The resulting selective codes are Open Innovation, examining the model itself with its strengths and weaknesses, and Open Innovation leading to competitive advantage.

One of the main obstacles encountered is for sure, the absence of numerical data. Indeed, this may represent a limitation given the absence of quantifiable references. Qualitative data such as the ones adopted, on the contrary, may be interpreted in such different ways, making the analysis less reliable and more difficult. However, the adoption of the data analysis software NVivo contributed to making qualitative data reliable, thanks to the counting and analysis of relevant words and phrases.

In order to make these results more comprehensible, a graphical representation of the coding is provided.

Figure 5.2 Open Innovation selective code²⁴⁶



²⁴⁶ Source: screenshot from NVivo

Figure 5.3 Open Innovation and Competitive Advantage selective code²⁴⁷



5. Findings

Now the findings of this research will be presented. On the basis of the data analysis several themes related to the Open innovation model adoption have been identified.

Drawing from the interviewee's answers, several numbers of open codes were collected, grouped in four axial codes: the *strengths* of the Open Innovation model, its *weaknesses*, the *product innovation*, and *dynamic capability*. The two graph shows the selective codes the research focuses on, and the following linked themes: the first one analysis Open Innovation and the related subjects identified as '*Primary research Area*'; while the second one, analysis its correlation with the gain of competitive advantage and it was classified as '*Secondary research Area*'.

Primary Research Area

Within the primary research area, we will focus on the emerging strengths and weaknesses of the Open Innovation model.

Strengths: many participants affirmed that contemporary companies are even more willing to invest in the Open Innovation model. Depending on the answers we collected, we grouped all

²⁴⁷ Source: screenshot from NVivo

the data in two macro-strengths: the model suitability for young people and its multidisciplinary approach. Regarding the former one, Aleardo Furlani, founder and CEO of Innova, affirmed that *'Surely, there are some models that are easier to implement for those accustomed to digital and to communities; the model is more suitable for the younger generation of entrepreneurial people. However, Innova was born many years before the first practical theoretical enunciation of the Open Innovation framework, and we work as a start-up's accelerator. Hence, also for us Open Innovation is the model which best fits our company's needs and goals'*. Also, Enrico Bassi, coordinator and designer for the company Open.dot, took the same position as the Innova's CEO, affirming that *'Open Innovation is a model more suitable for the younger generations, but it is not exclusive. In fact, young people can be the engine of the Open Innovation model implementation, but they need to be followed by the existing enterprises which, usually, are characterized by older management systems'*.

The second macro-strength identified is the interdisciplinary of the model. In fact, the multidisciplinary approach allows the company to refer to a great variety of skills useful for the functioning of the company itself. Filippo Mori, Co-founder and CEO of Kedrion Biopharma affirmed that *'Open Innovation model provides the company an approach that is openness to new knowledge, which determines an increase in the development and new market opportunities'*. Another interviewee, Antonio Zangrilli President of Mediapharma stated that *'For our company, open innovation is fundamental. We understand the importance of R&D in our industry, and then we ask ourselves why we don't share our research and development capabilities with others, starting collaboration which could increase our performance and the overall network performance?'*.

Weaknesses: based on the interviews, a lower number of weaknesses were found compared to the strengths already mentioned. However, there are some risks derived from the adoption of the Open Innovation model. The major risk identified was the one concerning the *'knowledge dispersion'*. In this regard, for example, Aleardo Furlani affirmed that *'when a company accepts to open its boundaries, it needs to accept also the risks deriving from this choice. The major risk companies are afraid of is, of course, that the internal capabilities and knowledge could be used by competitors. In this way the company loses competitiveness in the market. However, these risks can be mitigated with legal assurances, such as copyright and patents'*. Another

limit identified for the implementation of the open innovation model is represented by the existence of some legal constraints. In fact, Lorenzo Abeni, senior consultant of Isinnova reported that *'Our company works in partnerships with many public institutions; in research we have very strong constraints that are imposed by the same financiers of individual projects, and so somehow we have to stick to the will of the individual financier in the choice of the model we have to adopt'*. Also, Enrico Bassi added that *"there are certification procedures that are not very simple, and today there is still no clear regulation about projects born from Open innovation model, so far we have never been able to evolve the project, legalizing it precisely because the certification procedure was too expensive and difficult"*.

The second weakness identified within the data collection is *'the survival in some entrepreneurial environment of the Closed innovation model'*. About this issue participants offered different insights, in fact for some of them the two model can coexist, just as Edoardo Furlani affirmed *' "you cannot make a ranking between; in some cases, it is better for the entrepreneur to adopt the traditional model, while in others it is preferable to embrace the Open one"'*.

We can conclude that strengths outnumber weaknesses, and in light of this, the very focal point is the capacity that firm obtain from the implementation of the Open innovation model of acquire new knowledge from the external environment, which will create, if well managed, new opportunities for the firm itself.

Secondary Research Area

As we did for the Primary Research Area, here two main research themes were identified: *product innovation and dynamic capabilities*.

Product Innovation: many of the participants, in particular the ones operating in the medical industry, such as Antonio Zangrilli, Filippo Mori and Aleardo Furlani, agreed on the strict positive linkages between the adoption of the Open Innovation Model and the successful Product Innovation.

Filippo Mori affirmed that *'Product innovation is nowadays essential for companies to win competition and to secure market position. In a world that is even more driven by the*

globalization forces, and where businesses are even more part of global networks, a company cannot operate in isolation. For being successful in its production innovation activities companies need even more partners and collaborations, companies need Open Innovation'. Also, Aleardo Furlani continued affirming that 'in 2020, trying to give a fast response to the pandemic-crisis, our company was working on a project called EverMusk. EverMusk was resulted by product innovation practices, and it was carried out by our company that would never have been successful without the external partnership we established. That project was a success, and we not only conquered the market but also positively affected society'.

Dynamic Capability: all the participants agreed on the need for companies to own certain dynamic capabilities. Here are again the words of Aleardo Furlani, who demonstrated himself to be a great sustainer of this need. "All the companies need to have dynamic capabilities. That is why we live in a dynamic world, in a dynamic society and a dynamic economy. Companies need to adapt to this dynamism, and they cannot lay down anymore in their castle of glass. A company needs dynamic capabilities because it is the only way to rapidly identify potential new technologies and to adapt to the frequent changes in the external environment. In addition, we will now provide the testimonies of one of the most important figures in the Open Innovation field, Professor Henry Chesbrough, who affirmed: 'Open Innovation and Dynamic Capabilities are essential for each other. In fact, we cannot have Open Innovation if the company does not own dynamic capabilities, but, on the other hand, a firm which possesses dynamic capabilities, is probably already embracing the Open Innovation model'.

6. Discussion

Until now, it has been observed and investigated the spread of the Open Innovation model. In the first analysis the research deals with the analysis of Open Innovation more in general, addressing its characteristics, strengths and weaknesses. While the second analysis focused on the correlation between Open Innovation and Competitive Advantage, precisely how Open Innovation can lead to Competitive Advantage, focusing on product innovation and the dynamic capabilities of the company.

6.1 Providing an answer

The main question of this research was *'To what extent can Open Innovation lead to competitive advantage?'*. To answer this question, we need to focus both on the strengths of the Open Innovation model, and on the emerging findings about the product innovation and the firm's dynamic capabilities.

The main strength of the Open Innovation model is its multidisciplinary approach, by which companies can access different sources of knowledge from the external environment. The innovative elements, therefore, do not rely anymore on each single entity of the innovation environment, but on the linkages that these entities can create. The R&D activities need to be shared in order to create a huge knowledge base, which every company will use to acquire competitiveness in the market.

Moreover, focusing on the product innovation side and the dynamic capability approach, it can be concluded that the performance of an organization is determined by its core assets and the way the organization manages them. A firm possessing dynamic capabilities will be for sure more competitive than the others. In fact, in a rapidly changing environment, the ability to sense and seize new sources of knowledge, acquired both from the internal and the external of the organization and transforming these resources in new assets for the firm, is a key resource contributing to the creation and the maintenance of competitive advantage. However, the dynamics would be ineffective in a context of Closed Innovation, they can be valuable implemented only sequentially the Open Innovation model implementation. That is the reason why companies need to carry out Open Innovation, in order to integrate the mentioned dynamic capabilities, gaining a significant product innovation, which will result in the company's competitive advantage.

6.2 Recommendations

This thesis works, wanted to demonstrate how Open Innovation adoption can lead to competitive advantage, and which capabilities, in particular dynamic capabilities, a company needs to adopt in order to the valuable implementation of the model.

After having provided a description of the Open Innovation model, and its crucial role in the competitiveness of the firm, now some recommendations will be developed for firms, to be ready to change their internal organization in order to open to new opportunities.

The first recommendation relates to a better understanding of 'innovation' and 'openness', and how to rapidly identify them. This means that companies should be more informed about the changing innovation environment, in order to be always ready to adapt to any changes in the external environment. This is essential for companies to be constantly aware of the market's needs and forces.

The second recommendation, strictly linked to the first one, relates to the organizational culture each company adopts. In fact, companies should not only look at their direct competitors and the traditional incumbents in the market, but they should also look at the nicest markets, where small new entities emerge bringing to the market new innovative products and services, as well as organizational structures. In light of this, indeed, companies should never focus on a single market segment. In fact, innovation can be found in different environments, even the less probable ones. The sensing and seizing capabilities will allow firms to catch these opportunities from the outside, but firms must be ready to adopt them.

A last recommendation is to change the traditional way of elaborating strategies by shifting from a company-based view, focusing on the internal capabilities, such as the Research and Development resources, to a network-based view, focused on the knowledge coming from the linkages established within the network.

CONCLUSION

The aim of this working thesis was to answer the question *'to which extent the Open Innovation model can lead to competitive advantage'*. In fact, it was provided an explanation of the factors contributing to the sourceful implementation of the Open Innovation model within and outside of the firm, and which capabilities each company needs to develop, those essential for the implementation of the model.

Of course, in order to define a valuable framework for the implementation of the model, we had to identify the 'innovation environment' with a deep understanding of what innovation really means, and the sources from which innovation arises. In fact, innovation can arise from very different entities, such as companies, institutions, individuals and universities. However, the real value is created by the linkages these entities can create. Indeed, firms should be aware that, in order to gain competitive advantage, they cannot rely anymore only on their internal Research and Development capabilities, but they need to invest in partnerships, favouring the flows of knowledge to go in and out of the firm's boundaries. In this regard, particular attention was placed on the concept of 'network' and 'spillovers', which represent the first strategic essential elements for a deep understanding of the conditions favourable to the implementation of the Open Innovation model.

Moving forward, after the examination of the innovation landscape, in the second chapter we focused on the Open Innovation model, with all of its intrinsic characteristics. We defined Open Innovation as 'the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the market for external use of innovation, respectively'. In an ever-changing environment this model for innovation seemed to be the most fitting, due to phenomena such as globalization, technological development and the velocity and volatility of the market, which made the Closed Innovation model outdated. One of the most important aspects outlined in this section was, for sure, the consideration of the Open Innovation model under the dynamic capabilities' perspective. In fact, we focused on the nature of the capabilities a company needs to possess in order to implement the Open Innovation model. Such capabilities are the sensing, seizing and transforming ones. However, it is important to outline

that Open Innovation and Dynamic capabilities seem to be directly correlated. They are essential to each other's: without the development of these capabilities, the company will not succeed in the implementation of the Open Innovation model, and the latter one represents the clear signal of a firm being dynamic.

While in the previous chapter the attention was on those capabilities a firm needs to develop in order to be competitive in the innovation environment, such as the sensing, the seizing and the transforming ones, in the third chapter of this working thesis we investigated the correlation between these capabilities and a networked business model. With networked business model we mean a business model which insists on the importance of the institution of valuable linkages and partnerships in the external environment. In this sense the transforming capabilities are crucial for the firm: it must be able to internalize resources from the external environment. Each company must integrate the external knowledge and resources and manage inter-organizational relationships outside of its boundaries, being able to deal with potential external contingencies such as the organizational culture, technological turbulences and dynamic competition. Companies which succeed in these challenges will be able to implement the Open Model of Innovation, gaining, finally, competitive advantage.

The last chapters, the fourth and the fifth can be analyzed together, since the former one took in consideration the theoretical results of the studying, and the last one focused on the empirical results. In fact, after the analysis of all the internal and external factors which could affect the company's choices through innovation, we can finally conclude which is the correlation between the three pillars this work is built on: Dynamic Capabilities, Open Innovation and Competitive Advantage. It was shown that the firm's performance is determined by the number of assets it owns and the extent to which it uses these assets strategically. In particular, we saw how the sensing and seizing capabilities are essential for the acquisition of the intangible and tangible assets from the external environment. While the transforming capability appears to be crucial for internalizing these resources and being able to adapt to the environment which constantly changes. These are the key resources for the company to gain competitive advantage, and, at the same time, they are crucial for the firm to carry out the Open Innovation model, since they affect the company's product innovation performance and consequently its competitive advantage. We decided to find an empirical outcome of these findings taking in

consideration some examples of Italian companies which decided (or are willing to) adapt their business model, since they understood the importance of being innovative for the maintenance of their market position, and the resulting competitive advantage. In fact, in chapter five, after having explained the research strategy and the research design, based on inductive and qualitative research approach, it is shown the empirical result of this study, thanks to an accurate data analysis, carried out with the Computer-Assisted Qualitative Data Analysis Software NVivo. In this regard, it was decided to apply a grounded theory methodology, through the application of codes and categories deduced from data. The findings of the research can be divided in the Primary Research Area, where the strengths and the weaknesses of the Open Innovation model were identified, with a considerable disparity in favor of the strengths against the weaknesses; and the Secondary Research Area where the two recurrent elements identified were product innovation and dynamic capabilities. This section of the findings was crucial, since all the data resulting from the interviews confirmed that Open Innovation is directly linked to product innovation and dynamic capabilities. Regarding dynamic capabilities we can affirm that they play a crucial role in a company's competitiveness, since these refer to a firm's ability to adapt and evolve its processes, strategies, and resources to respond to changing market conditions and opportunities. By having strong dynamic capabilities, a company can quickly respond to shifts in the market, leverage new technologies and innovations, and stay ahead of its competitors. This, in turn, can enhance a company's long-term competitiveness and overall success. On the other side, regarding the product innovation, we found an intrinsic correlation with the already mentioned dynamic capabilities, which will lead to the implementation of the Open Innovation Model. In fact, Product innovation is closely linked to dynamic capability as it is a key aspect of a company's ability to adapt and evolve. Dynamic capabilities allow a company to identify and pursue new product innovation opportunities, as well as to effectively develop and bring new products to market. The development and commercialization of new products require a combination of various resources, such as research and development, design and engineering, marketing, and manufacturing. Dynamic capabilities enable a company to effectively coordinate and integrate these resources to pursue new product innovation. Moreover, product innovation can also enhance a company's dynamic capabilities by providing new sources of revenue, enabling it to explore new markets and customer segments, and creating new opportunities for growth and

differentiation. By continuously innovating and introducing new products, a company can maintain its competitiveness and stay ahead of its competitors in the market. All of these elements result in the company's competitive advantage. Finally, we provided the answer to the initial research question: ' *To what extent can Open Innovation lead to competitive advantage?*' concluding that Open Innovation can definitely represent a competitive advantage for a company. In particular a firm adapting to any changes in the external environment, hence being in this sense 'dynamic', and being able to create valuable linkages, is ready to adapt its business model through the openness and the innovation, the main driver of competitive advantage.

Once the Research Question had been answered, it is time to make some considerations. In order to understand the real value behind the implementation of the Open Innovation model, we can precise that the first and most important objective for the firm is to maximize its profits. The implementation of the Open Innovation model stands for two main pillars: the fact that the firm has innovated its business model and that it has engaged in an innovative mindset and culture.

What about the first, business model innovation is crucial for a company's success and long-term competitiveness, since it enables a company to respond to market changes, create new opportunities for growth and profitability, and differentiate itself from its competitors. However, the researcher, thanks to the confrontation with the interviewees and experts, understood the importance for the firm to implement the open model of innovation, since its implementation represents a clear signal of a switch in the organizational culture within the firm: from the closed-in, to the opened-up. It means that the company does not operate anymore in an uncertain environment, where sharing is a risk for the company itself, but it decides to open up its boundaries, investing on the creation of strengths external linkages. This is the new path forward to innovation and fair competition.

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Summary

Innovation can be considered the main mechanism companies can use in order to grow and to create a competitive advantage. In fact, firms are constantly looking for new ways to innovate, transforming their business models and strategies in order to maintain their market position and their superior performances. Traditionally firms, according to the Closed Innovation model, used to emphasize their internal capabilities, focusing on the control over the entire innovation process. In fact, Closed Innovation refers to the model firms adopted where the main focus was on the protection of the internal Research and Development (R&D) functions, and on the development of the internal process for the product innovation. However, phenomena such as globalization, technological development and market volatility, have called attention to the need for a transformation of the traditional model of innovation. The need for a change is imperative, since technological and economic changes and trends suggest that the single firm cannot anymore innovate in isolation. Hence, firms need to open their boundaries, accepting new knowledge and resources flows from the outside. These flows need to be found in the linkages established within the so-called Global networks, networks made of companies, institutions, government incubators, non-profit organizations, and universities. In this context Open Innovation (OI) can be defined, using the words of Henry Chesbrough '*the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively*'. Given these developments, the fundamental assumption of this work is that firms are increasingly transforming their organizational internal structure, gradually adopting open models for innovation. This means that companies understand the necessity of developing those capabilities, the so-called dynamic capabilities, which will enable the company itself to survive and maintain its predominance in the market, in this dynamic environment, characterized by a growing number of external factors influencing the firm's performance. For this reason, one of the main aims of this thesis work will be to analyze which are the capabilities a firm needs to possess to gain competitive advantage in the ever-changing environment, and, whether the adoption of the Open Innovation model helps firms to be maintain and grow their competitiveness on the market.

In order to develop a proper analysis, a research question needed to be built. Hence, after the initial screening of some documents and books related to the topic, an intriguing aspect of Open Innovation was individuated: the dynamic capability, and in particular, how Open Innovation can lead to competitive advantage under the dynamic capability framework. Therefore, considering both the definition of Open Innovation and Competitive Advantage in the modern business environment, the

main research question has the aim to understand the conditions under which Open Innovation can lead to competitive advantage, as you can see below:

RQ: To what extent the Open Innovation can lead to competitive advantage?

However, the focus of the work is also to study which are those capabilities a firm needs to develop in order to maintenance and increase its position on the market and within the innovation environment. Thus, a sub question leading the research has been developed as you can see below:

- *Which are the typical capabilities a firm needs to develop in order to gain a competitive advantage?*

Chapter One. Technological Innovation: the dynamics

The first chapter of this working thesis started with the explanation of the importance of Technological Innovation and how innovation can produce positive externalities for all society. Technological Innovation is that element which boosts the growth in the economy and in society. Analyzing this framework showed the reader the reasons why firms should embrace innovation, and most importantly the strategies the firm invests in. These ways are the more different, in fact, innovation can arise from very different sources, and from very different linkages. Firms should be aware that, for being competitive on the market, they cannot rely anymore only on their internal capabilities, such as the internal R&D resources, but they need to invest in partnerships, favoring the flows of knowledge to go in and out of the firm's boundaries. Within the Innovation environment, the crucial element that was highlighted, was be the rise of the 'networks' and the 'spillovers'. Such will create a fertile ground for firms to embrace the new model for Innovation, the Open Innovation model, a new strategic tool that later in this research will prove to be essential for the firm's competitiveness and for gaining competitive advantage.

Technological innovation has become a crucial element for companies to gain a competitive advantage in various industries. This is driven by factors such as globalization and advancements in information technology, which have made it easier for firms to produce new and differentiated products to meet the needs of specific customer groups. Companies such as Toyota and Samsung have successfully implemented innovative processes, leading to a wider range of products and a more segmented market. As competition increases, innovation has become the new strategic imperative across all industries and those who do not adapt will face difficulty in remaining competitive.

The innovation process has had a significant positive impact on society, particularly in terms of delivering goods and services globally and contributing to the growth of the economy. The growth in

GDP per capita over the past few decades can be largely attributed to technological change and the advancements in innovation. The benefits of innovation have been felt across various industries and have improved the quality of life for individuals all over the world. The continued development of technology and innovative practices promises to bring even greater benefits to society in the future.

Innovation can be generated from various sources such as individuals, universities, government incubators, non-profit organizations, and firms. Firms have the most resources and management systems to support innovation, but the most important source of innovation is the linkages between these entities. By forming a network, these entities can collaborate and leverage each other's strengths and resources to bring new and innovative solutions to the market. This network of entities is the most powerful agent of technological innovation.

The innovation process is a complex and multifaceted phenomenon, but what is certain is that its success today is largely dependent on the existence and effectiveness of collaborative research and development networks. By bringing together different sources of knowledge, expertise, and resources, these networks facilitate the exchange of information, ideas, and technologies, which ultimately leads to the development of new and more innovative products and services. It is important for companies and organizations to recognize the importance of these networks and to actively seek out opportunities to participate in them, in order to remain competitive and to continue to drive economic growth and development.

Another way to explain the diffusion of knowledge across organizational and regional boundaries is the issue of technological spillovers, '*a positive externality to research and development resulting from the diffusion of knowledge across organizational or regional boundaries*'¹. They appear when the benefit from the research activity of a company (or whatever other entity) spills over to other companies (or entities). So, we can define spillover as a positive external effect resulting from the company's R&D efforts. It is obvious that spillovers are one of the most important drivers for any innovation process.

Spillovers and technology cluster represent the real starting point for our discussion on the theme of Open Innovation. As we will see later in this thesis, Open Innovation is the framework by which the internal firm's boundaries are abated in order to complete knowledge sharing, which will bring to a greater and higher innovation perspective. Spillovers and Clusters are the right basis of the hugest and hottest theme research topics in the field of contemporary management, Open Innovation.

Chapter Two. The Fuzzy Front End Era of the Open Innovation

After the initial presentation of the innovation landscape, with all of its actors and its opportunities for firms to grow, the second chapter will focus on the strategies a firm can implement in order to be competitive in the innovation landscape, such as the adoption of the Open Innovation Model.

In order to understand the company's choices, it was presented the phenomena which lead to the implementation of the Open Innovation and the reasons why companies are even more willing to change their business models; then it was defined both the Open and the Close Innovation model, deepening down the differences, and finding in the literature insightful opinions. Finally the researcher introduced the concept of dynamic capability, essential for the companies to successfully implement the Open Innovation Model.

In the past decades, firms and companies used to adopt a different model for innovation: the Closed Innovation model, which focused on the internal resources of the firms rather than the external to improve the innovation process. In fact, all those firms adopting the Closed Innovation model prefer to invest their resources for the internal Research and Development activities, only relying on their internal process in order to launch new projects.

This means that the company itself becomes the center and place of the innovation process, the first base for the exploration and use of internal technology.

However, phenomena like globalization, technological development and the velocity and volatility of markets, made the Closed Innovation model obsolete and not in line with the ever-changing world. For example, when talking about competition, the focus is not anymore on the competitive environment concept, but on the competitive landscape, characterized by the absence of any boundaries (which was an intrinsic characteristic of the competitive environment concept) and the dynamicity, typical element of the landscape, which is always in change compared to the environment which, on the other side, is static and stable. Firms can not anymore innovate on their selves, isolated from the others. In fact, an alternative approach for the management of innovation, proposes firms to open their boundaries, enriching their knowledge with the external resources, combining internal and external knowledge in its innovation process and bringing internal inventions to market using innovative and external methods. In this context we can define Open Innovation *"the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the market for external use of innovation, respectively"*.

While Closed Innovation model focuses on the protection of the internal knowledge, firms adopting the Open Innovation model are characterized by a diffused mentality based on the "*outside-in*" and "*inside-out*" way of thinking, which enables them to grow on external sources of innovation and commercialization. In '*The Era of Open Innovation*', Chesbrough described all the erosion factors which led the Closed Innovation model of the R&D to a fall, opening the doors for the new Open Innovation model. These factors are:

- *The growing mobility of skilled professionals.* The labor market is becoming increasingly dynamic, and skilled workers are no longer tied to a single company or region, but are changing roles and positions more and more frequently. It is clear that, with staff moving, for a firm it is difficult maintaining in-house the knowledge developed, but, on the other hand, knowledge spread out outside of the firm's boundaries.
- *The rise of venture capital funding, incentive the development of new start-ups.* This also had the effect of restructuring industries, intensifying competition, and shifts in market share. All of these new companies played an important role in innovation, entering the market with highly innovative and sometimes disruptive products.
- *Globalization* of the market also pushed hard for the intensification of competition, as firms, in fact, started to compete not only locally but on a global scale.
- *The need of better specialization.* Indeed, as the complexity of technologies increases, companies must specialize in a narrow area to develop specific skills and competencies. This means that firms should avoid focusing on a wider competencies' portfolio, but they have to insist on a smaller area if they want to keep focus and efficiency.
- *The rise of the Internet,* which has fostered the dissemination of knowledge and the sharing of skills from previously company-specific internal ICT networks to the World Wide Web.

The new paradigm involves all of the external actors to participate in the innovation process: customers, suppliers, universities, competitors, individuals, inventors and start-ups. They all participate to the innovation process following different flexible ways such as collaborative agreements, crowdsourcing, co-creation, external corporate venturing, all of those ways which transcend the traditional notion of innovation alliances.

Nowadays there are still some open questions regarding the ways in which companies can capture value from the implementation of the open innovation. In order to provide a valuable answer to these questions, explaining the phenomenon, it was identified the 'capability perspective' approach. This perspective explains the organizational capabilities and processes that companies must develop to

create a valuable innovation process. These capabilities require a combination of resources both inside and outside the organization's boundaries, and they are likely to be different for the traditional ones found in the R&D settings. This approach explains the way in which firms adopt Open Innovation strategies, and which are the capabilities required in order to adopt those strategies. A crucial question regards how these capabilities represent a competitive advantage in the open environment, where innovation is increasingly distributed and cannot be constrained any more into the firm's boundaries.

Starting from the most common definition of Dynamic capability which is "*the capacity of an organization to purposefully create, extend, or modify its resource base*", it has been individuated other relevant literature giving other interpretations and definitions. Another definition is provided by Eisenhardt and Martin, who argue that resources can be acquired and shed, integrated, and then reconfigured via dynamic capacities. Adaptive, absorptive, and inventive capability are three of the three elements that Wang and Ahmed identify as dynamic capabilities. One of the most recognized definitions^(Oguz) who describes DC as:

- *Sensing and Shaping opportunities.* Sensing dynamic capabilities is the '*mobilization of necessary organizational infrastructure and resources to provide opportunities for producing, acquiring, or shedding resources*'.
- *Seizing Opportunities.* Seizing Dynamic capabilities refers to '*the ability of the company to collect value from these opportunities while favoring a proper integration*'.
- *Reconfiguring Intangible and tangible assets.* The ability of the company to continuously recombine resources in response to changes in the market and technology is referred to as reconfiguring dynamic capabilities.

In conclusion, some of the more crucial aspects of open innovation are addressed through dynamic capabilities. In particular, the integration of knowledge from both internal and external sources, the importance of the business model, and the use of open innovation to include outside technologies. Both Dynamic Capabilities and Open Innovation focus on the ever-changing environment, and the strategies a firm needs to adopt in order to stay competitive. And, finally, both approaches focus on the importance of knowledge, and its role in inter-organizational transactions

For this reason, Open Innovation is considered the result of incorporating external ideas, knowledge and technologies, with the main objective of accelerating the internal innovation processes

Chapter Three. How Firms benefit from Open Innovation

This chapter focused on the implementation of the Open Innovation model in global firms, who decide to open up their business models and to adopt a network structure. It presented the networked business model, representing a competitive advantage for the company, and the importance, for the firm, to be able to interact with the external environment. In fact, if in the previous chapter the focus was on the importance of acquiring external sources of knowledge, while in this chapter particular attention was put on the central role of integration with the external environment, in order to successfully integrate external resources. As it was previously stated, this is the reason why much importance was given to the linkage between Open Innovation and Dynamic Capabilities, because thanks to DC, firms are able to integrate sources and manage inter-organizational relationships with the external environment, successfully dealing with potential external contingencies such as organizational culture, technologies turbulences and dynamic of competition, finally getting to competitive advantage.

Previously, the company and its business model were the key issues of analysis of open innovation. Now, as Chesbrough suggests, the inter-organizational level, or the network of entities and the value those entities can jointly create, should now be the new focus area. In this case, the "relational view" offers a useful theoretical framework for the investigation of open innovation.

As Chesbrough affirmed: *'In open innovation, companies, developing their new products and services, rely on both internal and external resources, and the internal resources can be deployed using inside and outside path to the market'*. In this framework, all the firms, even the largest ones, cannot develop the required resources alone, but they need to cooperate, letting resources flow from one company to another. This is the sign that the firm's boundaries are becoming even more permeable, favoring the match between the market opportunities and capabilities, as well as a better allocation of resources. The main elements analysed in this chapter are, for sure, the impact that Dynamic Capabilities and Global Networks have on the optimal implementation of the Open Innovation model.

In contrast with the classic Resource Based View (RBV), for which the tangible resources are the most important asset for a firm, the Relational View emphasizes that the firm's resources should not be protected, neither developed only within the firm's boundaries, but they must be looked for also outside the firm's boundaries. Two or more firms who jointly decide to collaborate will be able to combine resources and knowledge, getting competitive advantage over the rivals who choose a stand-alone strategy. The innovative element of the Relational View stands in the perception of the inter-organizational relationships as a form of competitive advantage, which is one of the main assumptions

of the open innovation in se, considering external knowledge coming from external partners as a source for gaining competitive advantages. Moreover, the Relational View, focuses on the '*network*' as its unit of analysis, so for this reason, it is no more reasonable thinking about resources in terms of firm's resources, but only as something that goes beyond the control of the individual firm.

Specifically, Networks can refer to a variety of different things, but in the context of innovation they generally refer to connections between people, organizations, or other entities that can facilitate the exchange of information and ideas. These networks can include formal organizations such as research institutions and companies, as well as informal networks such as communities of experts or hobbyists.

There are various definitions of '*network*'. Freeman defined network as '*a pattern of organizing involving more and more connections: networks involve collection of nodes (individuals, teams, organizations etc.) which are linked to each other's by relationships. If these relationships take place within groups of firms or public-sector institutions, they can be addressed as innovation networks*'. Today, networks play a central role in the innovation process. First, the formation of networks is the direct result of the globalization phenomenon. On the one hand, globalization has led to the expansion and strengthening of networks by providing new opportunities for trade, investment, and collaboration across borders. The growth of international trade and investment, for example, has led to the creation of new networks of suppliers, customers, and partners for companies operating in global markets. Additionally, advances in technology and transportation have made it possible for people and organizations to connect and collaborate across borders more easily than ever before. For sure, one of the main strengths of networks is that they allow firms to reach goals that alone they could not reach. For example, firms can take part in any collaborative R&D project, because costs and risks are shared, otherwise, it would have been impossible to take the responsibility of such investment alone.

Additionally, networks enable extensive self-help through experience sharing and learning. In fact, cooperative networks in Europe allow small businesses to compete globally as well.

What it is clear, and the most important element behind any network formation, is not in reference to the costs saving, but relies in the strategic behaviour (appropriation of knowledge, technological complementarity, trust, ethics cooperative mind) that each company decide to adopt, a behaviour even more in line with the open innovation framework, that firms are adapting to. The challenge for managers consists in matching these external relationships with the internal capabilities. This is the way for the firm to create value. In fact, firms participating in business network can evolve capabilities around new forms of innovation, due to the number and variety of the network components, who bring and share with the others their expertise. In this way cross-functional cooperation and

interaction with all the different entities such as, R&D units, manufacturing, services and marketing companies, make the company able to acquire new capabilities, enhancing also interaction with third parties, both in the private and public sector.

This image of global network deals with the theoretical framework of the Relational View, claiming that companies which cooperate and collaborate combining resources and knowledge are more likely to gain competitive advantages on the market, than those companies implementing a standing alone strategy.

We can conclude that Open Innovation can be considered a valuable and more efficient alternative to vertical integration as a value-creation strategy. In this context firms decide to join global networks in order to sense the future market trends, to reduce the entry time to markets and to tap into new knowledge and external knowledge sources. However, as it was presented, external technological sources are not enough for the innovation process to succeed. In fact, there are other factors which can influence the firm's innovation process, such as the environmental dynamics and the firm's capability to internalize the external sources of knowledge. Consequently, the success of Open Innovation depends on dynamics capabilities (the ability to integrate sources and manage relationships with partners with critical resources) as well as environmental factors, including organizational culture, technological turbulences, and competitive dynamics. Once the conditions are realized the firm will be able to get a competitive advantage from the Open innovation model implementation

Chapter Four. Theoretical Findings: Open Innovation Leading to competitive advantage

In the Second Chapter, in its last paragraphs the research focused on the firm's Dynamic Capabilities, particularly focusing on the Dynamics Capabilities developed in the context of Open Innovation. Now, after the analysis of all the factors, internal and external of the firm's boundaries, the researcher will finally use the dynamic capabilities perspective for gaining the theoretical foundation of the open innovation leading to competitive advantage. The researcher firstly distinguished between Dynamic Capabilities, Open Innovation and Competitive Advantage. Then we will go through the correlation between Dynamic Capabilities and Open Innovation; second between Dynamic Capabilities and Competitive Advantage; finally, we will show the correlation between the adoption of the Open Innovation Model and Competitive Advantage.

Competitive Advantage refers to *'the ability gained through attributes and resources perform better than competitors in the same industry'*. Within the corporate competitive advantage three set of theories have been identified:

- *The Industrial Organizational View (IOV)*. A competitive advantage can be gained through the structure of industrial competition according to this theory.
- *The Resource Based View (RBV)*. This theory insists on internal capabilities and resources.
- *The Dynamic Capability View (DCV)*. This theory explains that the ability to consolidate, structure and reconfigure capabilities exists both inside and outside of the firms and thanks to this ability the firm can adapt to the environmental changes.

Within these three theories we the research focused on the last one, since it can better explain how the business performance changes depending on the capability of the firm to consolidate, integrate and reconfigure internal and external competencies in line with changes in the environment.

In this chapter it was theoretically demonstrated the correlation between dynamic capabilities and competitive advantage, through the impact that DCs have on the Product Development. Since it was found a positively growing correlation, we can now affirm that the firm's performance is not only determined by the amount of assets the firm owns, but also by the way the firm effectively uses them. In particular, the sensing and seizing capability is essential for acquiring intangible and tangible assets from the external environment, and transforming capability is crucial to transform the existing knowledge whether environmental changes verify. These are all key resources for the creation and the maintenance of competitive advantage. These three dynamic capabilities are essential for every firm to carry out Open Innovation, and they need to act together, in a comprehensive manner in order to affect the product innovation performance and competitive advantage. The research took into consideration helped to understand the interrelation between the adoption of the Open Innovation model and competitive advantage. In fact, open innovation faster the firm willingness to innovate and to adopt dynamic capabilities that are essential for the survival of firm in the ever-changing environment. Hence, Open Innovation is one of the key resources for competitive advantage.

Chapter Five. Research Methodology

In the following chapter it was explained the research methods adopted during this research in order to answer the main research question *'To which extent can Open Innovation lead to competitive Advantage'*. The chapter provided both the research strategy and the research design, and then it will go through some aspects of the data collection and data analysis, finally getting to an empirical answer which will confirm or not the theoretical findings already mentioned in the previous chapter.

During this working thesis it was decided to follow a *qualitative approach* since the field of study and the research question appeared to be more suitable for a descriptive outcome for the observation of the phenomenon. In fact, the most suitable approach for giving an answer to our research question appeared to be the *inductive approach*, which aims to generate a theory starting from observations of the field of study chosen. After choosing to apply a qualitative analysis based on an inductive approach, we had to evaluate which research design better fits this research. It was chosen the cross-sectional design, since the aim of the research was not the deep exploration of specific companies, but providing a general theory based on the analysis of our candidates.

After the identification of the right research strategy and design, now we will go through the research methods adopted in this research. We adopted two main sources of data gathering. The first concerns the *secondary data collection*, which was carried out through a systematic literature review that made possible to identify the most relevant theoretical findings regarding the adoption of open innovation and its effect on competitive advantage. The second source concerns the *primary data collection*, gathering insights from qualitative interviews with companies and academics.

In order to increase the quality of this study, six participants were identified, both from entrepreneurial and academic environments. To get more information and insights about the topic studied, we identified five different companies which differ in size, each of which is represented by people with different roles.

Moving forward, after the collection of the interviews needed, the data analysis was carried out thanks to the support of the Computer-Assisted Qualitative Data Analysis Software NVivo, which proved to be crucial to gain the quality for the analysis of data. The first step of the analysis consisted in the analysis of the ideas proved by the interviewees, with the identification of 50 codes, the ones which best suited the research. After, thematical macro-categories comprehensive of more codes were created. For the first analysis, we started with the general codification of Open Innovation, identifying Open Innovation itself as selective code. Hence, the first derived axial codes were about the *strengths* of the Open Innovation model, meaning its benefits compared to the Closed Innovation model. According to the answer we received from the participants, one of the major strengths of Open Innovation is for sure the *interdisciplinary*, thanks to which companies and start-ups can access different sources of knowledge from the outside. Following the same logic, another identified benefit was the *outsourcing* from global networks, which allow firms to invest in huger projects in a risk-sharing environment. Of course, the subsequent axial code was about the *weaknesses* of the Open Innovation model, such as the *existence of some legal constraints* which, sometimes, do not legally allow firms to take part in global projects in an open innovation environment, By the analysis of the

two axial codes, and their relative open codes, it can be noticed that within the strengths of open innovation, 18 different codes have been identified, against the 7 codes under the axial code of the weaknesses. Drawing from the interviewee's answers, several numbers of open codes were collected, grouped in four axial codes: the *strengths* of the Open Innovation model, its *weaknesses*, the *product innovation*, and *dynamic capability*. The two graph shows the selective codes the research focuses on, and the following linked themes: the first one analysis Open Innovation and the related subjects identified as '*Primary research Area*'; while the second one, analysis its correlation with the gain of competitive advantage and it was classified as '*Secondary research Area*'.

After the analysis ended, we finally came up to an answer to the initial research question. To answer this question, we need to focus both on the strengths of the Open Innovation model, and on the emerging findings about the product innovation and the firm's dynamic capabilities.

The main strength of the Open Innovation model is its multidisciplinary approach, by which companies can access different sources of knowledge from the external environment. The innovative elements, therefore, do not rely anymore on each single entity of the innovation environment, but on the linkages that these entities can create. The R&D activities need to be shared in order to create a huger knowledge base, which every company will use to acquire competitiveness in the market.

Moreover, focusing on the product innovation side and the dynamic capability approach, it can be concluded that the performance of an organization is determined by its core assets and the way the organization manages them. A firm possessing dynamic capabilities will be for sure more competitive than the others. In fact, in a rapidly changing environment, the ability to sense and seize new sources of knowledge, acquired both from the internal and the external of the organization and transforming these resources in new assets for the firm, is a key resource contributing to the creation and the maintenance of competitive advantage. However, the dynamics would be ineffective in a context of Closed Innovation, they can be valuable implemented only sequentially the Open Innovation model implementation. That is the reason why companies need to carry out Open Innovation, in order to integrate the mentioned dynamic capabilities, gaining a significant product innovation, which will result in the company's competitive advantage.

It can be concluded Open Innovation can definitely represent a competitive advantage for a company. In particular a firm adapting to any changes in the external environment, hence being in this sense 'dynamic', and being able to create valuable linkages, is ready to adapt its business model through the openness and the innovation, the main driver of competitive advantage.

