CHALMERS
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Exploring Project Management in Open Innovation Projects

A multiple case study investigating practices, challenges and future development

Master of Science Thesis

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Abstract

Innovation is recognized as one of the main factor for firms to maintain a high profitability and pursue a sustainable growth. Traditionally, industrial companies developed new technologies for their products relying exclusively on their own R&D capabilities. In today's competitive markets, "closed innovation" is no longer sustainable due to global competition, thus inter-organizational relationships began to form. In 2003 Chesbrough introduced Open Innovation model, which received increasing attention, and since then the body of literature related to this topic has developed rapidly. Although intensive research has been done on Open Innovation and Project Management, there is a lack of knowledge concerning the connection between these two main topics. Thus the reason why this thesis has been written is that different knowledge gaps have been identified for this connection.

Most of the studies are conducted at a firm level although innovation activities in companies are commonly managed through R&D projects. Shifting the analysis from the firm level to the project-level, the thesis aims to explore project management in Open Innovation projects, which has not been fully investigated in such collaborations, and how project management methodology may change in this setting compared to a traditional setting. Reviewing both Project Management and Open Innovation literature, two aspects appeared to be more interesting to focus on, and they are project managers' roles, competences and challenges and stakeholder management. Concerning the first aspect, traditional project manager roles and personal competencies have been analysed to further understand if they can be used to overcome difficulties and challenges that a project manager may encounter in Open Innovation projects. The second relevant aspect was to understand which project management areas appeared to be more significant in Open Innovation model. After the literature analysis, the authors of this thesis proposed stakeholder management as a field to be observed with particular attention, because the high number and the heterogeneity of stakeholders play a central role for the project's success in this kind of collaborations. The topics examined were the identification of stakeholders, their engagement, and how future collaboration should be prepared. Each one of these resulted to have at the same time similar and different dynamics compared to traditional setting. The cases studied provided numerous insights to better comprehend the connection between stakeholder management and Open Innovation model. The study was conducted through semi-structured interviews in Italy and in Sweden to project managers working in Open Innovation projects. The 7 projects selected involve partners from the Triple Helix such as academia, society and industry.

Joining the two main aspects examined, the authors of this thesis presented some suggestions for project managers on how mitigating challenges found in this context. Finally, the authors have identified the characteristics of an OI project and their implications on project management methodology.

Keywords: Open Innovation, project management, project manager roles, project manager competencies, Open Innovation project challenges, stakeholder management, multi-actor setting

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Francesca Cococcioni

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1. Introduction

In this chapter a short background of the topic of project management in Open Innovation projects will be conducted, highlighting the reasons why this topic is relevant from an academic and managerial point of view. Subsequently, aim, research questions and delimitations are presented in order to get an overview of the study.

1.1 Background

Innovation is recognized as the main factor for firms to maintain a high profitability and pursue a sustainable growth (Elmquist et al., 2009). Traditionally, industrial companies developed new technologies for their products relying exclusively on their own R&D capabilities (Chesbrough, 2003). Thus, most firms pursued relatively "closed" innovation strategies, meaning limited interactions with the outside environment. In today's competitive markets, "closed innovation" is no longer sustainable due to global competition and to complex issues that the world needs to address, such as global warming, renewable energy sources, and poverty. In this situation organizations seek new innovations and try to sustain a sustainable competitive advantage by collaborating with external partners, establishing inter-organizational relationships.

In this innovative context, a popularized business model has been firstly introduced by Chesbrough in 2003 in the field of innovation management with the name of "Open Innovation", in order to describe a new trend in the evolution of innovation theory. Chesbrough defines Open Innovation as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough et al., 2006, p. 1). The external knowledge exploration refers to the acquisition of knowledge from external sources, such as intermediaries and different kind of partners, aiming to support Open Innovation processes. It recognizes that not all good ideas come from inside the firm nor need they all emerge within the particular firm and be commercialized by that same firm. In addition, firms should use and combine internal ideas, as well as external ones, into architectures and systems whose requirements are defined by a business model. After Chesbrough publications, this new paradigm has received an increasing attention by scholars as well as practitioners and the body of literature related to this topic has developed rapidly, even though some researchers have investigated the novelty of this paradigm (Trott and Hartmann, 2009; Mowery, 2009; Piller et al., 2006).

An increasing number of companies have integrated Open Innovation strategies in their innovation processes, and consequently many studies have started to explore the organizational implications of Open Innovation, understanding the challenges associated with collaboration across organizational borders and the difficulties to reach joint goals (Boscherini et al. 2010; Buganza et al., 2011). In particular, empirical research indicates that strong organizational barriers and inertia need to be overcome to ensure a smooth transition of a firm's approach to technological innovation from Closed to Open Innovation (Chiaroni et al., 2010).

Most of these studies are conducted at a firm level although innovation activities in companies are commonly managed through R&D projects. Traditional R&D projects

are conducted within the same firm and they can differ on how they can be managed (Du et al., 2014). However, the thesis will focus on projects that are conducted by different organizations and interact with different kinds of knowledge sources. In order to understand the effectiveness of Open Innovation approach and the sources of innovation is fundamental to shift the analysis from the firm level to the project-level (Chesbrough et al., 2006). This switch allows to explore new aspects, which can be only observed at the project level (Du, Leten and Vanhaverbeke 2014; Chesbrough et al., 2006) such as not knowing exactly what is expected and how to get good results from the project.

Nevertheless, the managerial aspects of such collaboration and the project management perspective are not yet fully explored. Specifically, it is not clear which project management's findings related to closed innovation projects, can be generalized and applicable to Open Innovation projects (Due et al., 2014; Gronlund et al., 2010). Understanding project management in Open Innovation projects requires adopting a perspective that is more detailed than that currently found in the innovation management literature. Some researchers argue that formal project management methodology may not applicable for all kinds of projects, especially when there is a high level of uncertainty associated. The similar context is related to project management in large and complex projects where there is a high level of uncertainty associated. In the literature it has been studied how these projects are managed but due to the general and explorative nature of this thesis, the authors have tried to conduct a wider study on general project management. Managing an Open Innovation project that involves a new technology and new players is thought to be seen differently as to those who produce a product or good with results that uses internal R&D capabilities Furthermore, it might imply new roles for project managers, as they do not have the same mandate, and different responsibilities in comparison to traditional projects who are conducted internally in one organization. If true, different methodology will be required in order to explore opportunities and mitigate challenges in between collaborating actors.

Therefore this master thesis will explore project management in Open Innovation projects, finding out the relevant aspects in this field and presenting some suggestions to project managers on how the challenges can be mitigated. Case studies will be conducted in Italy and in Sweden, selecting Open Innovation projects where three types of actors are involved such as academia, industry and public authority. Therefore an interview study will be performed, focusing on project managers working in Open Innovation projects.

1.2 Aim and research questions

Over the last few decades, although a lot of research has been done about Open Innovation and project management, there is a lack of knowledge concerning the connection between these two main topics. The reason why this thesis has been written is that different knowledge gaps have been identified. First of all, there is a lack of understanding regarding the methodology used by project managers in open collaborative projects. Furthermore, managerial aspects of collaboration across organisational borders are not yet fully explored.

The purpose of this thesis is to explore project management practice in Open Innovation projects. The path begins with the exploration and mapping of actual project management practices, identifying then the challenges that project managers may encounter, due to the number of the organizations involved. Thus, the first research question is as follows:

1. *What are the main roles, competencies and challenges for project managers in Open Innovation projects?*

The following step consists of understanding which project management areas influence mostly projects' activities in Open Innovation. Furthermore the authors of this thesis are attempting to comprehend if classical project management methodology is applicable in a collaborative multi-actor setting, or if additional practices are required to ensure a successful result. Therefore, the second research question is as follows:

2. *What are the essential aspects of project management in Open Innovation, and what is their impact on traditional project management methods?*

Finally, the results, as well as analysis of data, will be used to make some suggestions about how to mitigate challenges in open innovative contexts, and thus some recommendations for future actions will be given.

1.3 Delimitations

The two main themes of this thesis are Open Innovation and project management. Project management is a complex and interconnected set of different competence areas, which are linked with many disciplines, such as Knowledge Management, Change management, Organizational management and Processes management. The authors of this thesis will focus only on core Project management discipline, particularly on more recent project management theory. For what concern Open Innovation, the authors of this thesis did not intend to study how Project management theory and practice change among different Open Innovation modes. This approach was preferred in order to find more general results, even because the topic appears still too much understudied.

The research focused only on Italian and Swedish samples, and only covers a fraction of national samples, due to time limitations. The possible cultural context implications of this focus have not been studied. The authors of this thesis specified the project characteristics to select case studies. The decision to make a case study research design implicates that the findings will be subjective to the specific context in question, and the possibility to generalize outside that context will be limited. Moreover, the analysis is intended to be explorative and not sector specific. However, a case study is a reasonable choice considering the depth we want to accomplish with the interviews within the time schedule.

2. Theoretical Background

2.1. Open Innovation

In this section the authors intend to address the main issues of the Open Innovation concept from a firm level perspective toward sub-level analysis. First of all, definition and classification of this new model are given, focusing on inbound Open Innovation. Secondly, Open Innovation collaborations are explored, highlighting challenges and benefits of these relationships and partners involved. Finally Open Innovation projects and their characteristics are described.

2.1.1 Defining Open Innovation

The term Open Innovation was introduced for the first time by Henry Chesbrough in 2003 to describe innovation processes in which firms interact widely with their environment, leading to a relevant amount of external knowledge exploration and exploitation (Chesbrough, 2003; Van de Vrande, Lemmens and Vanhaverbeke, 2006). In a single sentence, the author defines Open Innovation as:

"*Firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology*" (Chesbrough, 2003, p. xxiv).

After Chesbrough work, this new paradigm has received an increasing attention by scholars as well as practitioners and has acquired several meanings. The definition of Open Innovation proposed by Chesbrough has been questioned and numerous authors argue that this term has a much broader application (Piller and Walcher, 2006). For a better understanding, Chesbrough et al. clarified this concept in 2006 asserted that "*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*" (Chesbrough et al., 2006, p.1). In particular, it consists in stimulating innovation by opening up firm's boundaries to different types of external contributions and ideas (Chesbrough, 2012). The general Open Innovation model is shown in figure 1.

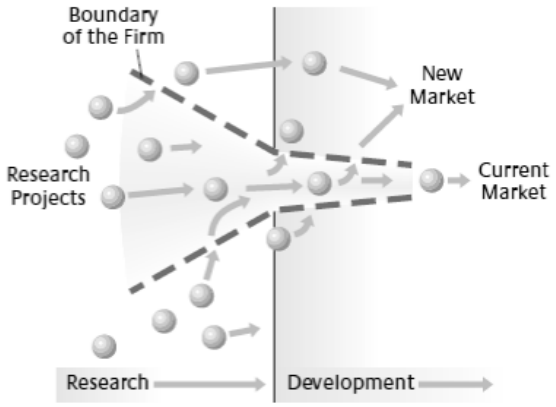


Figure 1. Open Innovation model (Chesbrough, 2003)

This paradigm can be understood as the opposite of the closed innovation model which considers the internal R&D a valuable strategic asset and a formidable barrier to entry by competitors in many markets. The closed innovation model refers to the traditional innovation process in which innovation processes are managed within the boundaries of the firm. Furthermore, the traditional innovation process is closed because ideas flow into the firm on the left and flow out to the market on the right in one way and the connection between research and development is internally focused. In other words, this approach is based on the following conception: *If you want something done right, you've got to do it yourself* (Chesbrough, 2003). For a better understanding of the Open Innovation principles, the differences between Closed Innovation and Open Innovation rules are summarized in table 1.

Table 1. Contrasting principles of Closed and Open Innovation (Chesbrough, 2003)

Closed innovation principles	Open Innovation principles
The smart people in the field work for us.	Not all of the smart people work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company.
To profit from R&D, we must discover, develop, produce and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We do not have to originate the research in order to profit from it.
If we are the first to commercialize an innovation, we will win.	Building a better business model is better than getting to market first.
If we create the most and best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our intellectual property (IP) so that our competitors do not profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP, whenever it advances our own business model.

For the most of 20th century the traditional model worked quite well because firms could access to the market first and obtain the most of the profits, thanks to huge investments in internal R&D more than their competitors and hiring the smartest people.

It allowed them to discover the greatest number of ideas, which they protected by controlling their intellectual property (IP) to prevent competitors from exploiting it.

In the last years different factors made the classic model vulnerable (Chesbrough, 2003; Quarantino et al., 2009):

- The growing mobility of knowledge workers has increased the difficulty for firms to control their proprietary ideas and know-how.
- The emergent presence of private venture capital, which specialized in converting new capable start-up in valuable companies.
- From a strategic point of view, the growing importance of cluster and horizontal business relationships between companies.

In addition, also under an economic perspective the closed business model is not sustainable anymore. This is demonstrated by the figure 2 below, which shows how market revenue does not cover the rising development costs because of the shorter product life in the market.

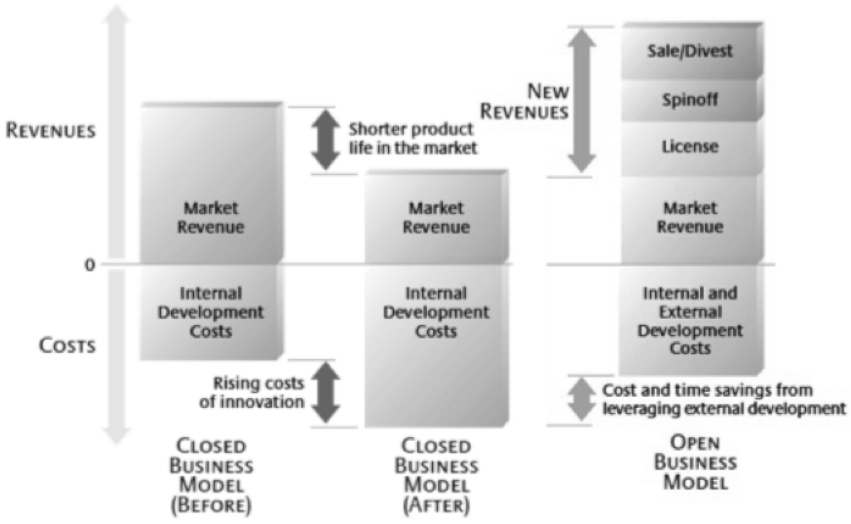


Figure 2. The economics of Open Innovation (Chesbrough, 2007)

In this context a new approach need to be adopted, in which firms open their boundaries to other external sources of knowledge such as customers, universities, competitors, suppliers, consultants and research institutes in order to use ideas and technologies developed by them and reduce the development costs of innovation. Meanwhile, there are new revenue opportunities resulting from participating in other segments and cooperation trough licensing revenues, joint-ventures and spin-off (Chesbrough et al., 2006).
Recently, Mowery (2009), Piller et al. (2006), Trott and Hartmann (2009) have investigated the newness of the "Open Innovation concept" , arguing that since 1970s these technology partnerships between organizations have been increased and it is nothing new as shown by the different kinds of collaborations that already exist. To the critics, Buganza, Chiaroni, Colombo and Frattini (2011) respond that the uniqueness of this concept is situated on the possibility for innovative firms to create new

organizational structures and processes in order to strategically incorporate many traditional innovation activities. Furthermore, Grönlund et al., (2010, p.108) argue that in comparison to the older literature, Open Innovation model "*provides not only a more detailed, but also a more holistic perspective on external collaboration and commercialization"*. Specifically, Trott and Hartmann (2009) believe that the Open Innovation model is an " old wine in new bottles" and accuse Chesbrough to have used a false dichotomy between closed and Open Innovation to introduce the new paradigm. Furthermore, there are many authors who agree with Trott and Hartmann, referring to the fact that this dichotomy doesn't explain well what Open Innovation is in the reality (Henttonen, P. Pussinen and T. Koivumäki, 2012). However, quantitative studies (Chesbrough, 2013) claimed that the management support for open innovation is increasing, and only few firms are abandoning open innovation. This evidence strongly suggests that open innovation is not a fad that is about to go away.

West and Gallagher (2006) introduce another innovation model such as the external innovation to clarify the differences with the Open Innovation. Henttonen et al. (2012) have summarized the managerial attitudes, challenges and techniques of this model in comparison with close and open innovation, as shown in table 2.

Table 2. Three innovation models (Henttonen, Pussinen and Koivumäki, 2012).

Innovation model	Managerial attitudes	Key managerial challenges	Related managerial techniques
Closed innovation	Only internal R&D matters, 'not invented here' syndrome Fierce protection against spill-over	1.Attract the best talent into the company 2.Exploit own research commercially	1.Provide excellent compensation, resources and freedom to internal inventors 2. Provide a dedicated development function to link research with market knowledge
External innovation	Harvesting external ideas, 'innovation happens elsewhere' Modest protection against spill-over	1.Explore a wide range of sources for innovation 2. Integrate external knowledge with own innovative activities	1.Scan environment carefully 2. Develop absorptive capacity, utilize networks
Open Innovation	Facilitating external innovation, pooled R&D, 'innovation happens together' Willing spill-over, 'never sit on surplus IP'	1. Motivate the creation and contribution of external knowledge 2. Incorporate external knowledge with own innovative activities 2. Maximize exploitation of diverse IP resources	1. Provide intrinsic rewards for contributions 2. As in external innovation 3. Share or give away IP to maximize returns from entire innovation portfolio

The core of their model is the absorptive capacity (Cohen et al., 1989), which refers to the firm's capability to create new knowledge exploiting external sources of innovation such as academia, clients, supplies and competitors. Consequently, Open Innovation is not referred only to exploiting external sources when are available but is also based on implementing an intrinsic strategy for driving the formation of external knowledge (Henttonen et al., 2012).

Even though the dichotomy between closed and open it does not actually exist in the reality, Trott and Hartmann (2009) recognize that it can be a stimulating and helping tactic to introduce the principle of Open Innovation to companies. Furthermore, these authors highlight that companies, considered "closed" in the past, today do not appear to exist anymore, except in very specialized sectors.

Reviewing the existing literature (Elmquist et al., 2009; Giannopoulou, 2010), many publications have analyzed various topics related to the field of Open Innovation as shown in table 3:

Table 3. Open Innovation publications review (Giannopoulou et al., 2010)

Themes	Keywords	References
OI: the development of the Concept	The concept of OI, the notion of OI, dimensions of OI, inside-out process, outside-in process, exploration, exploitation, model, framework a.o.9	Sandulli and Chesbrough (2009); Lichtenhalter (2008a); Slowinski et al. (2009); Harryson (2008); Cassiman and Valentini (2009)
Organizational Design and Boundaries of the Firm	Organization, organizational setup, organizational units, R&D organization, mechanisms, structures, process, inside-out process, outside-in process, inward process, outward process, product development process, stage gate model, stages, capabilities, competencies, resources, absorptive capacity, relative capacity, TCI capabilities.	Herzog (2008, 2009); Broring and Herzog (2008); Cassiman and Valentini (2009);
Open Strategy	strategy, strategic choice, strategic approach, technology exploration, technology exploitation, out-licensing, R&D alliances/collaborations, partnerships, academia, communities.	OECD (2008); Lichtenthaler (2008); Slowinski et al. (2009); Bessant (2008); Morgan et al., (2008)
The Human Factor in OI, Culture and Leadership	Leader, leadership, culture, mentality, mindset, cultural change, human factor, employees, customers, communities, motivation, motives, incentives, teamwork, team	Gemunden et al., (2007); Herzog (2008); Vanhaverbeke et al. (2008); Slowinski et al. (2009);
Communities for Distributed co-Creation with Customers and other Collaborating Actors	(Online) community, brand community, participations, OSS, open source, open standards, customer, customer involvement, customer participation, virtual worlds, avatars, co-creation	Bughin et al. (2008); Prahalad et al., (2000); Bretschneider et al. (2008); West et al., (2008); Dahlander et al. (2008a); Jantunen et al., (2009); Fuller et al. (2008); Waguespack et al., (2009); Morgan et al., (2008)
IP, Patenting and Appropriation	IP, intellectual property, IPR, intellectual property rights, technology assets, knowledge, sharing, free revealing,	Lee et al., (2009); OECD (2008); Pénin et al., (2008); Henkel (2009); Zerby (2008);

	selective revealing, appropriability, regimes, patent, patent system, IP auctions, IP protection, secrecy.	Slowinski et al., (2008); Bughin et al. (2008); Lichtenhalter (2008)
Innovation Intermediaries: A new Business Model Arising	Technology or innovation intermediaries, knowledge brokers, solution providers, solver brokers, solution brokers, solution seekers, brokerage, technology transactions.	Feller et al. (2008); Lee et al., (2009); Lichtenhalter et al.,(2008); Terwiesch et al., (2008)
The Triple Helix: Industry, Academia and Government Policy	Industry, regional innovation systems, clusters, academia, universities, industry-academia linkages, government, policy, policy makers, innovation systems, innovation regimes, global innovation networks.	OECD's (2008); Cassiman et al., (2009); Tether et al., (2008); Mowery (2009); Perkmann et al., (2007); Chen (2008); León (2007); Young et al. (2008)

The research gap has been identified in the relation between Open Innovation and how projects in this context are managed. Regarding to the human factor, it would be interesting to explore the role of project manager and skills required in order to overcome possible challenges that this new paradigm brings. Schweitzer, Gassmann and Gaubinger (2011) and Buckley (2009) suggest that future research on new management skills can be useful to understand how the coordination of sources and activities not owned by the firm should be done and to capture the value from Open Innovation practices. Furthermore, Elmquist et al., (2009) suggests future research on the human side of OI.

However, in the literature it should be noticed Open Innovation concept is often unclear and sometimes converges into similar areas such as open source (West and Gallagher, 2006), user focused innovation (Von Hippel, 2005) , user co-creation (Madi et al., 2013), crowd sourcing (Hammon and Hippner, 2012). Thus the Open Innovation research is growing it seems that Open Innovation concept is a managerial trend and its meaning is still debated (Elmquist et al., 2009). Nonetheless, there is the necessity to explore more this concept under a managerial point of view (Giannopoulou, 2010).

2.1.1.1 Classification of modes of Open Innovation

In the Open Innovation literature, there are many categorisations of innovation practices (Koskela et al., 2011; Idrissa et al., 2012; Keupp et al., 2009). The most discussed is the classification on how firms open up their innovation processes (Brunswicker et al., 2013; Sisodiya et al., 2013):

> *Inbound Open Innovation refers to the obtainment of external knowledge with the purpose of creating new product/service development where internal or external technology sources are used to enhance internal innovation practices;*
>
> *Outbound Open Innovation is when projects proceed toward new markets in different ways like through spin-off venture company or out licensing with the purpose of exploiting externally internal knowledge.*

Inbound and Outbound Open Innovation may be also divided into pecuniary and non pecuniary that is associated to financial compensation of knowledge flows (Brunswicker, 2013).Table 4 clearly compares the four types of Open Innovation (Dahlander et al., 2010).

Table 4. Comparison of four different types of openness (Dahlander et al., 2010)

	Outbound innovation Revealing	**Outbound innovation Selling**	**Inbound innovation Sourcing**	**Inbound innovation Acquiring**
Logic of exchange	Non-pecuniary-indirect benefits	Pecuniary—money involved in exchange	Non-pecuniary—indirect benefits	Pecuniary—money involved in exchange
Focus	Revealing internal resources to the external environment (e.g. Allen, 1983; Henkel, 2006; Nuvolari, 2004; von Hippel and von Krogh, 2003)	Out-licensing or selling products in the market place (e.g. Lichtenthaler and Ernst, 2009; Chesbrough and Rosenbloom, 2002)	Sourcing external ideas and knowledge from suppliers, customers, competitors, consultants, universities, public research organizations, etc. (e.g. Fey and Birkinshaw, 2005; Lakhani et al., 2006; Laursen and Salter, 2006a)	Acquiring inventions and input to the innovative process through informal and formal relationships (e.g. Chesbrough and Crowther, 2006;Christensen et al., 2005)
Advantages and disadvantages shaping extent of openness				
Advantages driving openness	Marshal resources and support (Henkel, 2006) Gaining legitimacy from external environment (Nuvolari, 2004) Foster incremental and cumulative innovation (Murray and O'Mahony, 2007; Scotchmer, 1991)	Commercialize products that are 'on the shelf' Outside partners may be better equipped to commercialize inventions to the mutual interests of both organizations (Chesbrough and Rosenbloom, 2002)	Access to a wide array of ideas and knowledge (Laursen and Salter, 2006a) Discovering radical new solutions to solving problems (Lakhani et al., 2006)	Gaining access to resources and knowledge of partners (Powell et al., 1996) Leveraging complementarities with partners (Dyer and Singh, 1998)
Disadvantages driving closeness	Difficult to capture the benefits that accrue	Over-commitment to own product and technologies	Many sources create an attention problem (Laursen and Salter, 2006a)	Difficult to maintain a large number of ties with different partners

	Internal resources can leak to competitors (Laursen and Salter, 2006b)	make it difficult to out-license (Lichtenthaler and Ernst, 2007)	Difficult to choose and combine between too many alternatives (Sapienza et al., 2004)	(Ahuja, 2000) Risk of outsourcing critical dimension of the firm's business

Rothwell (1974) argues that a successful innovation factor is represented by getting the access to external knowledge. Specifically Dahlander and Gann (2010) highlight the advantages of this kind of openness such as the possibility to develop new profitable products and services whether firms are able to manage the synergy between their own processes and external know-how. Some scholars have found limitations in this approach such as cognitive limits and devoting too much time to search external sources (Dahlander et al., 2010).
How can firms get access to external knowledge? Kang and Kang (2009) have defined and explored three external sourcing methods such as informal networks, R&D collaborations and technology acquisition, analyzing their effect on technology innovation performance. Specifically for the R&D collaborations they have found that there is a negative correlation with technology performance. Therefore in these kinds of partnerships, from firm's point of view, it is fundamental the control of scope and being careful of opportunistic actions of its collaborators.

Empirical studies have shown that many different companies have adopted the principles of the inbound part of Open Innovation to improve project development and realization, where external knowledge is used internally (Bucic et al., 2013; Buganza et al., 2009; Bianchi et al., 2010; Cheng at al., 2010). Huizingh (2010) suggests that the reason why firms have used more inbound activities is because there are more organizations that use external knowledge instead of providing it.

However this study is focused on Open Innovation, where external knowledge comes from companies, universities and public research organizations. Furthermore no literature was found concerning project management and the distinction between inbound and outbound Open Innovation. Moreover this typical distinction is based on a firm perspective, which does not seem so suitable for the project's point of view, adopted by the authors of this thesis. The projects studied in this thesis are about creating ideas for some kind of development in the future, and does not really fit with the traditional inbound or outbound distinction.

2.1.2 Open Innovation collaboration

This section aims to examine Open Innovation practices and collaborations in order to further understand which challenges a project manager may encounter in such collaborations, at a project level. The authors have limited the scope of theories, focusing on the research on inter-organizational collaborations and multi actor setting.

2.1.2.1 Collaborative practices in inter-organizational setting

Currently, huge barriers and challenges are faced by firms to compete on uncertain markets due to globalised and turbulent economic conditions. At the same time, large

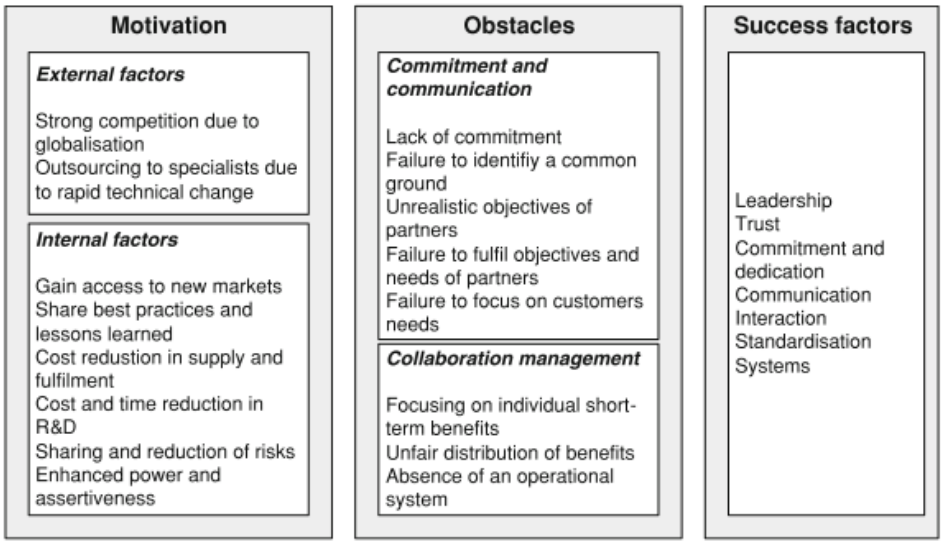
and small-medium enterprises are addressing a rising costumer focus, shorter time to market, increasing flexibility and more rapid innovations (Kreowski et al., 2009). In the last thirty years companies have noticed that partnerships with other organizations are a fundamental precondition for their success. Several benefits of these collaborations have been identified such as the creation of value for all of the partners involved (Dreyer et al., 2005), risk and cost sharing (Barringer et al., 2000; Hamel et al., 1989), growth of competitive advantage (Koza and Lewin, 2000), resources and capabilities sharing and the possibility to develop new business (Kang et al., 2009).

For these reasons, inter-organizational relationships and collaborations have received a growing interest by academia due to the possibility to get benefits which otherwise organizations would not realize alone (Wilson et al., 2006). Vangen and Huxman (2003) argue that these collaborations are complicated to manage and practitioners should support collaborative processes continuously in order to take advantage and operate more effectively "by working in partnership across organizational, sectorial and national boundaries".

Chiaromonte (2006) explains how Open Innovation collaborations diverge from traditional inter-organizational relations. In traditional partnerships individual companies used externalization to implement, develop and maintain internally the strategic control of innovation processes. Instead, in Open Innovation collaborations the strategic processes of innovation is shared with the organizations involved. This aspect has an impact on organization boundaries which become more porous (Xiaoren, 200) and on project management, where all of the partners "co-innovate" and contribute to create new knowledge thanks to their different backgrounds. In this sense, many scholars have underlined the changing of R&D innovation process and its implications. Open Innovation allows organizations to have more flexible innovation processes, in order to react quicker to possible changes (Elbanna, 2008).

Many studies have explored R&D partnerships at the firm's perspective and have pointed out different challenges related to the management of these collaborations due to high complexity such as the risk of intellectual property loss (Barringer et al, 2000) and high coordination cost (Kang et al., 2009). Table 5 summarizes the difficulties to implement these collaborations, the reason why organizations look for external partners and success factors that can help to support these relationships (Kreowski et al., 2009).

Table 5. Motivation, Obstacles and Success factors in inter-organizational collaborations (Kreowsky et al., 2009)



From firm's point of view, what is the real organizational implication of such Open Innovation collaborations? According to Herzog (2008) firms need to focus on the concept of ambidexterity, which is related to both on exploitation and exploration activities at the same time, and build the right organizational design to develop incremental and radical innovation. From a managerial perspective, Chiaroni et al., (2010) argue that organizational change process from Closed to Open Innovation is one of the most difficult challenges in inter-organizational networks because firms need to adopt new organizational methodologies. In this context Giannopoulou et al. (2011) suggest to consider project management under the Open Innovation model. In addition, it is extremely important to : 1) integrate external knowledge into the firm's innovation processes through dedicated "Open Innovation" business units or cross functional teams, 2) definition of "leaders" who guide the process of shift from Closed to Open and 3) the definition of incentives with more oriented open objectives (Chiaroni et al., 2010).

Du, Leten and Vanhaverbeke (2014) and other scholars divide two different type of Open Innovation partnerships, i.e. market based (customers and suppliers) and science based (universities and public and private research institutions). This study is focused on science based partnerships, where universities and knowledge institutions are important to generate innovation, and their impact on R&D projects. Although these Open Innovation partnerships are growing, many studies have explored Open Innovation at a firm level and not at R&D project level (Du et al., 2014).

2.1.2.2 The Role of Science Parks in the Triple Helix Collaboration

Open Innovation literature has focused essentially on the partnerships between firms. However, here is another interesting external source which is represented by universities. In this context, collaborations between industry and university are different

from the classical inter-organizational partnerships because the concept of Open Innovation represents a key role in creating innovation (Perkmann and Walsh, 2007). Melendez and Moreno (2012) argue that knowledge transfer from academia is an important aspect for the innovation process and economic development. Despite that, many barriers to implement such collaborations have been identified, such as cultural and informational obstacles among stakeholders, communication problems, bureaucratic inflexibility, different goals and time horizons between partners, ineffective management and incentive systems (Melendez et al., 2012; Gattringer et al., 2014).

According to Gattringer et al., (2014), networks between firms and public research bring many benefits like the possibility to get access to various resources and specialized skills. Therefore, collaborations between academia, firms and public authority are increasing (Glaister, 1999; Hudson et al., 1999). Since Open Innovation has become a popular topic, Chen (2008) points out that the government should promote innovation generation between these parties to improve the economic competitiveness of the country. Recently, policy makers have established publicly founded R&D centres, admitting the importance of external knowledge. These R&D centres have had an impact on economic development and technology transfer, thus many studies focus on the role of Science Parks in this context (Young et al., 2008). The role of Science Park lies in the connection between academic research with industrial activity and public authority, and in the technology transfer to the industry (Quintas et al., 1992), where the flow of knowledge and technology between these three parties is managed and stimulated. Furthermore, the science park's infrastructure facilitates SMEs to get a better access to the open market therefore not only big firms can take advantage from Open Innovation model (Apqc, 2013).

Bigliardi, Dormio, Nosella and Petroni (2006) have identified the "mission statements" of Science Parks- as shown in the table 6- and have developed a theoretical framework for their performance measurement.

Table 6. Science Parks' activities (Bigliardi et al., 2006)

Science Parks' activities
arrange modes of interaction between industrial and academic research structures (R&D labs close to university departments
promote the generation of academic spin-offs (through incubators, where available)
carry out re-industrialization programs by replacing obsolete or declining product technologies (through incubators if needed)
promote the founding of startups without the collaboration of university structures (if needed through incubators)
carry out technology transfer programs to strengthen firms located in a particular area
carry out training programs aimed at developing and managing emerging technologies
carry out training programs in the area of 'science and technology management'
provide management services to firms located within the park or in the near proximity

In this scenario, managers play a central role since they need to resolve conflicting interests and harmonize different stakeholder's expectations that are in Science Parks (Bigliardi et al., 2006). The objectives and expectations of different actors in the parks may diverge notably, thus it is really difficult to evaluate the science parks' effectiveness (Monck et al., 1988). From the academy point of view, reaching a reasonable level of income from the park, through supporting business activity nearly connected to its own research interests, is maybe one of its goals. In addition, universities try to exploit new business opportunities (Bigliardi et al., 2006). On the other side, commercial objectives linked to investments in the parks or firms are probably more important for private sector organizations (Löfsten et al., 2002). Finally the local government's expectation from Science Parks is associated to the economic growth of the whole region (Bigliardi et al., 2006).

Bellini, Teräs, and Ylinenpää (2012) argue that Science and Technology Parks should promote the liaisons within the Triple Helix (academia, enterprises, public administration), recalling a more open image (e.g., hub, arena) and working as an intermediary in the knowledge exchange. In general intermediaries assist other organizations in their Open Innovation processes (Yström, 2013).

In this research, case studies have been selected from different Science and Technology Parks, analyzing the role of managers in Open Innovation projects.

2.1.3 Open Innovation Projects

The core of the Open Innovation paradigm is related to the switch from internal R&D processes to external R&D partnerships and to explore new ways to innovate and sustain technology advances (West et al, 2014). Traditionally, R&D projects are used by firms to control innovation processes and, as Chesbrough (2006) suggests, it is important to adopt this level of analysis to understand the sources of innovation. Exploring Open Innovation at project-level allows to describe and analyze new aspects, which are only obtainable at a sub-firm level (Du et al., 2014; Felin et al, 2014).

Baldwin and Von Hippel (2009) define an open collaborative innovation project as the involvement of the project's partners in order to openly share what they develop and generate ideas. An example of this kind of project where the participants are multiple users are open source software projects which are become extremely popular in the last twenty years (West and Gallagher, 2006). Originally the idea of Open Innovation has been explored from experiences in these kinds of projects but today the field related to this new paradigm has quickly become wider (Elmquist et al., 2009).

Reviewing the existing Open Innovation management literature, the characteristics of an Open Innovation project has been defined as follow: i) concerning an innovative design, the project's players are peers rather than rivals, otherwise they would not collaborate (Chiaromonte, 2006), and ii) products or services including the innovation or IP rights connected to it are not planned to be sold by them (Baldwin et al., 2009).

Based on these aspects, this study is focused on Open Innovation projects in which different partners such as academia, industry and eventually the governmental part represent the collaborative context.

Elmquist, Fredberg and Ollila (2009) have explored two dimensions of Open Innovation model, the "locus of the innovation process" and the "extent of collaboration". The first one is related to innovation process which is not necessarily controlled by the firm but it is spread between different actors involved in the project (Bergman et al., 2009). Consequently, the interaction and the active participations of all of the partners influence the project management. In the literature, the topic related to Open Innovation project management is still rather scarce due to difficulties in coordinating knowledge and activities among various players (Matheis et al., 2014). The second one focuses on the capability to collaborate with different partners, and not only on the classical collaboration between two parties in B2B markets. Chesbrough and Teece (2002) agree on the necessity to coordinate and manage the innovation processes in this context, due to conflicts among the participants that are increased by the open share of knowledge. Consequently, management and coordination of stakeholders involved in Open Innovation projects is seemed to be one of the main issues in the OI literature.

From this point of view, many authors and researches have highlighted that future research in Open Innovation should investigate the organizational side and human aspect of OI (Elmquist et al., 2009). Concerning the human side, Munkongsujarit (2011) argues that in the past decades, the variety of actors from various organizations involved in Open Innovation projects with different experiences has increased and as a result innovation processes are become more complex to manage. On the one hand this higher complexity related to the diversity of backgrounds promotes creativity and creation of new knowledge (Melendez et al., 2012) but on the other hand presents multiple challenges for working in Open Innovation projects, such as creating trust, handling with power differences and reconcile dissimilar individuals' goals (Du Chatenier et al.,2009, 2010).

2.2 Project Management

This chapter will discuss the overall project management principles, trying to describe the focus the thesis scope in the project management literature. Reviewing past studies and research designs, the authors of this thesis found out the areas where to concentrate, taking also care of theirs effect in the project organization. Then after a project processes description (useful to better position the identified aspects through the project life cycle), specific project management topics have been deeper examined.

2.2.1 Project Management Principles

As reported by project management literature, projects are often represented as complex (Gaddis, 1959; Gobeli and Larsson, 1986) and related to change (Kimmons and Loweree, 1989). A project is defined as "a project is a temporary endeavour undertaken

to create a unique product, service, or result" (PMBOK, 2013). The term "temporary" does not indicate a short duration of the project, but suggest that a project has a beginning and a defined end, which is reached with the achievement of project objectives. The end may occur also when the project clients want to terminate it or there is no longer need of project outcome (ibid.). The term may also refer to a reconsideration of project as temporary organization (Lundin and Söderholm, 1995) fit in different social contexts (Floricel et al, 2014), and thus the project should be treated as a social system (Packendorff, 1995). This point of view prompted a focus on many aspects, centring the social relationships and human aspects as main contributions of projects (Floricel et al., 2014). These brought results on programs and portfolios management (Turner and Müller, 2003), coordination mechanisms (Bengtsson et al., 2007), governance inside/outside projects (Ahola et al., 2014), project management offices (Aubry et al., 2011) and inter-organizational temporary organizations (Kenis et al., 2009).

The project's output is unique, often significantly different from what has been done before by the same organization. Typical project purposes are: developing a new product or service, changing in the organization, conducting research on a knowledge sector, constructing a plant or an infrastructure, developing an information system, improving or designing a business process (PMBOK, 2013). The final deliverable can be intangible or tangible. Especially when the end products are intangible, more effort should be put to define them in terms of clarity and agreement (Atkinson, 2006), in order to delineate the judgement of project's success criteria of various stakeholders. These often have different interpretations and expectations, especially for intangible products. Furthermore the success judgement in this case will be more likely to be based on qualitative rather than quantitative measures, where the former is susceptible to differing perceptions (ibid.). Repetitive elements are often visible in different project phases but every project has unique characteristics. Also prior knowledge is not completely useful in new projects, in terms of number of repetitive tasks needing it (Akbar, 2013). For each project there is high probability of revisions of previous paths. The absence of revisions means a project with repetitive well know tasks, short time horizon, and with no interdependencies with other projects. But almost no projects like that exist and in fact revisions are project managers' usual job (Söderholm, 2008). New and various competencies are often requested. Even though few large enterprises have the potential to assess them all within the organization, the majority of firms usually do not have all necessary knowledge, expertise, capital and technology internally, and particularly the specialist ones do not populate the organization's boundaries. Moreover it is pivotal to coordinate these multidisciplinary competencies. (Peters, et al., 1998; Story et al., 2009). Concerning accomplishment and uncertainty reduction, the project's realization requires the identification and the setting of ad-hoc activities' flow. The objectives' definition and their translation into operative activities proceed often with approximations during the project's life (De Meyer, 2001).

The project's definitions have given rise to a field of knowledge where practitioners and theoreticians meet, between technology and business administration, usually indicated as project management (Packendorff, 1995). "Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (PMBOK, 2013). Project management typically includes: addressing the

various requirements and needs of stakeholders, planning and executing continuous communications among stakeholders, integrating project requirements and creating project deliverables, and managing project constraints, which include Scope, Quality, Schedule, Budget, Resources, and Risks (ibid.). It is a field with its own professional associations, e.g. PMI and IPMA, journals, e.g. Project Management Journal and International Journal of Project Management, and conferences. Consultants and industrial engineers traditionally developed the techniques and methods for project planning and control (Engwall, M., 1992). However some researchers (Kloppenborg and Opfer, 2002) state that the literature concerning project management is often insufficient, also expressing doubts to consider it as a "real" discipline. This is supported by surveys and studies (Shenhar and Dvir, 2007), which highlight the debate if project management discipline matches with practice or academia. In fact Kwak and Anbari (2009) state that "*when it comes to the business and management field, scholars often appear puzzled and unconvinced of the notion project management"*, even because it is considered as a immature research field (Blomquist et al. , 2010).

Project management as a science started developing in the twenties with Gantt Diagram, and many different tools and methods have been developed among years (WBS, CPM, etc), even with the help of government defence forces. In the Seventies the Project Management Institute (PMI) was established and in 1986 the first Project Management Body of Knowledge was printed. In 2013, the fifth edition of the PMBOK has been printed.

In the 70s the "iron triangle" of time, cost and quality (Atkinson, 1999; Cooke-Davies, 1990) was the literature's focus (figure 3), concerning the operational tools and techniques of a project (Lim and Mohamed, 1999). Little focus has been put on communication with customers and other actors (Jugdev and Müller, 2005), thus not considering success factors linked with behavioural 'soft skills' (Munns et al., 1996).

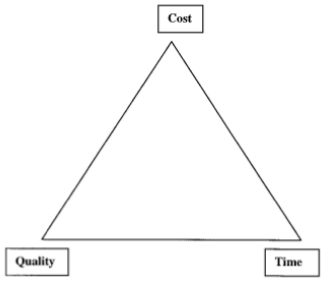


Figure 3. Iron Triangle (Atkinson, 1999)

It was noted that this period was largely theoretically based and that more empirical work was required (Belassi and Tukel, 1996). During the 1980s both researchers and practitioners felt the need for structuring the project management knowledge, thus the literature focused on planning & control techniques, project leadership, investment planning, computer-supported project management, human resource management and risk analysis (Packendorff, 1995). These activities resulted in the first PMBOK, Project Management Body of Knowledge, issued by Project Management Institute PMI. In the 1980s - 1990s the focus moved on looking at the project manager or project team aspects (Andersen et al., 1987) and at other stakeholders indirectly involved in the

project process, e.g. external stakeholders or clients/end users. The different definition of success and performance evaluation criteria held by various stakeholders started to be analysed (Munns and Bjeirmi, 1996), but firstly the problem was that the definitions of stakeholder groups was unclear . This aspect was then studied (Turner and Müller, 2006; Turner et al., 2009; Turner et al., 2012), in order to determine whether there was a collective understanding of project success and performances within groups. The 1990s - 2000s literature focused on the fact that the project manager's role and activities were not explicitly defined within a project, especially in term of success factor and project performance evaluation. The decade also noticed the integration and the improvement of standards in project management, in terms of tools and techniques for each knowledge area and sector (PMBOK, 2013). An interesting branch of 21st Century project management literature is the development of a proper stakeholder management during the project life cycle, especially generated by the widening of organisation boundaries (Turner, 2004; Turner et al., 2009; Turner and Zolin, 2012). The development of project management is summarized in the figure 4.

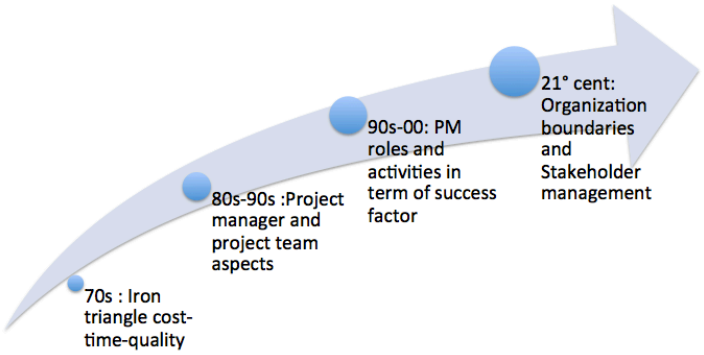


Figure 4. Project management development

Recently, the role of politics in projects has been examined, in order to better comprehend social contexts and dynamics within the project (Burström, 2012). Moreover Turner et al. (2009) assert that multiple and external stakeholders' evaluation of success and management is rarely conducted. This may lead to an improper decision making due their different perceptions, thus discouraging employees and worsening their performances, even in the whole organization context and not only in the single project (Turner and Zolin, 2012). The gathering of differing perspectives from multiple and external stakeholders is a process that is important to hold during the whole lifecycle, in terms of inputs, outcomes and impact (Davis, 2012). Furthermore Turner and Zolin (2012) observe that stakeholders' satisfaction and their subjective perceptions cannot be just summarized into the time-cost-quality triangle “without under or overestimating project success at critical points in the project life cycle”.

The project management knowledge structuring started in 1980 has continued till now (Packendorff, 1995), culminating in the fifth version of PMBOK by PMI. In the PMBOK, it is all features of project management are classified under the following knowledge areas: integration management, scope management, quality management, time management, cost management, risk management, human resources management,

communications management, procurement management, and stakeholder management. The liaisons, and sometimes even the trade-offs, among various aspects of these areas suggests that if any change occurs during the project lifecycle, there's a great probability that some other project variable will be affected (Atkinson, 1999). Balancing stakeholder expectations on these factors is important to achieve the project result and completion. Proactive communication is essential during the whole project period, even because one of the project characteristics has the high probability of change from what is planned at the beginning. Thus project management plan development is iterative and continues through the whole project life cycle, refining the information through the phases. This concept seems to be even more appropriate In OI, where information and collaboration flow is higher, even though the project manager and generally stakeholders often find some difficulties to understand how to disclose information to an external party. And this stands even for those with experience in Open Innovation, because revealing confidential data to other actors concerns several potentially risky situations. This often leads managers to decide to disclose too little information, lowering the performances and opportunities given by the collaboration (Salter et al., 2014).

2.2.2 Project Organization

This chapter is meant to cover both macro vision of a project and micro vision of roles of the actors involved in the project team, in order to outline project organization topics that the authors are interested in for this thesis. It starts with a portfolio overview, then it describes the single project's organization, and it ends with the definition of roles and activities within the project

During the 1990s, the external organization of innovation projects gained interest, resulting in studies and concepts, such as “extended enterprises”, “collaborative advantages”, “virtual enterprises” and “pragmatic collaboration” across organizational boundaries (Hersted et al., 2008). From the “first generation R&D organization”, through the “market pull second generation”, Hersted el al. (2008) specify a “third generation” mode of R&D organization, where internal R&D is integrated with external knowledge from other enterprises and actors. The disclosure of information among stakeholders in innovation projects reflects the intention to move from short-term focus of the second-generation model to the long-term corporate planning and strategy of the third generation. Emphasis was put on creating portfolios of innovation projects, trying to combine internal competencies and to hasten the absorption of knowledge drawn from external sources (ibid.).

Often in an organization (or a group of organizations) there is not a single project but a portfolio of projects, which is a collection of programs, sub-portfolios, projects and operations. Programs grouped in the portfolio are composed of subprograms that contain different projects on a specific theme. There are also individual projects outside a program, which are still considered as part of the portfolio. The different parts within the portfolio may be sometimes not directly related, but they are coherent with strategic plans and the relationship among them should be managed to reach the firm main

objectives (Abrantes et al, 2014). Like traditional projects within an organization, Open Innovation projects require to be tracked, designate resources, and accompanied, and especially it is pivotal to match the innovation and organisational context and the form of portfolio management (APQC, 2013). During the research of organizations involved in OI projects, the authors of this thesis found out that many of projects are performed within a science park. In this study the projects within science parks were organized within portfolios of projects, with their own programs, projects and sub-projects. Here various stakeholders usually have to balance their objectives among lots of projects, and their time too. Thus every partner organization needs to select the right program or projects to focus on. This influences even the commitment that every stakeholder put into the project (McFarthing, 2013). In particular many activities can be set up on science parks as ‘‘experiments’’ and then closed or merged, depending on how they evolve (Phana et al., 2003). The “experiments” are also defined as pilot projects, which recent stream of research has recognized as a practical way to move to the new approach of Open Innovation (Boscherini et al., 2010; Chiaroni et al., 2011). Turner (2005) defines a pilot project as “[...] an agency for change within an organization, created as a temporary organization to which resources can be assigned to bring about strategic change or innovation”. This definition fits with those companies who are looking for a test field to begin with the disclosure process toward other players brought by Open Innovation (Boscherini et al., 2010; Chiaroni et al., 2011).

One of the main question is how transferring the project outputs to the whole organization and the pilot projects supply prototypes (Turner, J.R. & Müller, R. 2003) for new practices to reduce uncertainty around human resources linked to Open Innovation projects (Chiaroni et al., 2011). These new practices and procedures should be managed through the re-design of a part of R&D internal organization structures in order to improve efficiency and effectiveness (Boscherini, 2013). This can be done either with re-organization of existing units or with the establishment of completely new units focused to this new approach (Buganza, 2010), the former usually applied in industries characterized by low turbulence and the latter in industries with high turbulence (ibid.). However, as well as prototypes and new practices, a crucial influence is given by the project team, who should spreads the outcomes to the whole organization (Chiaroni et al., 2011) in order to put into action the Open Innovation conception, and “to make a firm a real Open Innovator” (Lazzarotti and Manzini, 2009).

In a traditional R&D project, the project team, composed by the project manager, project management members and team members, is followed by a sponsor. Usual stakeholders around the team are top management, functional managers, operations managers, sellers, program manager and project management office (PMBOK, 2013). In the OI context, the number of actors involved increases, through the collaboration with partners, suppliers, competitors, lead users, public administration and universities & research labs. Sometimes dedicated teams operate in the organizational units to govern OI activities (Boscherini 2013), and new roles are created such as the innovation champion, that facilitates the embrace of OI approach (Chesbrough and Crowther, 2006), and the idea generators.

As Davis (2014) conveys, an important character of a project is the Project Manager, who is the person responsible of reaching the objective, the team leader elected to

perform the work assigned, becoming the link between the strategy and the team itself. This actor will be explored in the chapter project manager roles.

2.2.3 Project Management Processes

The project lifecycle is composed by different phases from the beginning to the end, usually time bounded and with control points. The specific aspects of organization, industry, market and technology employed shape the lifecycle, and activities & deliverables vary between different projects (PMBOK, 2013). A project may be broken down into any number of phases that are composed of certain amount of related activities. The number of phases depends on the size, complexity, and potential impact of the project (Bartezzaghi, 2010). Project phases are adopted when the work kind to be accomplished is unique to a specific project's part usually connected a particular major deliverable. Every project and product process is required to be aligned and connected with other processes to facilitate coordination, even because a variation in a process typically affects at least one other process. The coordination process is particularly important in OI approach, where the interactions among the stakeholders are required to work properly to bring a successful outcome. In facts often a set of processes needs to be repeated to achieve a result that satisfies every interest carrier (Becker, 2007).

Over the years various project management processes have been catalogued, and a useful categorization has been designed by PMBOK, which arranged 47 processes into 5 Project Management Process Groups. The Process Groups are not project life cycle phases, in fact each phase often contain each Process Group, and the output of a process is the input of another process, not necessarily of the same Group. The Project Management Process Group is:

- **Initiating** processes: the processes are performed to develop the bases of a new project or a new phase of the project on-stream. The output is the decision whether to continue or not with the project/phase. Initial scope and resources and main stakeholders are defined.
  The statement of work SOW is the start document, which explains the objectives and needs to be satisfied and "what" (not "how") the project/phase should provide. The document is issued by the initiator, which may be internal or external to the organization (Billows, 2005). The document is the input for the project team, which elaborate the project charter, the internal documentation of effects, objectives, organization, time, costs and risk. However these factors are handled with the collaboration of many other actors, in order to align the project/phase's purpose with the stakeholders' expectations (PMBOK, 2013). Then, on the bases of strategic evaluations and economic-financial analyses, the commission validates (or not) the project charter and authorize the project and the use of resources.
- **Planning** processes: the processes are performed to support the initiating processes and to create the project management plan, refining scope and objectives. Each project document is integrated to allow a satisfying project management, thus often several loops may be required to enhance analyses and

maximize the scope achievement respecting time and cost constrains. As more interactions and information are collected, other planning processes will occur, especially if they change previous hypotheses. This means that the planning process is iterative and lasts almost the entire project/phase. The planning processes are pivotal to delineate the strategy of the project/phase, thus when they are well managed, the successive processes are much easier to be conducted (Wysocki and McGary, 2003). When big variations, i.e. bad planning or exogenous phenomena, arise from approved plans (generally during Monitoring and Controlling processes), the project management plan and the project documents usually change many items or hypotheses, to provide greater precision and to respect time, costs, and quality (Billows, 2005). However the continuous process of collecting and aggregating information shouldn't slow down too much the whole project/phase, and when the initial planning seems acceptable the execution processes should start. Moreover, depending from the project/phase nature, some risks cannot be identified until few time spent planning or executing (Kerzner, 2005).

- **Executing** processes: the processes aim is to execute the project/phase concordantly to what has been planned, coordinating resources and integrating information (Wysocki and McGary, 2003). During execution variances may occur from the project management plan and documents have to be updated. The changes modify the way the activity should be performed and they can even require a re-baselining.
- **Monitoring & Controlling** processes: the processes aim is to reveal variances from what has been planned in terms of time, cost and quality. Performance measurement leads to re-planning processes and operating corrective or preventive actions to follow the initial desired results of the project/phase. These activities must be coordinated during each phase and integrated in a multiphase project (PMBOK, 2013).
- **Closing** processes: a project closing is not a moment but a well structured set of processes, from client's deliverable validation to contractual obligations. These processes are essential for Knowledge management and continuous improvement Audits and Post project reviews to analyse objective achievement levels in terms of time, costs and quality. However usually scarce attention is put on closing processes (Milton, 2005).

Usually the cost of change rises during the project time, while the risk and uncertainty decreases. At the beginning of the project lifecycle the uncertainty is too high thus project manager’s aim is to reduce it. Instead the cost and time for issues handling is prohibitive at the end of project’s lifecycle (Tichacek, 2005). The project manager and his team should work to balance this trade-off and thus to widen the “opportunity area” between the two curves (Bartezzaghi, 2010), as can be observed in figure 4.

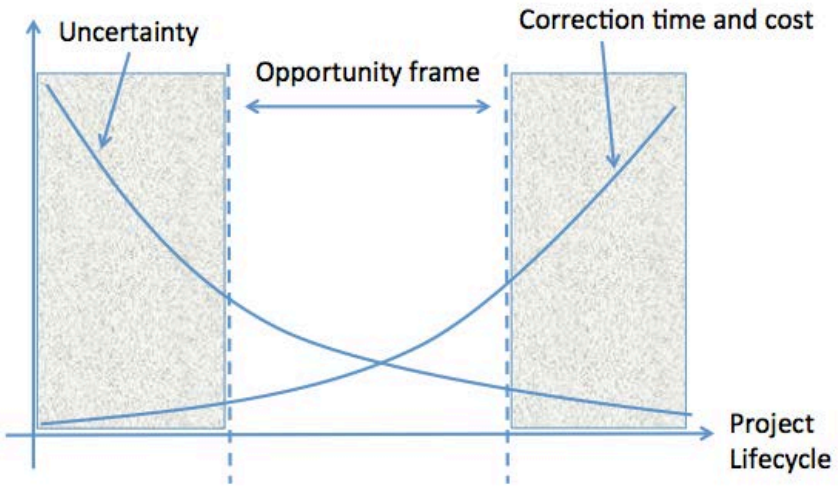


Figure 5. Opportunity area in anticipation-flexibility model

Thus two management principles help to achieve this target:

1. Anticipation to reduce uncertainty:
    - Stakeholder involvement: each constrains and opportunity carrier (see clients, consultants, organization function resources) should be involved since initial project phases. Team working is essential and every actor can suggest specific concept adjustments and improvements. Moreover phase or design reviews are useful to validate the intermediate project outcome as a checkpoint, even though success criteria should be set with every stakeholder since the beginning of the project (Turner, 2004).
    - Knowledge: available knowledge should be valorised, every carrier of experience and competencies should be involved into the project. Structured and coded knowledge assist the processes, e.g. design rules (design for assembly, design for testability, etc). Besides the promotion of new knowledge production should be one of the long period project objective. Experimentations are pivotal when the appeal to past experience is not possible or sufficient: validation tests are useful in final phases of the project (e.g. crash tests), while exploration tests help during the project development to verify hypothesis and solutions found.
    - Adoption of methodologies: the utilization of structured methods induces to face project's various aspects systematically.

2. Flexibility to reduce time and cost of corrective operations: the empowerment of the project manager with flexibility is pivotal to handle unforeseen scenarios (Turner, 2004).

- Operate on processes through temporal over-lapping of activities and prototypes construction. Beta releases (at least partially working and reliable to conduct tests) provide a helpful opportunity to collect feedbacks and to evaluate intermediate solutions adopted. If it is possible, this should happen with the client involvement.
- Provide the project with over-skilled people and specific technological resources.
- Operate on the output architecture, with the concepts of modularity and scalability.

However, this framework is usually intended to be applied in traditional projects. In Open Innovation projects uncertainty is an important feature that needs to be preserved in order to enable creativity, diversity and stimulate flexibility. Thus the traditional anticipation-flexibility mode could be not suitable for Open Innovation projects, as arguing that the opportunity frame should be maximized could be incorrect to in an OI context, because this would mean reducing uncertainty.

2.2.4 Project Management Knowledge Areas

Each Process Group defined above contains a set of processes in particular PMBOK defines 47 processes. These processes then may be regrouped in 10 Knowledge Areas, which are specialization areas around a project management professional field. Each Knowledge Area is integrated along the Process Group and among the other Knowledge Areas.
Every process has inputs and outputs, and several tools and techniques are used as best practices to improve outcome performances. These are the practices that every project manager should apply, or at least consider in his/her specific project (Ahern, 2014). The 10 Knowledge Areas are Project Integration Management, Project Scope Management, Project Time Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management, Project Procurement Management and Project Stakeholder Management. Reviewing the literature, the following Areas have been selected to focus the present research scope.

2.2.4.1 Project manager role

In this section project managers' role and skills are explored from the traditional project management perspective. First, the role of project manager related to the organization's structure will be described and subsequently it will be related to the external environment. Focusing on Open Innovation challenges, traditional project manager skills will be analysed to further understand if they can be used to overcome difficulties that a project manager may encounter in Open Innovation projects.

In the literature two different aspects of project management is considered. The first one focuses on methodologies and tools related to the management science and the second one emphasizes the human resource management, especially on the role of project manager (Blackburn, 2002). As already highlighted in the Open Innovation literature,

individuals play a central role in Open Innovation projects therefore this section is focused on the second perspective.

Research studies have underlined the importance to explore the role of managers to improve project performance (Anantatmula, 2010), particularly in Open Innovation collaborations (Ollila and Ystrom, 2014). Based on the classic project manager's roles and skills, it is possible to find out differences and analogies with Open Innovation projects. According to Iacob (2013), the project manager is considered as the person who is responsible for achieving project objectives and the "engine" of the project. Many scholars and practitioners describe the project manager's role as one of the most important figures in the organization, because the project's success depends on him/her (Ahsan, Ho and Khan, 2013). As reported by PMBOK (2013), project manager represents the connection between the strategy and the project team.

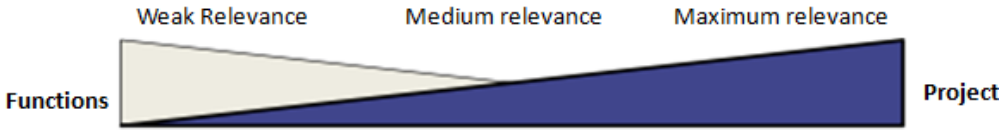
In the literature, one of the first classifications of managerial roles has been done by Mintzberg (1971) dividing into interpersonal roles, informational roles and decisional roles as shown in table 7. The first one is related to the manager's behaviour that is focused on people involvement and on interpersonal contact. The second one concerns to the collection and transmission of information and the last one is related to the decision making process. This general classification may help the authors of this thesis to find out specific project manager roles that are not considered important in traditional projects but may be relevant in OI projects.

Table 7. Interpersonal, informational and decisional managerial roles (Mintzberg, 1971)

Interpersonal roles	
Figurehead	The manager is a symbol who represents the head of organization
Leader	Responsible for motivating, encouraging his/her subordinates and stuffing duties
Liaison	Maintains the contacts with the organizational network
Informational Roles	
Monitor	Manager as the focal point in his/her organization for the movement of not ordinary information.
Disseminator	Receives and transmits information from outside to the organization
Spokesperson	Transmits information to outsiders
Decisional Roles	
Entrepreneur	Initiator who looks for opportunities and potential problems and focuses on voluntary change
Disturbance Handler	Responsible for maintaining a balance between change and stability
Resource Allocator	Responsible for controlling the allocation of its resources
Negotiator	Manager as participant in negotiation activity

A second classification, focused more on the project manager role, has been done in relation to the three main organizational configurations of a project. In the literature has been outlined that the role of project manager changes depending on the organizational structure. In functional organization the project is decomposed in sub-projects assigned

to specific organization functions, while in task forces the project manager is responsible of the project, with resources assigned full time. In matrix organization the project manager has resources included in organization functions. It may be defined in order as "weak" matrix, "mixed" matrix or "strong" matrix as the control of the project is in the project manager hands (Michael Poli, 2010). When the project's relevance for the organization is high, usually the "stronger" structures, such as task force or mixed/strong matrix, are preferred to achieve the project's objectives. The same argument fits for the criticality and the innovation level of the project (Bartezzaghi, 2010). The importance of project manager within project and firm changes considering the different structures, and thus responsibilities and roles change too, as shown in figure 5 (Azzariti, 2006).



Role	Facilitator Solicitor	Coordinator Planner Negotiator	Decision Maker
Responsibilities	Time	Time Cost	Time Cost Quality

Figure 6. Roles and responsibilities depending on project manager relevance (Bartezzaghi, 2010)

In the function the project manager has weak relevance, so s/he is a **facilitator** and **solicitor** and has the direct responsibility on time performance, s/he can't "see" the resources, but coordinate them. In task forces instead the project manager has maximum relevance, thus s/he is the **decision maker**, having full responsibility on time, cost and quality performance.
Between these two extremities there is the project manager with medium relevance, who is a **coordinator, planner, negotiator,** and has direct responsibility on time and cost performance (Bartezzaghi, 2010). Higher relevance and responsibilities corresponds to a major project manager's authoritativeness (Azzariti 2006).

Azzariti (2006) highlights that there are different planning and control techniques, regarding the project management. The main decisions, conducted by project managers, in order to plan activities are related to: i) project objectives, ii) activities description, what it should be done in the project, iii) responsibilities, allocating people to specific activities, iv) coordination mechanism, how people interact, v) policy adopted, basic decisions which have an impact on the behaviour of people involved in the project, vi) resources availability, vii) risks area, viii) planning and control systems.

Looking at collaborations with parties external to the organization, it is also necessary to highlight the role of project manager related to these stakeholders. Several studies have described the project manager's role as "boundary spanner" (Tushman and Scanlan, 1981), who plays a central role in the organization, interacting and dealing with people

inside and outside of the organization. In the traditional project management, the project manager "feels caught in the middle between external and internal forces", as shown in the figure 6 (Lysonski, Nilakant and Wilemon, 1989).

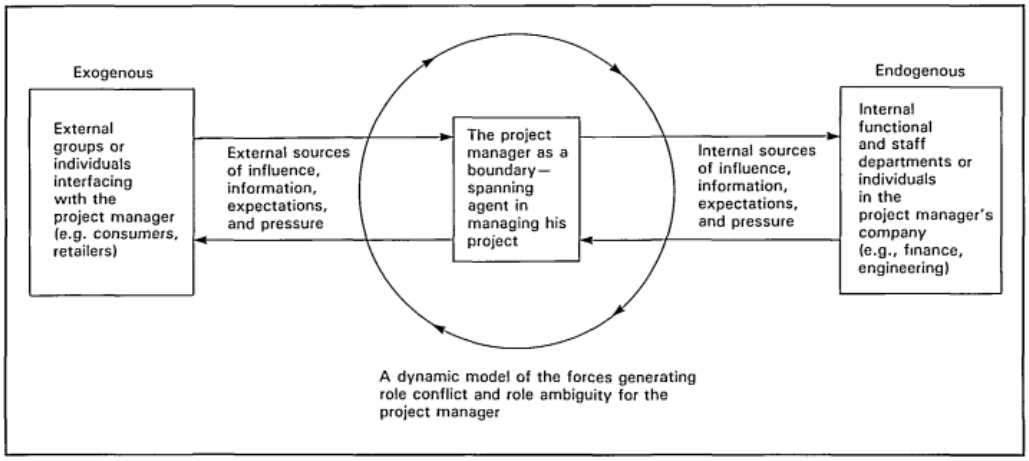


Figure 7. Dynamic model of the forces generating role conflict and ambiguity (Lysonski et al., 1989)

According to Lundberg (2013), the triple helix, described in the previous OI literature, need "boundary spanners" who are competent to link different partners within the project. Consequently, mediation among conflicts and expectations are key aspects in personal and communication skills of a project manager.

In the project management literature, the project manager's role has changed embracing not only technical knowledge and traditional skills but also personal and soft skills according to today's business market (Edum-Fotwe and McCaffer, 2000; Russel et al., 1997). In general competencies of projects managers depend on the type and the scope of the project (Ahsan et al., 2013). Therefore, this study uses PMCD framework (Project Manager Competency Development) to define project manager's competencies, which are designed to be applied generically (PMI, 2007).

- **Knowledge competence**, general and multidisciplinary skills related on the knowledge of project management tools and techniques
- **Performance competence**, how project managers put their knowledge into practice in order to achieve project requirements
- **Personal competence**, the project manager behaviour while applying the knowledge such as the own attitude, personality while guiding the project and authority (formal and merit). Some of the skills needed are: Leadership, Team building, Motivation, Communication, Influencing, Decision making, Political and cultural awareness, Negotiation, Trust building, Conflict management, and Coaching.

Katz (1991) points out that a good project manager should have a balanced mix of these competencies, in order to conduct an effective project management. Although, El-Sabaa (2001) argues that the major influence on project management practices is given by personal competence. Therefore, this thesis will address personal competence of project

managers through a qualitative method, trying to highlight additional skills required in Open Innovation projects. These skills should be used to focus on the innovation partners rather than considering only the organization's needs.

According to PMCD, project manager should have the following personal competencies:

- **Communicating.** Effectively exchanges accurate, appropriate, and relevant information with stakeholders using suitable methods.
- **Leading**. Guides, inspires, and motivates team members and other project stakeholders to manage and overcome issues to effectively achieve project objectives.
- **Managing**. Effectively administers the project through deployment and use of human, financial, material, intellectual, and intangible resources.
- **Cognitive Ability.** Applies an appropriate depth of perception, discernment, and judgment to effectively direct a project in a changing and evolving environment.
- **Effectiveness**. Produces desired results by using appropriate resources, tools, and techniques in all project management activities.
- **Professionalism**. Conforms to an ethical behavior governed by responsibility, respect, fairness, and honesty in the practice of project management.

The figure 7 outlines traditional personal competencies of a project manager (PMCD):

Figure 8. Project manager personal competencies in traditional projects (PMCD)

Du Chatenier (2010) suggests that future research should compare different skills required in close innovation and Open Innovation.

In Open Innovation projects personal skills are particularly important to succeed in managing the difficulties that this approach brings. Du Chatenier (2010) identifies challenges in Open Innovation projects and determines the competencies that project team should have to achieve a successful result. The barriers individuated typical of an Open Innovation context are show in table 8.

Table 8. Open Innovation project challenges (Du Chatenier 2009, 2010)

Challenges	Description	References
Creating the right level of trust	A negative correlation has been found between level of trust and innovative ideas.	Inkpen and Pien (2006) (Hite, 2003, 2005). Dodgson (1994), Ring, 1997) (Doz and Hamel, 1998)
Balancing individual with alliance	It is necessary to create common goals and work plans	(Hamel, 1991)
Balancing being in control and being out of control	It is related to the absence of traditional hierarchical lines	Ring (1997); West and Gallagher (2006)
Difficulty of absorbing and communicating knowledge between partner organizations	It is related to the difficulty of communication exchange among different partners	(Hansen, 1999)
Risk of loss knowledge	The porous boundaries of OI projects may increase the risk of losing knowledge that favors other players.	(Brown & Duguid, 2002; Szulanski, 2000)
Problem of free riding	Opportunistic behaviour, which means that an actor uses new ideas unfairly, or takes advantage of the openness of other actors in the network.	(Dyer and Nobeoka, 2000), (Teece, 2002).

From the Open Innovation challenges identified in the literature, this thesis will explore the Open Innovation difficulties from the project manager's point of view at project level.

2.2.4.2 Project Stakeholder Management

In this section stakeholder management is explored from the traditional project management perspective, even though it was among the last knowledge areas to be introduced in project management literature and thus close to multi-actor setting. First, a brief evolution of stakeholder management research is provided and subsequently the

main processes will be analysed, focusing on more recent stakeholder management theory. Finally stakeholder management literature gaps in multi-actor and OI are examined, looking for social and future collaboration facets.

The stakeholder concept was initially developed by Freeman's work in 1984. The stakeholders' different definition of success has been studied over years, especially their influence over decision-making (Munns and Bjeirmi, 1996), even though their description was vague. Then this gap was explored, especially by Freeman's seminal work, where he defined the stakeholder as "any group or individual who can affect or is affected by the achievement of the firm's objectives" (Freeman, 1984). More recent studies classified stakeholders into two tiers: primary stakeholder groups are those who control the project, while secondary stakeholder groups are those who influence the decision and the relationships among the other actors (Freeman, 2007). Morris and Hough (1987) tried to move from the iron triangle, through the integration of contractor perspective in the project, even if their framework is still partially based on cost-time-quality. Donaldson and Preston (1995) argued that firms which better involve stakeholders better accomplish to recognize the connections between stakeholder management and project's objectives achievement. The 21st century literature and practice seem to be more attracted in stakeholders' point of view and management within a project. They convey that "all the stakeholders may judge all the levels of results" (Turner, J.R., 2004; Turner, J.R., 2009 ; Turner, J.R. & Zolin, R., 2012), supporting the attention on gathering distinct facets from multiple stakeholders across the whole project life cycle, in terms of input, outputs, and effects. They also state that stakeholders' project evaluations "are inherently subjective and cannot be summarized naively into the iron triangle without under or overestimating project success at critical points in the project life cycle" (Davis, 2014). Depending on the project's relevance for each stakeholder, some of them will have a limited impact on project's decision and results instead others may put relevant pressure on other actors. Thus one of project manager scopes should be to recognize the appropriate attention for each stakeholder, which can signify the change from project's success to its (partial) failure (Jepsen and Eskerod, 2009). In fact project manager's time is limited and should be used as efficiently as possible, considering also that the stakeholder's actions and impact may not arise until later steps in the project phase. Thus it is often pivotal that the project manager takes care of the rapports necessary to respect the project objectives (Jepsen, Eskerod, 2009).

The processes to set a proper stakeholder management typically are identifying people who could affect the results of the projects and its completion, and planning a strategy to engage all relevant actors through the documentation of their needs, interdependencies and estimated impact (PMBOK, 2013). Once the initial steps are determined, issues management and meeting stakeholders' expectations are among the main purposes of the continuous communication flow during project life cycle. Then the relationships have to be controlled and the engagement strategies eventually fixed.

Stakeholder identification and analysis are vital components of stakeholder management (Aaltonen, 2011; Freeman, 1984; Jepsen and Eskerod, 2009; Magness, 2008; Mitchell et al., 1997). Stakeholder analysis is a technique for regularly assembling and examining quantitative and qualitative information to understand the interests and

expectations of the stakeholders. It also assists in recognizing stakeholder relationships with other stakeholders, which may enable the creation of coalitions and thus boost project's chance of success. In initial steps it is useful to determine the stakeholders that mostly influence project's objectives, making easier to assign the most appropriate focal responsible and/or accountable for the management of the identified stakeholders (De Schepper et al., 2014). However, De Schepper et al. (2014) suggest that a more accurate methodology for stakeholder influence identification is needed. Thus, even if many classifications are available, often they do not provide models and tools with which to identify all stakeholders and their interests (Pouloudi and Whitley, 1997; Yang et al., 2009a,b), and this can lead to the failure of a stakeholder management objective, i.e. to be useful to managers (Jensen and Sandström, 2011). Moreover Parmar et al. (2010) convey that organizations should describe and understand more completely and systematically how they are planning to manage their liaisons with stakeholders over time. Yang et al (2009) also illustrate that interdependences among stakeholders over time persist to be understudied. Eskerod and Vaagaasar (2012) confirm this issue, stating that stakeholder management is still not seen as a dynamic and continuous process. In fact Missonier et al. (2014) study started to look "*[...] the emergent nature of stakeholder networks, i.e. the co-evolution of the stakeholder identity and the project over time*" (p. 1109). Qualitative and quantitative information about stakeholders involved should be collected and managed in the stakeholder management plan, even if, as said above, this is still not a common practice. An information management system may also help the project manager to gather, store, and provide necessary information to stakeholders about the project status, eventually even to integrate documents to produce and distribute a formal report (e.g. formats such as table reporting, spread sheet analysis, and presentations) (Q. Zhou et al., 1998).

But stakeholder management is not only managing a team and enhancing communication, it is also about engagement, development and maintenance of relationships between the team and stakeholders, with the ambition to reach stakeholder satisfaction, i.e. respecting their requirements and needs. Stakeholder satisfaction, throughout managing controversies and funnelling different interests to common visions, should be governed as a key project objective (PMBOK, 2013; Kate Davis, 2014). The understanding of stakeholders' desiderata allows faster project decision-making and execution, which is one of the stakeholder management aims.
As Yang et al. (2009a, b) observed these actors should be engaged as early as possible to reach that goal. Dooms (2010) emphasizes the significance of ex-ante inclusion of stakeholders, which produce relevant advantages, e.g. simplifying the ex-post inclusion of stakeholders and hasten the initial processes. Nonetheless this is not simple, especially for context with a high potential for stakeholder controversies (De Schepper, 2014). A controversy can be an argument, an idea, an ideology, a perspective, that stresses the status quo and make evolve stakeholders' interactions (Latour, 2005). A controversy arises when facts that were considered authorized are then questioned, making lose time for redefining power balances. Project manager should consider every components of each controversy, to avoid the project's objectives failure or reformulation (Missionier, 2014).

However, reviewing stakeholder management literature, the focal organisation is perceived as the unique performer responsible for identifying and managing

stakeholders. In addition, stakeholder management is analysed in the literature from the point of view of a specific firm (Donaldson and Preston, 1995; Phillips et al., 2003; Callan et al., 2006; Turner, 2006; Vos and Achterkamp, 2006; PMBOK, 2013; De Schepper, 2014). More recent research (Freeman, et al., 2010; Noland and Phillips, 2010), is trying to consider social and organizational benefits of engagement with stakeholder in these processes. This may extend the awareness of Open Innovation principles within the focal organization (Gould, 2012). Frooman argued since 1999 the significance of assessing "multi-actor" relationships, in order to effectively adopt stakeholder theory tools within the focal organization. In fact stakeholders' network can be intricate, with actors having interactions with other player outside the control of the project manager / organization (Lewrick, Raeside, and Pelsi, 2007), because sometimes stakeholders try to connect with other participants to enhance their relative position (Zietsma and Winn, 2008). Furthermore stakeholder categorizations in the Open Innovation context may not be achieved without difficulties, in comparison with traditional primary or secondary categorization, because stakeholders may work with or without a clear organizational affiliation, considering the attributes of the market connections of network actors (Gould, 2012). Mutual understanding through high communication flows, together with the purpose of developing stakeholders network, could then be seen as an implementation of value creation (Maak, 2007 ; Baden, 2010), even because it becomes easier to construct win-win situations (Plaza-Úbeda, et al., 2009). This is also possible because stakeholder engagement and relationship building permit the organization to obtain information and knowledge from its stakeholders (Sharma, 2005). In fact the information flows exist in both ways, so while knowledge may un-purposely exit from the focal organization, it may happen that it inadvertently enters as well. Thus the risks of accidental knowledge leakage can be seen as a support to value creation, because it may assist the dialogue and finally the project's success (Gould, 2012). Moreover some authors see the skill to gather the stakeholder information and knowledge as a relevant competence, even because it enhances the probability of knowledge retention and knowledge exploitation (Ayuso, et al., 2006). This fact agrees with other studies (Achterkamp and Vos, 2008 ; Brown and Jones, 1998), which consider the project failure usually not given by insufficient or unproductive project management practices, but brought by inadequate social interactions among stakeholders (Missionier, 2014).

3. Methodology

This chapter aims to present the research strategy, design and research methods adopted to answer to the research questions of this thesis. The chapter will further describe data collection and data analysis methods, where the analytical framework will be shown. Finally, the chapter will end with a discussion of methods used that have influenced the results.

3.1 Research strategy and design

This study intends to explore project management in Open Innovation projects, identifying practices and challenges that project managers may encounter in this context. Because of the qualitative nature of the study, the authors of this thesis have chosen a research approach based in the interpretivist paradigm with an inductive orientation. According to Bryman and Bell (2011), the interpretivist paradigm has an epistemological position and highlights the subjective meaning and interpretations of researchers and participants in the study of a social world instead of apply pre-selected scientific models. Furthermore, this approach is considered interpretative since researchers transcribe verbal data and classify them into specific topics (Greener, 2008). Then theory is developed from the collection and analysis of data (Bryman and Bell, 2003). In this study an inductive oriented method, which is usually referred to a bottom-up approach, has been adopted in order to achieve the generalization through the observation of specific examples.

Based on this, the authors have chosen to conduct a qualitative multiple case study between two countries Italy and Sweden, where several cases have been analysed to understand the analogies and differences between the cases (Baxter et al., 2008). When compared to single case designs, Yin (2003) argues that multiple cases are considered more effective therefore the whole study results can be considered to be more robust. Researchers can anticipate similar or divergent results among cases, making theoretical reflection on the findings according to the objective of this thesis (Bryman and Bell, 2011). Yin (2003) argues that this is a useful method when the aim of the study is to resolve “how” and “why” questions and when hypothesis are not defined clearly before the research. Consequently, multiple-case study represents a valid research design in this study since the literature on Open Innovation project management is rather limited. Multiple case studies allow for addressing both specifics about each case, but also allows for cross-case analysis and pattern-findings (Bryman and Bell, 2011).

The research process of the thesis is outlined in the figure 8 introduced by Bryman and Bell (2003). This stepwise model for the empirical research allows to get different benefits in terms of visualizations’ clarity, conduction and simplification of research process. The authors of the thesis have used this model iteratively according to the research strategy, although it is represented as linear. As suggested by Kumar (2011), it is important to maintain freedom to include new ideas or excluding aspects that in the end are not considered relevant. Therefore the authors have followed an iterative process where the research problem was reformulated after the data collection phase in order to select specific aspects and get the total view of a phenomenon (Kumar, 2011).

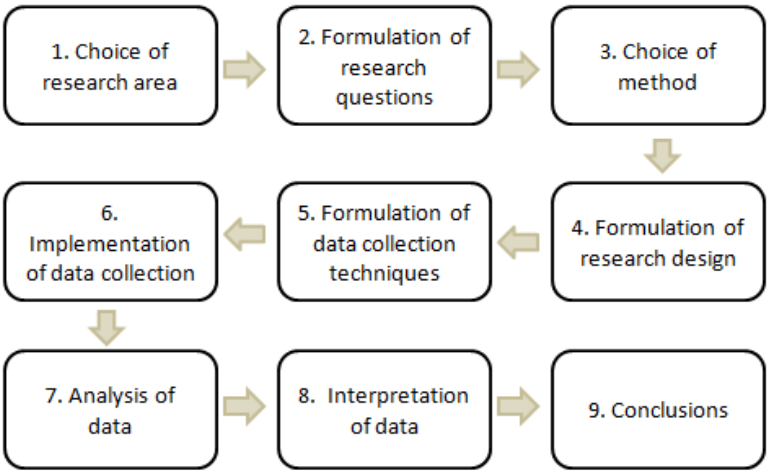


Figure 9. Research process (Bryman and Bell, 2011)

3.2 Data collection methods

3.2.1 Literature Analysis

A profound literature study has been conducted looking into the research that has been published in the field, and try to understand which the main issues are. As a fundamental part of the thesis, the study of relevant sources has been performed during the whole work.

In the beginning the relevant topics analyzed concern project management in Open Innovation projects. Gradually the analysis has change toward classical projects practices and models in order to identify the main factors and challenges of such projects.

The sources retrieved come from Databases from Politecnico of Milan, Chalmers Library Homepage, others scientific databases such as www.scopus.com and reference lists of relevant scientific papers. The key search words and expressions that we used were; Open Innovation, project management, inter-organizational collaboration, multi-actor setting, collaborative innovation, Open Innovation project. The search was conducted from June to October 2014.

After an initial literature study, a literature analysis was conducted grouping published books and peer-reviewed articles according to their thematic content. After a first scanning, some themes have been selected for further study and others have been dismissed. The theme selection was based according to the delimitation and the scope of the thesis and to the suggestions of our supervisors. Specifically, research questions have been used as a guide to decide which themes should have been considered in the

theoretical background.

3.2.2 Interview

Research interviews are a popular and common data collection strategy in qualitative research and the authors of this thesis have used it in order to deeply understand the research topic with the perspective of getting interviewees' opinions of the theme (Bryman and Bell, 2011). According to Kumar (2011), interviews can be time consuming and the quality of data depends upon the quality of the interaction with interviewed people. Despite of these disadvantages and given the complex and sensitive topic, the authors have decided to adopt this method of data collection. It permits to collect in-depth information and questions can be explained, reducing misunderstanding risks, especially in Open Innovation environment where the new concept seem to be not yet fully understood.

The qualitative interviews conducted in this thesis can be divided into unstructured and semi-structured interview, which present a flexible interview process that structured interviews are not able to do (Bryman and Bell, 2003). The first type of interview is similar to a conversation with the interviewee about a certain range of topics and the structured interview entails very specific questions in order to get a fixed range of answers by the interviewee.

A pre-study consisting of unstructured interviews have been conducted with project managers working in Open Innovation field in order to better understand the research topic and get general knowledge from their perspectives. Criticism to this type of interview is that is time consuming in collecting and analysing data and does not provide uniform information thus it does not guarantee the comparability of data (Kumar, 2011). Since unstructured interviews were conducted only in the initial phase of the thesis, these aspects were not considered as an issue by the authors. According to Bryman and Bell (2011), researchers can find out important information using an unstructured interview, which they did not expect before the interview. These initial interviews have been further used by the authors to create an interview guide that refers to a list of questions that address specific topics identified during the literature analysis and that appear more relevant during the unstructured interviews.

Based on this interview guide, semi-structured interviews were conducted and represent the most part of data collection in this study. As reported by Bryman and Bell (2011), semi-structured interviews allow asking further questions, which may give some inputs, despite of unstructured interviews or a questionnaire. Depending on the natural flow of the interviews and on the particular interviewer, the order of the questions was changed and additional questions were asked. Bryman and Bell (2011) argues that semi-structured interview is effective when researches use a multiple-case study design because a structure is needed to ensure cross-case comparability.

The interviews with Swedish project managers were conducted in person in English, while the others to Italian project managers were performed through Skype in Italian. Each interview was recorded and transcribed to simplify the compilation and analysis of the data. Italian interviews have been translated in English. The authors of this thesis

were both present during each interview. The questions were grouped into logical topics according to the analytical framework, which were then split between the authors. Notes were taken during each interview and audio recording was also allowed by each interviewee.

In total 14 interviews were performed which were between 45 and 80 minutes in the length, depending on the interviewee availability. The geographical location of each interview is shown on the map in figure 9.

Figure 10. Geographical location of case studies

3.2.3. Case study selection

Concerning the case studies, open innovation projects have been selected within Science Parks. At the first step Science and Technology Parks in Gothenburg and in the north of Italy, where they are developed most, were identified thanks to suggestions of our supervisors. Furthermore, the authors have had the opportunity to explore an Open Innovation project not within the Science Parks thus it has been investigated thanks to the interesting setting and the high number of partners involved.

The table 9 shows the STP selected in the two countries and the number of the cases selected for each country.

Table 9. STP, cities and number of case selected for each country

	Sweden	Italy
Science and Technology Parks	Lindholmen Science Park	Polo Tecnologico Padano AREA
City	Gothenburg Stockholm	Lodi Trieste
Number of cases selected	4	3

The selection criteria for the Open Innovation projects were:

- Involving partners from the Triple Helix such as academia, society and industry
- Number of the partners involved exceed ten
- A defined project with the characteristics defined in the theoretical background section (i.e. with a beginning and an end, R&D project)
- Have a designated project manager (i.e. not an Open Innovation community), who considers the project to be an Open Innovation project
- Project not concerning a specific market sector
- Science-based partnerships

After an initial selection of Open Innovation projects in these Science Parks, the selection of the interviewees was done through a preliminary contact via email or telephone, explaining the purpose, the content of the thesis and attaching the interview guide. Furthermore, in Sweden some interviewees were chosen with the assistance from a member of an Arena management group who provided information regarding the type and characteristics of projects, including the number of stakeholders involved. The authors of the thesis have not further investigated the nature of openness of the cases selected because it has been considered not relevant for the purpose of the thesis, as already highlighted in the previous literature analysis.

Finally, the table 10 provides an overview on the cases selected and open interview:

Table 10. Case and open interviews summary

	Sector	Number of partners involved (Society, Industry, Academy)	Status	Role	Date	Interview mode
A	Public transport	15 (5, 7, 3)	Finished	Project manager	22/10/14	In person
				Work package leader, Industry	24/06/14	In person
B	Public transport	13 (3, 7, 3)	On-going	Project Manager	10/10/14	In person
				Coordinator	27/10/14	In person

C	Traffic safety	43 (5, 32, 6)	Finished	Project manager	16/10/14	In person
D	Energy	25 (7, 15, 3)	On-going	Project manager	17/10/14	Telephone
E	Energy	12 (5, 3, 4)	On-going	Project Manager	17/10/14	Telephone
				WP leader, Society	10/11/14	Telephone
F	Agro industrial	19 (3, 9, 7)	Finished	Project Manager	31/10/14	Telephone
G	Naval industry	13 (6, 4, 3)	Finished	Project manager	12/11/14	Telephone
Open interviews	/	/	/	Program manager, Arena 1	12/06/14	In person
	/	/	/	Project Manager, Arena 2	13/06/14	Telephone
Other interviews	Manufacturing	/	/	Project manager	14/11/14	Telephone
	Medical Research	/	/	Project manager	14/10/14	In person

The context of the cases: The role of Science Parks in Open Innovation

The science parks considered in this thesis work in a collaborative context where the governmental, academic and industry partners meet and may be members of the science park itself. They represent platforms for open development and individual projects are conducted as well. The basic context is composed of few large industries that work together with academic partners and governmental partners. "*The typical scenario is when all of these (partners) might be competitors down the line (when they come a new product) but in the early phase, in the concept phase, they can work together because they are creating the new market possibilities for all of three by doing the work together in an open environment and they share information which normally they didn't do ten years ago."*[Program Manager Arena 1]

Nowadays, it has been recognized by researches that there has been a change into another way of working, which is made up by large industries and various SMEs: "*They together can form an **Open Innovation market** for the large industries. So this is another way of looking at the Open Innovation that is more connected at the engine of the Open Innovation, which is represented by large companies and they set up the*

rules.[..] The benefits for them could be they could find also by working together in other markets for their application. The one that is not used by one large company might work for another large company in some context. The idea is that collaboration is something good if you meet up with others doing the same things, ***you expand your own knowledge*** *and you get new ideas. This means that the market share for these SMEs might be expanded."*[Program Manager Arena 1]

For instance in the vehicle industry, the old way of working was focused on having mostly large suppliers but with this new context is possible also for small companies to be a supplier: *"In the last 20 years the number of suppliers has become lower and lower and the company larger and global, but with OI is possible to small supplier to have a global market but for a small feature."*[Program Manager Arena 2]

The projects analysed in this thesis are carried out in this context and large industries look for new sources in the called Open Innovation market to get more influence into their own R&D. The general phases of Open Innovation projects selected in this thesis, as explained effectively by a Program Manager 1 in a Swedish Science Park, are shown in figure 10. Basically the phases are:

- **Concept development**, where basic needs are explained and described. This phase can gather different players such as the governmental parts in the countries, the industry parts, suppliers etc. The aim is to look at different business models, explore the technology itself, how the market could be developed and how it will deploy. *"There are for instance problems with introducing electric mobility in Europe because the infrastructure is not solved for that. How shell the battery be charged? How can be possible to go from Goteborg to Milano in electric car? It's not possible to do that in an easy way. That is a concept that we need to develop: the infrastructure for European electric mobility"* [Program manager Arena 1].

- **Field trials.** It concerns the testing step, where data are collected and analysed.
- **Market and business development.** This step is conducted in parallel with the other phases described above.

There is a reiteration back where the concept ("*that is more than a technical concept*") is developed together with the eventual end-users. "*We get that feedback and then we iterated back. We do concept and then we get closer to the final solution"* [Program manager Arena 1]. In the early phases is easier to work in an open environment: "*Here it can be really open as long as you find a way of getting more and more close to the product. They [players] are competitors on the market and then [the process] is closed*" [Program manager Arena 1].

The role of this Science Park is to work in the pre-commercial phase*: "We leave the product/service development for the industries. It's not supported by us"* [Program manager Arena 1].

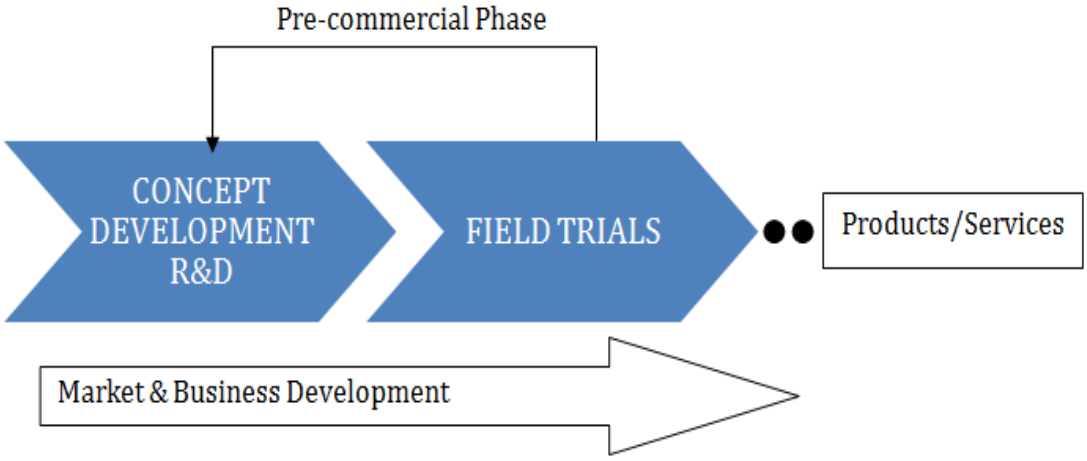


Figure 11. General OI project phases (Program Manager, Arena 1)

3.3 Data analysis method

In general, quantitative analysis is supported by codified rules, which are not suitable with qualitative analysis (Bryman and Bell, 2011). Burden and Roodt (2007) argue that one interpretative practice that has become popular in qualitative method in the last years is the grounded theory developed by Glaser and Strauss (1967). Grounded theory has been defined as "*theory that was derived from data, systematically gathered and analysed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another*" (Strauss and Corbin, 1998, p. 12). Overall, Bryman and Bell (2011) point out that this approach has several advantages such as capturing complexity, linking practice and providing different point of views in well-established fields. Hence, in this thesis the data analysis method have been based on this inductive approach, where data collection and analysis have been conducted iteratively. Researches usually use this method to generate theory where the literature is rather scarce or to provide some new insights for the existing knowledge (Burden et al., 2007).

Every interview has been recorded and discussed between the authors of this thesis immediately, with the purpose of sharing impressions and different perspectives and of improving the internal reliability. Subsequently the interviews have been transcribed to get a better understanding and to simplify the analysis. The data collected has been analyzed once after the interview and then again after the end of data collection. In this process the main step has been the coding where data have been grouped in main themes relevant for project management in Open Innovation. In order to identify the main themes and the framework that could best explain and analyze data, a literature analysis has been performed in parallel. The analytical framework is shown in the next section. Finally the themes individuated and the data collected has been integrated in this report.

Criticisms of the coding approach are related to the fragmentation of data which entails the loss of the narrative flow of what people say. Another issue refers to the

decontextualization of text by gathering chunks of text out of the context thus the social setting can be lost (Bryman and Bell, 2011).

3.3.1 Analytical framework

Concerning the project manager role in an Open Innovation project, the following variables have been identified in order to understand better the major challenges that project managers may encounter in this context and how they can be overcome**:**

- **Roles:** it is related to the role of the project manager in Open Innovation projects, describing all of his/her responsibilities in the project. The analysis is focused on finding out if project managers have different roles in Open Innovation projects in comparison to the traditional ones, described in the project manager role's section.
- **Competencies**: it refers to skills that a project manager should have in Open Innovation projects in order to deal with challenges that may be he/she encounters. According to the literature analysis described in the previous section, the personal competencies seem to be more important in Open Innovation projects in comparison to the other skills. Therefore, this thesis will focus on which personal competencies a project manager should have in Open Innovation projects.
- **Challenges**: it is related to challenges that project manager encounters in Open Innovation project from his/her point of view, highlighting the particular difficulties in an Open Innovation environment.

Reviewing the literature concerning the stakeholder management during the project life cycle, the authors focused on the aspects that seemed relevant for the comparison between the traditional and the Open Innovation projects. This frame could be seen as a re-adaptation of PMBOK usual processes' segmentation (figure 11).

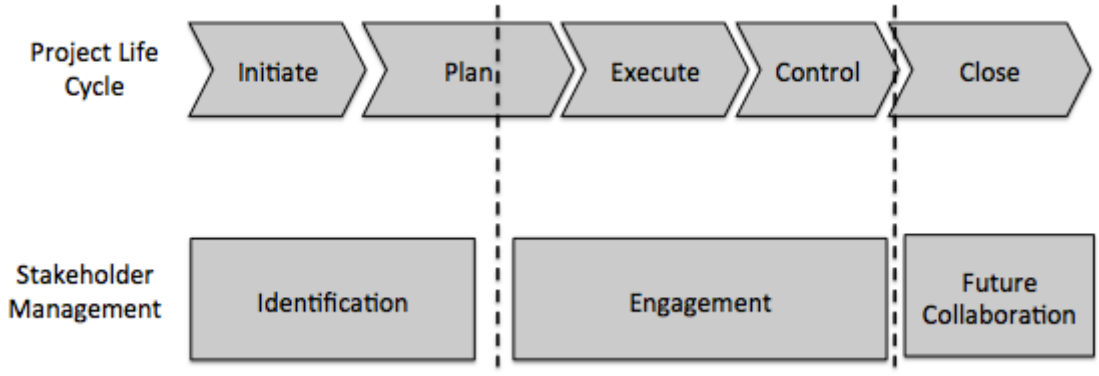


Figure 12. Frame re-adaptation to stakeholder management aspects

- **Identification:** First of all the authors of this thesis will try to understand how the stakeholders are identified and who defines who should be part of the project, considering that sometimes suppliers selection and evaluation tools & frameworks can be used even for stakeholders identification. But there are also specific tools suitable with the identification and analysis and all stakeholder. Being a very uncertain environment, the authors of this thesis try to comprehend if the actors' number may change during the project lifecycle. Moreover the relevance and the influence they can put on other players may be linked to project's uncertainty level, especially from the point of view of small enterprises.
- **Involvement**: The involvement of relevant actors in the initial phase of the project is essential to respect the project's defined objectives. Understanding what happen in open and frequent meetings may be useful to examine the interest and the commitment put within the project. Questions concerning workshops and focus groups will be asked to understand how stakeholders identified work and think, and to evaluate how ideas and data among different categories of actors are gathered. Several documents are produced usually in these steps, and each tool usually produces an update and upgrade of previous information about the stakeholder involved. It often takes time to integrate those information and judgements, in order to have effective report to other components of the team and other actors, both internal and external. Then comprehending how commitment is managed high during the project's lifecycle helps to understand also how to manage controversies among actors' various points of view. Stakeholder management practices are linked to the ability of the project manager and his/her team to interact in a complex and open collaborative setting, to the propensity to build and managing a network of contacts.
- **Future collaboration**: Once the project's final deliverable has been submitted, it may happen that the collaboration among the stakeholders will stop. The project's closing processes have been observed to be pivotal in order to correctly deliver information to the project's clients. These facets are linked to Knowledge management and knowledge management systems, whose study is not the aim of our thesis, but at the same time they influence how the project management is performed. For instance, the way the knowledge produced during the project will be used will affect the choice of communication and the integration procedures. Furthermore, the collaboration shouldn't stop with the project and it is up to personal skills and relationships making attitude of the project's members to maintain it. This can lead to new projects and indirect collaborations and fasten the identification and management of stakeholders.

3.4 Method discussion

The choice of research questions has strongly influenced the type of research adopted in this thesis. The main objectives of the thesis are to understand what challenges a project manager may encounter in Open Innovation projects and what are the main issues related to project management in Open Innovation environment. In order to understand these issues at a project-level, the project manager of each case study has been interviewed. Every case presents one or two interviews depending on the availability of the participants. It can be possible that project managers may present a false picture and boast the importance of their job, especially due to need of increasing the awareness of

the Open Innovation paradigm and practices. The cases with two interviews seemed to be less subjective to the project manager's personal opinion of his/her activities. During the literature analysis, the authors of this thesis have pointed out the necessity to explore the human side of Open Innovation projects, as suggested by Elmquist et al. (2009).

Consequently, as suggested by Kumar (2011), a qualitative study seems to be appropriated for exploring and discovering beliefs, meanings and perceptions of project managers who have been interviewed. A quantitative approach would not have guaranteed the flexibility and openness required by the topics explored. Indeed a qualitative research has allowed the authors to emphasis the description of the variables identified during the literature analysis (chapter 3.3.1). The main disadvantage of this method is related to the comparability of the data collected. Therefore, the authors have tried to define the characteristics of an Open Innovation project and to produce a conceptual and analytical framework, ensuring the exploration of the key aspects, as suggested by Kumar (2011).

Fundamental and crucial concepts for academic research are reliability and validity, which are related to the appropriateness and accuracy of the procedures adopted for finding answers to the research questions (Bryman et al., 2003; Kumar, 2011). According to Kumar (2011) validity is the ability of an instrument to measure what it is supposed to measure and reliability refers to the consistency and stability of an instrument. However, many researches argue that the use of these concepts is inappropriate and debatable to be applied in qualitative research because they have been designed for quantitative research. Guba and Lincoln (1994) suggest to consider "trustworthiness" and "authenticity" in qualitative research instead of the two previous concepts defined above. Specifically they have been created four indicators credibility, transferability, dependability and conformability.

The establishment of the credibility of findings lies on the acceptability by the members of social world of the research findings in order to get the confirmation that researchers really understood the social world explored. As suggested by Bryman and Bell (2011), researchers can use the respondent validation technique in order to ensure a good correlation between their findings and the perspectives of their research participants. The authors have used this technique sending to the interviewees a part of the empirical findings and later inviting them to one-day collaborative enquiry workshop.

Transferability refers to the degree to which the research findings can be generalized or transferred to other contexts. As suggested by Geertz (1973), researchers should produce thick descriptions on the research context, which has been done by the authors in the theoretical background, thus others can evaluate the possibility to transfer the empirical findings of this study to another setting. Concerning the dependability, as a parallel to reliability in quantitative research refers to the consistency of the results. Bryman and Bell (2011) suggest using an auditing approach where complete records are kept of all phases of the research process in an accessible manner. The authors have kept fieldwork notes, interview transcripts and data analysis decisions of this study to ensure dependability.

Conformability is related to a certain degree of objectivity in the research without expressing any personal authors' values or theoretical inclinations. The authors tried to ensure conformability reporting interviewees' quotes in the empirical findings without expressing any personal opinion. In the discussion, the authors have interpreted the empirical findings collected according to the literature analysis. Concerning the authenticity, it refers to a set of issues with the political impact of research. In this sense the authors try to ensure fairness criteria representing different viewpoints among members of the social setting especially of the triple helix, as suggested by Bryman and Bell (2011).

4. Empirical Findings

4.1 General Findings from Open Interviews

The open interviews were conducted as a first step of designing this study and have allowed the authors of this thesis to get a sense of the main differences between the management of "closed innovation projects" and "Open Innovation projects", building the opinion even on the years of experience of the program manager interviewed. Based on this, this thesis is focused on relevant aspects of project management in Open Innovation projects from project managers' point of view. They will be described in the next section in relation the specific cases selected by the authors of this thesis.

Various differences have been individuated in the way on how a project is managed within an organization and in an open environment: *"If you work in an organization you have all of the process and common project management methodology defined by that organization. When you work in an open environment you meet different organizations which have different processes in the way how a project can be managed. You need to be adjusted and dynamic and listen to people."*
Project managers should be **more adaptable** to collaborative working, not only with their own design organization but also with other suppliers and partners that the organizations have, *"you need to form projects cross-organizationally between a number of organizations and not only with your own organization"*.
In particular, in the vehicle industry sector it is important to define the platform where the technology is provided, even in the Open Innovation environment: *"that platform need to be defined, simplified for the integration of function and even in the way of working together."*

Other general issues and project manager requirements in Open Innovation environment have been highlighted from a program manager within the Swedish Science Park, who claimed: *"You don't have a common terminology. You meet different firms together and they have different processes and terminology. I would say that when we look at experience for project managers to work in open environment, we say that you must have at least 10 years of experience from some large international industries, because if you used to work in that context you also have worked with lot of customers and members with different cultures. If you come entirely from one organization and you are not used to work in an international context or you haven't met a number of different cultures (there are also different cultures in Europe) you are very handicap in your work. You need to have that experience and understand that you need to have a defined common terminology so everybody can understand what you are talking about"*. [Program Manager 1]

It could be argued that having many years of experience form traditional project management may make project managers and team members less comfortable with an open environment, even though they had previous experience of working with customers and different cultures. It may be not easy for them to switch to a new paradigm, as instead it could be for newcomer who will see Open Innovation as a norm.

However the program manager stated also*: "You need to do this **planning together with people that are not used to work together**. So you need to invent it a little from to time to time from project to project. It's not clear to everybody from the first what it means"*.
Specifically in the vehicle industry sector, which is highly competitive and global industry, "*there is not much money to experiment or do something out of scope that is the main challenge. If you are offering Open Innovation as an alternative to the existing supply chain you have to be more productive or offer more value"*.
Furthermore, concerning the difficulties to break up the existing well functioning and well organized production, the program manager stated that there is a "*lack of trust, because in the existing processes you have well functioning methods, so in the new model you have to be more productive from the beginning"[Program Manager 1]*.

Nowadays, the traditional way for an in industry to plan its products without involving the customer is not sustainable anymore. "*You need to have the customer involved much earlier in the first phases. This puts requirements on the project management side. You need to be a person who can be adoptable to the customers and understand this product is going to be used by who (by this target group, who are they, how they think, you need to involve, contact them in the early phases). You also have new inter-phases and you need to understand the market much more now than ten years ago"*. Furthermore, the time to market and the time between the concept and the product development are getting shorter "*you need to understand what is happening in the market in the early phases and then you need to know what people pay for. That would be something that differs from the traditional project management. **Project managers must be more marketable***".

The question for the leaders of the organizations is related on **how to protect their own IPR**, being open at the same time, and "*they must to be able to introduce all of the people in the organization in this way of working*". This has an effect on the strategy in the way "*that you need maybe to share your IRP in the way that you have never done before without risking your own business*".
Regarding the concept of Open Innovation market, the idea is that "*you can't benefit just by collaborating with others that they might be also at the same time competitors. That is something that you need to take from case to case. It can be very stimulating, inspiring, innovating if you do it in the right way but it can also be a flashback or it doesn't work. You need to test and have people who are not afraid of experimenting"*. [Program Manager 1]
The program manager then pointed out among the central risks concerning Open Innovation projects*: "Open Innovation projects are **extremely risky because it is so immature yet**. You don't have a clear strategy or how usually are manage it, you need to be not afraid of it, you need to have people who carry that kind of test things and to have the judgment to say yes/no in the right position and so on. It's more risky than the traditional innovation projects where you have everything under control. But maybe the benefit in the end will be higher if you work in an open environment than in the closed. You don't know but you need to take risk"*. [Program Manager 1]

Concerning **the project management skills**, one of the most important things is that "*you need to develop your skill in working in collaborative environment with organizations that you know they are competitive at the end*". There are some specific

projects that can be conducted collaboratively in Open Innovation environment, for instance "*looking at future infrastructure for your own business. Then when it comes to see a single solution, the solution that you are competing with, is not good a project example to do in an open environment. You need to understand as a project manager that not all of the projects are feasible for Open Innovation"* [Program Manager 2].

From one of the program manager point of view within one of the Science Park selected, "the networking phase is the most important". It has been recognized that **the management of partners** involved in Open Innovation project is relevant in this open context.
"*We conduct strategic discussions with the actors so we talk about how we can create this collaborative platform, what is needed from business point of view, business models. Then you have presentation, exhibitions, where people can network and explain what they're doing. Then we have are providing an open lab, so that small company do not need to invest on large laboratory or verification platform, they do not need to invest in cars in order to test their product, they do in a laboratory and in a virtual verification platform"* [Program Manager 2].

4.2 Findings from the case studies

In this section findings related to case studies are presented. It represents the starting point for answering the research questions defined in the beginning of the study. Compiling the findings related to each case study, the authors present a summary based on the analytical framework applied.

4.2.1 Case A

4.2.1.1 Project overview

The project A, constituted by several sub-projects, aims to develop and test an innovative travel broker service for sustainable mobility in urban areas. The project has been financed by the Swedish government for innovation and other participating parties. The vision is to promote the access to mobility despite of owning a car. There are two main parts. The first one, where the main partners are represented by the large firm together with the safety authority, is related to electrical vehicles and to test a new system. The second one it is a business model that has been tested in real life and concerns the development of a travel service. The test phase is finished and at the end of the test a company was started*: "this was also like a dream scenario to get a company starting out of an idea"* [Project manager within the Science Park].

4.2.1.2 Project Manager Role

The project A has been defined by the project manager as "*the best example when you talk about Open Innovation*". Even though it is considered an Open Innovation project, "*every project is focused to make the company/city/researcher institutes competitive"*. [Work package leader, WPL]

The project is set up by a steering committee and a project management group. The steering committee is more the high level representative from companies. The project management group consists of various work package leaders. Regular meetings with the project management group are conducted and they try to divide responsibilities for the different work packages or parts on different partners, keeping coordinating roles. Then the partners are responsible for the content of their work packages.

Roles

In this project, the role of the project manager is to manage and coordinate the project as a lead partner: *"Project management is one thing but our role is also to make things happen and to organize workshops. We are a neutral part so we are supposed to* ***facilitate*** *working together. Our role was to set and get the partners all together" [Project Manager]*. According to the contract and plan, the project manager needs to respect the budget and what it has been promised to do. Furthermore, concerning the project climate, he/she should "***keep a good atmosphere****, and everybody happy, by regular meetings, so people feel that they are a part of the project"* [*Project Manager*].

One of the sub-projects within the project A, carried out by the large firm involved, is focused on the technological shifts towards electric and hybrid power and on electro mobility. Together with other sub-projects, it contributes to achieve the main objective of the whole Open Innovation project which is related to public transport and sustainable urban development. The role of this sub-project manager: *"I managed the guys that made what we need to do, but I was also a* ***package leader****, which means coordinator with partners, with the large company, external consultants for installations, then the company handling the bus, the city, etc. So I was both* ***internal and external coordinator****. We were 6 or 7 work package leaders, so we had steering group meetings and I was one of the responsible, for my work package. It is also like normal project management but it's a bit more open" [WPL]*

Competencies

In Open Innovation projects the level of uncertainty is even higher when compared to traditional projects therefore specific skills are required to ensure a successful result:
"In Open Innovation you have to be more ***flexible****, since it doesn't always go as it's supposed to be. Things happen all of time because of reasons that we don't know before. You have to be even* ***closer contact to the people*** *and who are financing. If you are open with them since the beginning they are also more open to have things changed because they can trust you." [Project Manager]*

Also the work package leader agrees with the project manager: *"Anyway you have to be flexible. Even the other traditional project manager should have this skill, but since there are a lot of partner involved and since you don't know if it will work because you are trying to demonstrate something. Here you don't even know if people will like what you found, 'why did you do this?' I think that the relevant aspects are* ***flexibility*** *and* ***uncertainty****". [WPL]*

Since these projects usually start as small projects with an idea and then they become larger projects with different partners involved *"You have always to **show the business cases.** That is one of the skills you really need. You have to show business cases on something that you cannot calculate a business case on. You have to stand in front of all steering groups and try to tell them how everybody can make money from that. You have to push and promote this idea into the steering group. And most of the steering groups are a bit **conservative** [...] and sometimes they don't understand. So a skill is **convincing** them, even because usually these projects work that you try to get money from the previous project to begin the new one. So you have to **interest partners** and keep them interested in order to try to affect their time and effort spent in the project, you can't just send an email ordering what to do. You need to be closer to the people, really looking at the same goal, the **engagement** is very important. If there aren't some partners you cannot proceed in some kind of projects. You have to point out even their needs. This is another skill, even if they already have their own agendas". [WPL]*

Challenges

One of the main problems in this project, where different partners were involved, was how to find a good continuous collaboration with the public transport operator and how to have a long term view on the collaboration: *" This is really important, how to continue these collaborations at the end of the project*" [*Project Manager*].
Moreover the work package leader claimed: *"How the results of this project will give us the money and resources for the next project and you have to look at that during the project. It is important to focus on the **continuation of the collaboration**". [WPL]*

The project manager should understand the partners' interests and on the continuation of the collaboration: *"The accountability for this is for the coordinator for the overall project, in this case the Science Park, but also every work package leader should have the responsibilities that the findings on that work actually moves on, otherwise that package could even be swept away. So you need to be quite strong, not weak, and **be enthusiastic** so that everybody understands the importance of your work package. You have to be clear what your role is, because **everything is so unclear** and keep reminding people where we are going and what should be done". [WPL]*

Specifically to this project, issues come up when the project manager is not within one organization: *"When you are not the project manager within one organization you are actually a bit **tied down** because you **cannot stare the resources**. If some of the partners say 'this was delayed and now we don't have the resources, then we have to wait months before we can do it, I cannot really do anything about it'. I can talk in the steering committee and we will discuss the risks, but it's still a discussion, I still **cannot affect their decisions** in that ways. So you know then it will be really hard to plan and to re-plan if something happens. You have to be more political as well. And be more correct. [WPL]*

In comparison to traditional projects there are more difficulties related to the **coordination of partners** because in these kinds of projects every organization has its own agenda: *"At the end of the day the large organization want to sell more busses of course. But other people have other agenda. For instance we had some issues, we had a*

problem with the technology, and I suggested that we will fake it for the demonstration and that would have been ok, but the other partner wanted that it actually work, they had their own tasks, they had to show to their interested parties that it actually works to have money from them. So I had to reconsider it" [WPL].

In this project, the risk was the impossibility to have a live demonstration and a previous testing which is an important aspect within the public transport sector:
"There are bigger risks in these projects that you head up to by saying 'I couldn't do it', because of course you have wasted a lot of money and you need to have a ***backup plan****. I think that* ***you can never really foresee risks****, especially in these kinds of projects, where you have to speak with a lot of people. It is like a detective work. Also we need to make sure that the results are not scattered, so that the results are good and useful for every partner"* [WPL].

4.2.1.3 Stakeholder Management

The steering committee is built only once the project is started, so before that the partner scouting is more in the hands of **coordinating partner**. If they decide to set up a new project, they are also in **the power to decide who will be into the collaboration**, at least the core stakeholders. If a stakeholder does not have something interesting to offer for the project *"I could just decide it doesn't fit, so before the project start the power is in the hands of the coordinator"* [*Project Manager*].

Thus the stakeholders were identified before that the WP leader was directly involved into the project, but she could observe how they had different objectives concerning projects results: *"Some stakeholders were not really eager to share their full objectives. And we do that as well. Some of the things we do, we can get money from them, and we don't want to share it.* ***Everybody has a part of the agenda*** *that is quite* ***hidden****, because everyone wants to make profit or progress. Not everybody is that open, but I think that is ok because we need to be competitive. Because even if it is open, every project is focused to make the company, the city or researcher institutes competitive"* [WP leader].

In the initial steps of the project *"you have the partnership with different partners and* ***no matter how much*** *you have* ***common goals****,* ***everyone*** *comes in from total different angles with* ***their own prospective****, and their organization best in mind. I think what we could have done even better in this project was to start even earlier with discussing the company or the setting up of the commercialization, the* ***discussion should start as early as possible****, because then everybody have time to discuss internally in their organizations. Sometimes is a person who breaks into the project, but they maybe don't have mandate up the top level, it's not until somebody need to sign a paper that there can be questions. It's important to make sure that people in the project have the right mandate"* [Project Manager].

When every actor receives money from financing institution, that amount has to be put into the project, but often stakeholders, especially the large enterprises, have an **extra project going parallel** with this. *"Everything done within the project is of course open*

material, but if you have a parallel project, which is only within the organization, you can develop things that found in the main project. It's not like people hide things within the project, you have to share to each other, it's more like people take advantage from the project and grow ideas for the organization" [WP leader].

Concerning stakeholder documents, a lot of work has been done in the start-up of the project, mostly throughout meetings, gathering qualitative information. They already had a good idea of what partners should need, thus **identification and classification tools** were **not implemented.** *"We are doing that all the time, but it is more in the start-up of the project. But it's not like we are documenting, we just have meetings. Every partner suggests other partners, then you understand if they are good or not"* [WP leader].

It has been quite hard to agree on the project objectives, because some of the partners wanted a larger scope, and the WP leader realised that they could not achieve that for time and technology reasons. When the final version of the scope statement was set, it was quite an **extensive document**, in order to make everyone understand what should be accomplished. It was also specified future actions, how the results will be analysed, and so on. *"These steering documents are quite extensive, and that's because we have a lot of partners. It's not fun to send out documents like this, with a lot of text, and ask them to read through. Then you may also have **agreements**, everybody have the chance to read it and make changes. In the next follow-up meeting you can ask if this is clear and then you get 'yes or no'. So you have what has been decided. So even if it is boring you still need documents like that"* [WP leader].

The stakeholders did not integrate their information systems, but they use internet common tool for the integration and communication with partners, where the coordinator invite them and everyone has access to the **project sharing place**. Furthermore the WP leader tried to have **follow-up meetings** quite every week with each stakeholder, even to try to keep the scope intact: *"I tried to talk to everybody very often. Sometimes even too often. Trying to understand if they are doing what they are supposed to do, take 5 minutes to make them explain what they are doing. I think it is a good way to understand if they are moving out of the scope"* [WP leader]. Informal talks and individual talking with people are useful, so it can be understood what stakeholders are really doing, because sometimes it can be that not all people want to talk about the results of their work. *"You have to create **a system where everybody gets the same**, so everybody is with you. And is also easier to co-create**. It needs a lot of talking to people**"* [Project manager]. Also in each work package they most often had workshops, and the workshops for bringing new partners that they wanted to attract. *"When you prepare the **workshops**, there you can **control the scope** because the partner already involved ask you questions, and if their going out of the scope you actually notice that during the workshops"* [WP leader].

When a **conflict** arises, it can be managed and **solved in different ways**: *"You can do it in different ways. You can talk in the start, try to call them before meeting with the partner, one partner at time, asking what is happened and if they have resource problems. Otherwise you have to report it as a risk to the steering committee and you can make the proper person make some lobbying to that partner. Then if they actually*

don't have resources you shift tasks to another company or shift money. You can do that, even if it takes a little bit of time, but it is also a good way to solve problems, because often partners don't work because they don't really have resources and not because they are bored or something, they really ***didn't see the vastness of the project*** *at the beginning and now they can't cope with it. In the worst case scenario we will never do projects again with that partner"* [WP leader].

For what concerns other aspects in the projects, it is **like normal project management** ***"but it's a bit more open*** *and very much interesting to speak"*. No new or different tools were used, such as Gantt and action list (who is the actor, what is supposed to be done), but the WP leader said that version management tools were really useful: "*You need to have documents, a system of saving emails, because then the people change within their organizations and they are not aware of what happen. At the beginning they agree, but then they don't, so you have to make them go back and see. It's import to* ***write down clearly what has been decided.*** *In the beginning of the meeting we have a list of activities and we start with this list. Is this have been done? No, why not? Like a checklist and we take it up in every meeting. So we can see 'You were supposed to do this' etc, because then you don't lose anything and you see who is supposed to do something and it is also what it has been decided"* [Project Manager]. Also the WP leader stated it might need more extensive tools and help especially for the administration side, which is not so easy to follow-up if people don't know how to do it, such as SAP. An economic department may be needing to know what is should be done when the final reporting has to be prepared, because there are a lot different voices to track. The PM's organization is a large industry partner, so they have an economic department, but other companies are in a different level and dimension, thus if they did not collected all the data in the beginning then they have to sort out all the different costs.

An important issue for this project is they need to find a good **continuous collaboration** with some partner, especially the public transport operator. "*This is really important: how to continue these collaborations at the end of the project. In order to carry out large demonstration project that we know should also even after the end of the project, we need to start the evaluation already from the beginning of the project, or even before in the R&D. Before, during and after the project. Before to make sure that it's already been done and learn from previous failures or good examples and, then during to be able to carry out and see what is happening and have a good systems, follow up and indicator and provide recommendations"* [Project Manager].

4.2.2 Case B

4.2.2.1 Project overview

The project B is constituted by different sub-projects and deals with the development of innovative and sustainable transportation systems. It is referred to the use of electric buses entirely emissions-free in a temporary route, in order to get environmental benefits. The cooperation also involves the creation of a demo arena where companies and research institutions can test and develop innovative solutions for public transport.

The project directs its attention to citizens and commuters with the purpose of attract them to use public transports in the region.

4.2.2.2 Project Manager Role

The overall governance of the project is represented by a joint steering group, where all the stakeholders are represented, and joint decisions are taken in the joint steering committee. An external organization has been hired to coordinate all the stakeholders of the project. The project is composed by a project manager who is the ultimately responsible for the successful delivery of the project outputs and an external coordinator who builds networks of cooperation and coordinates resources and information.

Roles

In this project, the main role of the project manager within the industry partner is to manage the organization's deliveries and the IT service, in order to connect the vehicle and traffic and he/she has also the responsibility for the entire project. In compared to traditional projects, the Open Innovation paradigm has had an impact on the roles and responsibilities of the project manager and in general on the way to work: *"It has been a **big change** for me personally, and for everyone actually, because it's a clash with the way we were working. I'm the responsible of the large organization for electricity, but I'm also one of the three coordinators for the whole project. All the stakeholders put in contribute with their parts in this collaboration. It's not like someone has the right to tell the other one "you should do like this"" [Project Manager]*

Concerning the role, the coordinator also states*: "Everybody in this project does something that they are not used to do. The different thing with this project is that the steering committee **cannot tell to anybody what to do**. It has to be voluntary. We don't have any **authority** to say people you should do that or you shouldn't do that. But we can be quite **persuasive**. The management in this is that address on very high expectations (what this repaid). It's a bit shameful to not fulfil any expectations. [..]We have to help the steering committee to be realistic and the people who actually do the work to be both optimistic and realistic." [Coordinator]*

Competencies

This collaboration brings different ways to manage the project and different skills are needed in compared to traditional projects: *"It's a lot **more understanding** of each other, in the setup we have I'm used to the fact that I can go to my steering group and I say 'this is how I want to do it' and I get the yes or no. You cannot really get that here. You get like a **consensus**, you get 'yes, let's do like this', but you don't get the directions, like I'm used to at least" [Project Manager]*.

Furthermore the coordinator stated that additional skills are required: *"You need **integrity** to tell people 'actually now you are not doing what you are supposed to do' and not be afraid to speak with anybody, no matter what position in a company or in authority. […] You cannot tell anybody to do something; you can only ask to do something in a firm way" [Coordinator]*.

According to the project manager of this project, since the beginning of the project it is important to "**make people focus**" and "**move the decision down to the bottom**": *"If you create a vision for the project and you control not down to every hard fact, but you say 'we have to deliver it to 2015, and we should achieve this', if you continue to talk about few features of the product, and push that message down to the organization, then you can create an organization where the **decisions are around** what actually is important, and how to solve things will happen all the way down the organization, instead of the top management of the project." [Project Manager]*. It seems that creating a common vision is more important than control the organization and people. Consequently people that are involved in the team need to be more creative and to have different competencies: *"You need to have people that are not being used to be exactly told what do, so they can take decision on their own. It's **delegation and creativity coming from the bottom**, I cannot stand for the creativity, I can stand for the **vision**, and where we are heading, they are the one who are need to solve this, it's a big responsibility but also a big challenge, and it's more fun to work in that way." [Project Manager]*

The project manager, who is from a company and thus may give only a personal point of view, the real change is not connected with what they deliver and how they handle it but with the service side, which is governed through the Science Park. Around this service area, "creative thinking" is developed with all of the stakeholders and "anyone that has an idea". In the literature, the Open Innovation concept is often connected to this **creation of new knowledge** where the role of the science park in this project is to "*collect and look at ideas, package them down into mini projects, introduce a certain time scene and discuss the ideas with the stakeholders and bring it up into the project" [Project Manager]*. Usually the initial project is used to generate new ideas and new projects and is divided in sub-projects where every part has their own responsibilities. In this context, the project manager should assure that **everyone is synchronized** and is going to respect the deadlines.

Challenges

In the conception phase of the project a set of targets, a common vision and few goals have been defined in order to be first on the market. The common goal of the project is to get environmental benefits but every partner involved has **slightly different objectives**. The university aims to strengthen the cooperation with industries, energy authority to improve public transport and energy vehicles efficiency, the industry to sell their product and the public authority to develop the public transport and create more jobs in the region.

One of the main challenges that project manager has encountered during the project is the coordination within the triplex helix of academia, companies and government, due to the high number of partners involved: *"In the project **it's hard to control** that, because I think these parts need to have their own lives, I don't think you should control them and how people implement them, that is left to the parties. The only difference with traditional context is that 'we can only **coordinate** this I cannot tell what to do'."* [Project Manager]

From the coordinator point of view, another aspect has been highlighted like the **different culture** on **how partners make decisions**: "*The large firm involved in the project is a traditional industrial company where the top management says you should do that and that would be done. It should not be like this for the public authorities because they are democratic institutions. So that is another challenge. Make traditional industrial companies understand the political process, and get the authorities to make understand how companies work*". [Coordinator]

Furthermore, the project manager believes that in a traditional context it's easier to take decisions. "*When you work with public organizations is much **harder to take decisions**, the decision making is very slow. It's very hard to get decision around the table without involving a lot of different stakeholders and the politics even." [Project Manager]*

4.2.2.3 Stakeholder Management

The stakeholders within the project come from industry (automotive company, public transportation company, Real Estate Company, energy company, science), public institutions (city, region, national energy institute) and universities, which cooperate within two science parks. It started with an idea from the automotive company, and some partners were *invited* to be on-board, such as the city, the region, the energy agency, and the two science parks. Instead they then the university came into the project *directly*.

When each core actor had been pointed out by the automotive company, they found **their stakeholders for their own**, e.g. the city have pointed out the city energy company as responsible for the energy supply, the municipal development company for some property development and for some connections with future urban planning that is ongoing with the area, the region pointed out the public transportation company. An **external company** was hired by the city and the automotive company **to manage the coordination** of the project, but this company was not a partner and "*that make us really free to say what we wants… I think that other partners look at us like **independent**, we are paid by three different partners and this means that we have lot of freedom. We don't represent any of the partners*". This company had the role to deal with conflicts that could arise.

The **relevance of the actors evolved** during the project lifecycle, and it will happen even in the coming months. In fact the project manager stated that they "*will see a heavier involvement on service R&D from the science parks and university once we will deliver the platform we are now building*". The government had not so much direct influence on what the large company will do: the company provided the public institutions a project description of what it wanted to do, and the approved it, giving the group the frame within was possible to manoeuvre. Furthermore the PM said that the stakeholders will change, even if he thinks it is early to say, because the project is still on-going and project's relationships are really quick due to this flexible context.

The initial **involvement of stakeholders was not up to the project manager**. They were identified before the project started by the top management of the large company but it **took a while to understand who was the right stakeholder to engage,** especially when the financing part was discussed. That affected the time left to the project manager to deliver the final outcome (June 2015). "*It could have been done in a better way. Before you enter the project execution phase, you really need to know exactly who does what, and we were not there, so that took a while to get that. Almost a year. It's something to improve. And also get **commitment**, especially who does what, **quite early**. Everyone in a project wants this, even because someone needs to pay"* [Project Manager].
The stress on time aspects was clear also for the coordination between the parties, with the **definition of a "short deadline**": *"Without that short deadline we could have talked forever. So we say, we should have something ready for June 2015, and then this is the platform that we will deliver. That is the challenge, what is the target for this kind of project and the expectations" [Project Manager]*. These flows of information are managed as a traditional project, where a project meeting is used to synchronize the status and the resources of the projects with all of the participants.

It took a while before all stakeholders involved were defined, slowing the successive process of "**creating their ambition**" in order to make them understand what they can do in the specific project. Based on those ambitions they then created some **high level targets**. But the ambition should be at the **right level, in order not to waste time in useless discussion.** *"There have been workshops and focus groups around every project's work package. There were a lot of consultations in the steering group too. Basically the team develop something and present it to the steering group, and there's the consensus and the decision-making" [Project Manager]*

The **negotiation of project's objectives** among stakeholders was a **long sub-phase**, due to very malleable project context and number of actors. This **time consumption** and porous boundaries were **especially felt by the large industry**: *"Of course we had an idea of what we wanted to do, we wanted to add services and we wanted to test how they were. That's some kind of fluffy!" [Project Manager]*. Regarding the **different partner's perception of risks and objectives priority**, the coordinator stated: *"Everyone started with what they know, what their tasks normally are and then they realize that something more is expecting from them and then they may got insecure about that , which is completely natural and a bit defensive. Then they came around and started to think that it could be developing for themselves as people, for their own organizations and for the public transport in the city. They got very enthusiastic and then after a while they **get more realistic**" [Coordinator]*. Then the various objectives were united and later re-split, depending on each actor possibilities, capabilities and commitment. The city wanted to show up as a progressive city, in the forefront, and see how the city can be built. Instead the research and demonstration arena aspects were held in the university. The large industry had among the overall goals even to create a demonstration arena, so they wanted to test and evaluate different ideas that increase attractiveness in public transport. The industry project manager stated: *"We are good at measuring hard facts. The more soft things, such as increase the attractiveness, future impact in the city planning, environmental goals, will be handled by other enterprises*

and institutions, and through their channels and methods that can be measured better" [Project Manager].

Thus the **scope** documents has been **held and managed jointly**, even though each actor managed it with a different depth level for each subproject. For instance the industry is the main controller of the product's scope, but the Science Park is the coordinator of the services development (they take the ideas and then they package them into the project) and the industry only take decision on a conceptual level. The coordination company coordinated every document and they created since the beginning an agreement called "cooperation plan". There were some problems and errors in that, but the coordinator also stated "***documents are not so important in this collaboration. It's is a lot of talking***". Also the project manager confirmed that the stakeholder management has been performed basically through discussions during the whole project with the other stakeholders. However the information flows and the document created were shared in a common workspace in the net, a virtual project space where they store all the data. They keep documents there in order to make everybody reduce their use of mailboxes. But the publishing of information has some issues: "*Here is a tricky part, because there's a public and private part. I cannot publish all I would like to publish in that team or project place, because then it becomes public, so you need to handle that. For instance, around the design of vehicle I cannot publish that there, but of course other stakeholders are in need of that type of information, so we need to share that informally. So there are* ***two channels, one formal and one informal****" [Project Manager]*.

Concerning the **activities distribution and work breakdown structure**, it has been considered by the industry project manager as **more flexible and generic process**, but not so different from the closed context: *"Yes, we have some overall milestones and basically even if the stakeholders situation and the constraints situation has been quite changing, I tried to handle this as a closed project. Not that difference. The difference is the way the idea is coming, is how much you can influence."* [Project Manager]. The only additional activities to be structured in the WBS were those linked to the collaboration and integration aspects, and many agreed on the fact here there is a tricky part: *"It took a while* ***to make people understand that we have a huge integration task in front of us****. People think that they develop their part and see if it works, but it doesn't work because it works only if you try it directly in an interconnected context. I've done a lot of workshop with the team to pull out their needs for the integration."[Project Manager]*.

When an idea or a concept is proposed by a stakeholder, who has a near organization who can execute that, then it is not easy to make them understand they have expose many data, for example who does impact, who finance it, and when it should be introduced. *"We need to find one that is settled on high level, then we need to start negotiation and who does what."* Especially the large industry try to control all these smaller companies gathered by the other stakeholders, because with their experience they understood it is pivotal that they have to know as early as possible who has a stake in the project. But at the same time, in order to follow the principles of openness and to disclose purposively information, they should not try to control everything: *"That is tricky, because* ***on one hand we want to have control of the delivery and on the other hand we want to scope creep****.* ***Because all the project is about scope creep****. Because it*

is also a demonstration arena for ideas that we don't know at this stage. We want to test things, and we want to test them in a small scale (we created a single route), so it's ***allowed to fail****, and that is very important when it comes to new things, you need to try and to be allowed to fail. Mini trial and error" [Project Manager]*.

The project constantly evolves so they are pushing quite hard in order to handle this situation, focusing on "this" scope until "that". Then when new ideas are brought up, coming especially from small companies around the large industry, they are funnelled to the Science Park. The PM stated that this is somehow the traditional way between Sales department and project development in a single firm, where the Sales area asks always something more. It is the same concept but translated to the multi actor setting open setting. If there is a part that does not influence the other parts they can introduce it whenever, but there are such few things like that. So they to focus on "*one thing at a time and then the next thing after*". The **unexpected and unwanted scope changes** that occurred were usually **managed** by the stakeholder who **was the initiator of the issue**, so they had to take on board the task to have a new proposal, and then the proposal was brought up and agreed in the steering group. And **this is a time-consuming activity in this context,** ***"but it is necessary to maintain the borders porous****"*.

Concerning the ways of managing these issues, the PM also stated: *"This is actually something that is requested from this project****, ways of working between private and public****, and all kind the actors in this context… We wasted a lot of time in discussions after the project kick-off has started. We could have settled a lot more things at the beginning. It will be easier next time****, we learnt****" [Project Manager]*. In fact one of the main differences in this approach is that "*We* ***don't have direct influence, but you need to influence indirectly****" [Project Manager]*. Given that there is not unique authority in this open context, it is not possible to control the resources directly. Therefore, it is possible to **use risk management tools for controlling the resources indirectly**: *"We try to make our own evaluation, then we use the risk assessment and identification to put focus on different parts, this is one tool to control your product. Since you don't have direct control on final product, as I'm looking from the top, I can highlight an area as a high risk, and in the steering group the one who hold that risk will feel the pressure, this the main way of controlling indirectly"[Project Manager]*.

Concerning future collaboration, in June 2015 the route will be launched, but the project will run until June 2018, and there will be continuous development of the project for these three years. They still don't know if there will be the same stakeholders and how the continuation of stakeholder management will be set up. Some discussions are initiated, but at the moment the focus is on June 2015. There is a really **strong focus on time management**, due to the number of collaborators. *"The collaboration will continue even after, it will evolve, here in the company we want to test new vehicles, starting with this route, but we'll more things coming in. That's the idea."*

4.2.3 Case C

4.2.3.1 Project overview

The aim of this project is to create an innovative approach to look at traffic safety, involving lot of actors in different workshops with the purpose of co-creating a common agenda on automotive safety future development. The collaboration allows building a structural capital and accumulated knowledge.
Road traffic and vehicle safety is a sector where several Swedish companies are world leaders and among the most innovative players. The international success has been given by a long series of innovations and high-quality researches. A main contributing fact to this is the long tradition of collaboration between government, industry and academia. The starting point of this agenda project has been innovation and growth related to four main areas within the safety field: road users, vehicles, and infrastructure and traffic systems. Concerning these areas, four main workshops have been arranged for different set of people, depending on their expertise. Several concepts were pointed out, and those were spread even in different fields in order to better market the results found.

4.2.3.2 Project Manager Role

Roles

The project manager role in this project was to coordinate and lead the project: *"It's not management like in an organization when you work in this arena it's different because it has too many dimensions in comparison to the standard. You **don't have any authority**. It's extremely person driven. I think you really need someone exceptional in the approach to people and in the co-creation and collaboration, who just loves all of these tricky issues"*.

Competencies

Since the project manager does not have any clear authority or role, he or she needs to like "*experiments*" and to be better at **building trust** in these kinds of projects than in traditional ones: *"In your mind you should set yourself the authority that you don't have and then act or find a way to implement that without offending somebody. You need to be **good at navigating** and to be able to **adjust to circumstances** and to **listen.** I think it's very central, to be able to hear what those that you are supposed to get working in the right direction, what are their interested and how you can **create win-win**, which is not always easy. You need lots of **persistency**, **endurance** and you have to believe otherwise it is extremely hard to convince somebody else"*.

In Open Innovation projects is more important the building of trust among the players because traditional projects are conducted by line organizations: *"The line organization says 'you go work there' and somebody goes working there. There is a start, an end, lot of follow up and interests from the guy who said you work there to see that it works. In Open Innovation some people still are sent there but sometimes with scepticism and some people join collaboration because they think they cannot not join because all of the others appear to be there. So you can kind just go there and show up. This is very different I think"*. The project manager stated also: *"You need to **build the trust** and the **interest** because it's not so clear that it is there from the beginning. Management may*

not even think that they should be there but they can't afford not to be there. I really think that this is true in many of these circumstances. [..]I think that this trust is more important because you don't necessarily want to be there and your supervisors don't necessary want to contribute you in there. So then to still get something good out of that, that is a challenge!"

The project manager should have a realistic time idea on how much it takes to collaborate and involve the people in an open context: *"It is a lot of **trust building** with stakeholder, you really have to invest in that, and get to know them, even between them. And you as a project leader have to do that as well. And allow it to take time. Understand how it takes time. From a personal perspective I really understood the **people involvement** part be more important than before".*

Challenges

From the project manager point of view, there is hesitance and a misunderstanding on what Open Innovation is: *"I think overcoming these challenges, all of this **scepticism** toward the concept of Open Innovation. I think you need this trust because otherwise you will not have the openness to share. It is a challenge making people understand what it is and how it works and what it is not"*. Furthermore, there are not only interrelations between different players that come from different areas but also lot of internal achievements in the organizations that need to be reached: "*Because if you are in a project and you want to contribute you may need the help in your own organization from somebody else but then it may not be the highest priority of that guy because there are these internal achievements and priorities. I think that it is more important and more challenges than in a normal project, because in a normal project there are at least some basic agreements about priorities. I think Open Innovation projects sometimes has the nature of appearing more '**fluffy**' [...] It is not so much recognized as a **rule of business** so you have to fight internal priorities and it is something that it is not so known and something else is more known and clear when it comes to constrains about money, time and resources. Then it takes almost a year to find the path. So I think that this **competition with the traditional** projects I think it's a challenge".*

The big challenge in Open Innovation projects appears to be related to the human resource management because despite of other projects "*you don't control over people*": "*These projects need **people involvement** and t is a risk because you don't really know who is invited. The risk has to do with people and how you manage them and how you involve them and you cannot have their continue attention. That problem has to do with scope and objective and vision. It is important to have some clear idea, what you are going to deliver at the end of the day, but it has to be the right vision. It should be something that is useful, not like consultancy big fluffy goals. If you don't have that clear, people can't interrelate. Being such a fluffy thing, even if it results in something**, not knowing exactly what was expected** and try to form that, probably is true for every Open Innovation project. You don't know exactly where you are going. This is a risk, how you navigate in such unknown context, people are disturbed when they don't know where they're going. So it's difficult to unite those groups."*

These issues are related also to a lot of personal risk for trust building, from a project manager point of view: *"If you invest a lot of time in something unknown and it is a failure, then you take a lot of risk, because you can be seen as someone who wasted time, and you can be associated with the wrong things. There is lot of* ***personal risk*** *for trust building"*. From the academic perspective it is not a problem because it is "kind of normal" to fail in a research program a*nd "they can still write a paper on that, whereas in the industry will be out next time. There is a lot of "****not invented here****" in the industry"*. The project manager should "***give a sense of direction***" in order to manage these issues and should *"strongly believe in that direction, even though you know there will be adjustments. You have to seem convinced"*.

In Open Innovation projects, there are lot of people involved especially in the initial phases. At this step it is important to try to not have anyone who will "mess up all of the ideas". Therefore, it is the project manager responsibility to treat everyone in the same way and get the enthusiasm. The project manager drew the typical trend of enthusiasm in Open Innovation projects in relation to the project life cycle, as shown in figure 12.

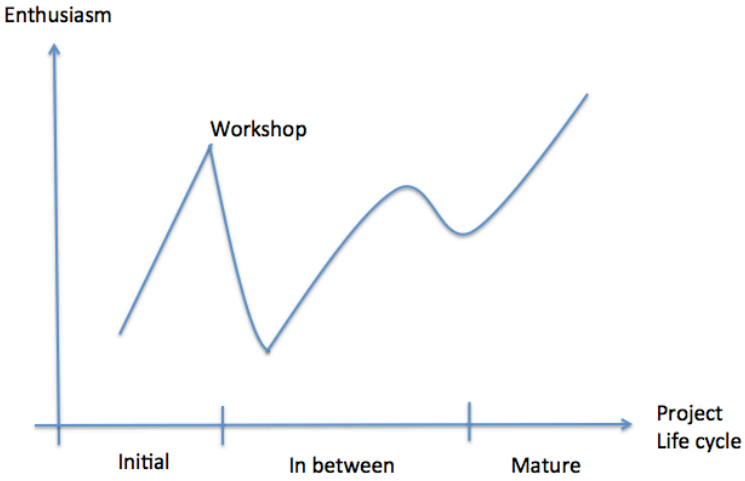


Figure 13. Enthusiasm-project lifecycle graph (Project Manager)

Initially there is a lot of enthusiasm and positivism and "*you get closer to something actually, tangible in our case with lot of enthusiasm and then we had the workshops*". In the second step some scepticism come up: '*well this it will never work'*, '*what came with this*?'. Then slowly "*you can think 'When will this project be good?' and then again some scepticism"*. It is in this phase that some people drop off because they realize that they "*have to do something and it was not what they thought*". At one stage, the project manager and all of the project team, manage to create a brochure, so people thought '*Wow! We have been part of this'*.

It is really important to capture the initial enthusiasm and the project manager has "*to handle this in between were you have had the workshop and you don't really know what to do with all of the enthusiasm and generating knowledge and ideas, before it ends maturity to something where everyone can again see 'oh did you create all of this? I want to be a part of this'. I think it is often like that and maybe that it is not a good*

tactic to take it on in the intermediate phase yourself. People who enjoy this very much are probably good at handling that gap".

4.2.3.3 Stakeholder Management

Concerning project's objective and vision, the project manager stated: *"We **didn't know what the agenda clearly was**, but we were really clear on thinking 'we want to have something which can lead to traffic safety', and that was what we sold to the stakeholders. We thought that they would benefit from such an agenda. It is also industrial growth, which was really an important part of the project. We defined together the objectives and then that we would land in a brochure. We didn't have clue about that, we have seen some ideas of how it should look like from the agencies, but we wanted to do something that was good for us"* [Project manager].

In initial phases stakeholders were involved through brainstorming meetings: *"There was lot of brainstorming, very wide thinking, sometimes actually it got too wide because some people didn't really feel that they could contribute at the end of the day. But we tried to be innovative in our thinking. Also in order to make it **credible** you need to have key stakeholders as well, **the large stakeholders**, If you don't have those than people will think that you are out of the box".*

The project has lots of partners, everyone was welcome but of course they identified who could contribute more, for a credibility factor too. The coordination in meetings was sold as " […] '*come and bring your brain: **I don't want to ask people who seem to be a little bit sceptical to also do something** and not only show up to really bring their ideas. I think I would not prepare something or go if I was asked to prepare a lot of documentation. So it actually takes a lot of the hard work from me to try to **create an atmosphere** where you get people to share their experience because everyone loves to feel that 'wow'. 'Wow' it is so good to be able to **envision that to all stakeholders**, to create that sharing atmosphere, with lots of open workshops, creating a good set up for contributions".* So the tactic was to take an expert in helping to create an open and contributing atmosphere, but still very structured: *"We were taking on lot of hard work of structuring all of the ideas and this was very hard because we have been so loose in our directives. So we sit in this room, I don't know how many days and hours to try".*

There were 4 main workshops in 4 distinct areas for different set of people. Some people showed up more because there were 4 different teams. So there were some people in all and other in one, depending on their expertise. *"I was also involving myself in similar initiatives and in completely different fields. I am really trying to be myself good player in other projects to get ideas. We worked with these workshops and we condensed the workshops into something more useful. Finally, there was just a bunch of ideas. Anyway it was **less structured, not so formalized***".

The stakeholders who had more influence were the large players needed for trust and credibility: *"They were really contributing. Then some people who are frustrated in their own organization because they don't get enough attention for their job. They were very good, they have so much to share, quite mature people so they went in here and they were very good and responsive. Then you have some actors who are not in this*

'family' yet but they believe that they should be allowed to come in for free because they are also good. They were also very committed. When you work with safety, people are very dedicated, you just love it. We tried to get entrepreneurs as well but they were very enthusiastic and good in the workshop phase and then it got too theoretical. I think that when you work ***with large organizations, you need probably to institutionalize*** *at one stage a bit those who are not use to that theoretical".*

The **academic world was important for this project**. The people from industries recognize that the academy possesses a huge knowledge but there is still this impression about researchers sitting there with their theory: "*I think that it is true, but I have never seen such openness as you do in academy because you don't just think about the budget, time constraints. If there is a meeting place where two people meet, they will talk about what they can do together, I am so surprised. In the industry often you just say 'I don't have time'. When I was in the industry I didn't really understand the impact of academy can have on doing things*". This welcoming open and sharing atmosphere is important to capture ideas, and there is really much knowledge and the **scientific approach can help to be more pragmatic**. *"Normally if you are in industry you think that you are extremely pragmatic, which you are, but I didn't think that I could get so much help to be pragmatic from academia. I am so impressed by this gain here. I really like to be a part of it".*

The number of actor changed during the project lifecycle: "*I think in the beginning we had a lot more, and then towards the end some dropped it off because they thought that this one was not their thing. Individuals also at some stage were replaced by somebody else coming from that organizations".* The PM selected all relevant stakeholders and created a main list. The four areas were really different. She tried to be very wide in the selection of four teams. Four different groups received relevant information for their respective area. Then they tried to back it together and see what the next step for the all thing was. But they had some **issues in the communication side**: *"Lot of emails, probably too many. It took great care in the headline of the mail, in order to not make people think 'oh this is another one for this project'. It is extremely important when you mail, who you email and what is the title of your mail".*

The **scoping was a continuous process** over the project lifecycle: "*We knew that we had something that we could call agenda in the end of the day. The scope changed a lot. We tried to use some techniques with us and we were really stubborn****. Any techniques, mechanism or established method was really useful****, we tried to conceptualize something. It was a struggle. There were* ***some milestones but really flexible,*** *because there were lots of ideas, how can we frame on this? We had nice results from the workshop, what we do now? It was really difficult to understand what the product could be in the end, how it should look, what can we use it. The experience of some actors in Open Innovation theory helped me defining to how we should structure this. Actually I think it helped to scope it more. A big learning for me is this* ***theory behind innovation, it is very applicable*** *and this knowing how people think and how we have packaged things from that perspective and not only the true scientific logic and technical staff is very useful".*

The collaboration **continued even after the end of the project, to better transfer project's results**: *"We informed everyone at the end of the project, emailing and asking everyone to share, contribute, react, strike out and come with new ideas if there were. We also informed everyone that we were going to apply this to a real product. We also had to communicate we didn't end up where we would have liked, so now we are considering different options. In the application for that money, not everyone we were inviting was involved, but we pinpointed the stakeholders who we wanted to take with us. We have had some dialogues afterward but the reality has to take over. I think that actually we can work a lot with the lines that we identified in the application"*.

Towards the end the project created a brochure, in order make easier to market the ideas. And then they organized parties, lunch with coffee and cake and gathering everyone, to advertise the concepts found: "*We had this lunch where we invited the **stakeholders** and we tried to **make them feel proud** about this. And then also make the brochure available for everyone, to market it outside, every stakeholder was advertising that. Wherever I go I take this brochure, to make people understand what we did, and make activities based on this. We tried to press ourselves in the agenda of events, in order to market this knowledge that is available in this field. This is a big challenge. We take with us stakeholder to market it better. We want to spread it even in different fields"*.

4.2.4 Case D

4.2.4.1 Project overview

The project D concerns designing state of the art patented, floating platforms, able to turn automatically into the wind, while harnessing offshore excellent conditions for production of renewable energy. Deep water offshore areas enables utility corporations to choose their wind farm installations upon areas with best possible wind conditions, rather than primarily basing them on remaining areas with shallow waters. The focal organization is devoted to take the lead role as technology developer of floating platforms for wind power. The company offers different solutions, but now it is developing a solution simultaneously in Scotland, Canary Islands and Stockholm, trying to find synergies to boost project performances.

4.2.4.2 Project Manager Role

Roles

The project manager, hired by the focal company, has the responsibility and the role of planning the scope, budget and scheduling. Furthermore it concerns the communication with stakeholders: *"communicating to get acceptance with stakeholders, there's a lot do, there is a lot of communication with stakeholder, we do develop offshore platform, we need to interact with fishing, environmental, aviation organization. So there are a lot of **different actors**"*.

Competencies

Due to the different players involved in the project, the coordination is an important aspect to consider. It is fundamental to gather stakeholders' relevant information "*about who are they, what kind of attention do they need, you need to meet them several time to get an input"*. The competencies that a project manager should have in this open collaborative setting are: "***Communicative skills**. But also a feel for how long a certain activity take in time and cost, which is the plan. The analytic aspects, especially in the planning phase."*

Challenges

The project manager of this project has identified *"many more challenges in this context than within a single company. **The number of stakeholders**, if one of them has an issue or complain something it can expand the project a month or seven months and you can miss the deadline"*. Specifically, one of the main difficulties in this project, from the project manager point of view, is to put together a realistic plan within time frames given: *"In this project we need to have the whole floating platform permission to produce electricity by a certain date. So getting that plan is really difficult, also because you need stakeholder to say they believe the plan can be done. That takes a lot of work"*.

This project is very dependent on other parties such as institutions, governments and a lot of stakeholders and therefore this is perceived as a big risk from the project manager point of view. In order to mitigate it *"the communication and understanding, and continuous dialog is really key and essential. We need to know stakeholders' requirement and needs. And it must be done at the beginning of the project. Even because when you go at the execution phase you have a lot of other operative risks that are connected with the planning. So planning is essential to control those risks. In the beginning there are more risks connected to the stakeholders and regulatory too"*.

The other big challenge is to keep the capital spending as low as possible at the beginning, until the government will approve a relevant document. *"The strategy of project development is to spend as little as possible, but still get as much quality as possible"*.

4.3.4.3 Stakeholder management

There are 25 stakeholders in this project. The main ones are fishing communities, animal protective organizations, aviation communities, and boat driving associations. The focal organization did not use specific methodology in order to find the stakeholders, but they worked with **a project development organization to identify proper stakeholders**, because they have done these specific activities with several similar projects before. *"We based on their experience"*. They selected the **project evaluation criteria with the project development organization**, who set up both cost and time planning.

That organization managed the stakeholders' involvement too, setting up the communication and the meetings needed. *"Last week we had a pre-scope workshop*

with all stakeholders. We explained what we wanted to do and we let them give us inputs in our selection of places where to put the platforms. We had to listen what they had to complain about, for fishing aspects, environmental aspects, aviation aspects, what were their preference".

Concerning impacts assessment, the fishing communities were the stakeholders who had the most influence. But also the institutions that own the sea area where the platform will be installed. *"Then the government that gives you all the licences to operate the platform, but we first need to have environmental assessment. It is quite typical for this sector".*

Regarding communication among stakeholders, the project manager stated: *"We have not set the communication plan at this stage, but we will need to keep them involved throughout the development phase. The most important thing is to involve them as early as we have done now, so make them* ***feel that we involved them in our selection, that we actually selected them****. And give them* ***early information*** *of what we are doing. We have seen in other projects in this industry that, the ones who haven't done that, they have done a lot of planning and spent a lot of money, and then at later stage a specific or a couple of stakeholders have objected because they simply hadn't been informed enough. Negative effects at later stage of the project. We have* ***a really aggressive time line****, so we need to inform everyone early, to mitigate any risk of delay*".

For now the **scope hasn't been really controlled among each stakeholder**, only future scope changes have been estimated, *"but once you get to the execution monitoring and controlling will be a big part".* All milestones are set, but a huge one is the initial financing milestone. *"We need also to have an application with the government, to be able to meet time objectives. As long as you have a good communication with stakeholders you know what and when they need things. And we are working together to produce the material they need, such as the application for the sea area.* ***I don't know how I'm controlling it more than estimating*** *how much writing there is to do and be sure that we do that in time".*

For what concerns project management tools, many traditional ones will be used. "*We are now planning to buy some big software for project management. It is important to get structured in the project, to follow some methodology. I'm certified in PMI Project management Professional, I'm following their methods and frameworks, and you don't do exactly what they say, but it gives you good frameworks, making sure you don't forget anything, checklists".*

4.2.5 Case E

4.2.5.1 Project Overview

The project E aims to promote the solar energy resource and increase the use of alternative energetic systems for cooling in the Adriatic regions in order to reach autonomy from fossil fuels. The key aspect is to demonstrate the convenience of using

the air conditioning systems through a "smart and green" technology like solar panels, despite of exploit electric energy from non-renewable energy. After a joint feasibility analysis, all of the partners of the project have noticed the need to develop transnational models and tools for the application of solar cooling systems in order to provide both economic and environmental benefits. Therefore, six demonstration pilot plants have been designed, implemented, tested and monitored. This project includes 12 Partners from 5 Countries covering a wide Adriatic area and is co-funded by the cross-border cooperation programme.

4.2.5.2 Project Manager Role

Roles

The lead partner of this project is an Italian Science Park and plays the role of a regional hub for innovation. The role of project manager within the Science Park was: "*I was the project leader of this project and my role was to manage the partnership, conflicts and the quality of outputs. For example, there was a conflict because one partner was not performing so I had to cut his budget in half*" [Project Manager].

In this project, there were six big work packages, where two were led by coordinators for the results diffusion and coordination and the others were led by other partners: *"Actually the very important thing in these kinds of projects is that **there is not a really project owner**. The activity is always outlined giving responsibilities to the actor with the proper competence. Every actor, within its field and competencies, has its own responsibilities. My role, as a project manager, is to manage these responsibilities"*.

Competencies

The project manager described different personal competencies:
*"The starting point is the knowledge of the contract which you are working with. Thereafter **mediation skills** are very important because not all of the partners involved in the collaboration do what it is supposed to. There is someone who performs better than others. **Great tenacity**, not get discouraged, propose new solutions and have back up plans are key aspects"*.

Challenges

Specifically in this project, the different type of partners brought various difficulties on the project management such as organizations who have a "*cooperation concept very limited"*, *public authority* who has "*operational difficulties in comparison to SME because it is easier to work with a small company, especially if it situated really close to the Science Park*".

Essentially the main challenges are related to stakeholders' heterogeneity, the organizations size and their location: *"For **heterogeneity** I mean that every actor has different objectives and different experiences. Furthermore there were problems associated to the public authority like the bureaucracy advances slowly"*.

In particular, risks or problems related to the relationship with the universities involved in the project have not been identified. *"Actually they were one of the partners more well-performing. The two universities involved in the project have had great experiences in Open Innovation projects"*. They are considered by the project manager well structured so it is easier to work together: *"We could speak about deliverables, output and work packages. We know perfectly what we were talking about"*.

4.2.5.3 Stakeholder Management

The identification of stakeholders was not a task completely up to the project manager, but he was the **stakeholder manager.** The different kinds of partners led to difficulties in the coordination process among stakeholders. In this project the **research partners** were **well structured** to manage a collaborative project, especially a university, who *"had very qualified personnel and the ability to effectively interact with every partner"*. Instead other partners involved demonstrated underdeveloped abilities in cooperating, because the understanding of *"the cooperation concept was still limited"*. This was especially the problem of a municipality, who had not much previous experience in collaboration projects but who wanted to improve its collaborative competence.

The coordination among the actors was managed through the **minimization of information flow**. The PM stated that he *"hates the dissemination of emails where everyone just adds a bite and then nobody will understand properly"*. He affirmed that he prefers working with net drives and intranets to share data, and that: *"the net infrastructure was developed exactly to minimize those typical problems in messages and documents exchanges"*. Throughout intranet with reserved access the partner can find everything it is needed without issues concerning loosing pieces of information and knowledge. The partner can find there both bureaucratic documents, such as last signed contract, and project pivotal shared files, such as design scheme presented to the financer, with each work package. It **remembers what every actor should do** in each specific time slot. The intranets shed light on project's key points, then twice a year unification moments are set through meetings. The completion percentage of work and critical points are discussed, and a joint decision on how to complete the activities is taken.

No stakeholder management plan was created, there was only qualitative information gathered during project's initial meeting among high-level management actors.

Over time, there have been some **controversies** among the partners, but they were **managed in a shared way**, negotiated through the partners. For instance a partner had assigned an amount from the project sponsor, but they were heavily underperforming even after some warnings in previous meetings, thus the PM decide to reduce the budget and transfer it to the other partners to cover the missing tasks. *"You can't just reduce the budget one shot. **You have to work beside first**, both me and the other work package leaders to which I already said I would transfer that percentage of budget. I before said to them to prepare a program to absorb those inflows. So everyone already knew what*

to say at the meeting. ***There was no more conflict, even though it was not already official****!"*.

In this project there existed a **steering committee, where each stakeholder's agendas are disclosed and then verbalized**. Each decision on budget variation and transfer among partners need to be decided by stakeholders' representatives, with one vote per person. In this way it is possible to reduce issues concerning partners changing their ideas, otherwise there will be time waste due activity recycling. It is **easier to solve conflicts, because it is verbalized**. The same approach stands for initial objectives negotiation. In fact the PM stated: *"Typically in projects with many stakeholders it is better* ***to start the project with a limited core of partner****. When at the beginning I was thinking about the contacts to involve, I made some preparatory meeting at the science park, with 3 or 4 individuals, which then actually became package leader too"*. Still, during the project there occurred unexpected scope changes, which caused almost 9 months delay, because a feasibility study was not conducted properly by one of the stakeholders.

The core partners also set then the **performance evaluation criteria** of the project. The criteria were chosen in a shared way, even through brainstorming, thinking about the logical flows of what should be done. Then the criteria came up, **especially when they set up a demonstrative project**.

Traditional tools were used in this project, such as WBS, Gantt, and S-curve. They did not use professional software for project management, because they were working on a limited number of activities, about 100 activities. Also other open project within the science park had this dimension, even because maximum budget is 10 million €, with an average of 3 million €. The project manager compared this open project to a previous project, where the total project consisted of about 3000 activities. It was a big steel company, where specific and sophisticated tools were used with sectorial best practices. Thus, being **not so many activities** in case E project, the project manager considered suitable the **use of simple tools to manage it.**

4.2.6 Case F

4.2.6.1 Project overview

The project F is focused on the application of the new genomic know-how to support sustainability and profitability of the cattle industry. The project started from a joint desire to cooperate from both research institutions and many private partners, especially farmers associations. One of the aims of the project is to develop new models and tools, using genomic and phenotypic information, for optimising and customising genetic selection strategies. These tools are tested and validated jointly with SMEs and industry partners. A bovine genome sequence database has been created thanks to the exchanging data with other projects and the sequencing of key animals.

4.2.6.2 Project Manager Role

Roles

The role of the project manager is to maintain the relationship with the financial partner managing problems during the project and manage the communication among the partners such as organizing meetings: *"My role is support the scientific coordinator and all the stakeholders, concerning the economic, technical and financial aspects. There are various project managers and there are people who are focused only on the reporting. Specifically, we are ten who do only project management"*. In this project the scientific coordinator was a medical doctor, thus he/she was taking care of the most technical parts.

Competencies

Communication skills appear to be fundamental, especially "*speaking the same language of the stakeholders, aligning communication with the environment and reveal in which direction you want to go*". It is important also to meet people in person and try to make the interaction with partners *"**more direct and human**"*. The academy has to know the practice that companies live everyday and understand the market objectives.

From the project manager point of view, the Open Innovation approach enables her experience as a project manager: *"Traditional projects are not so frequent like in the past. This new approach has added new skills for sure and now I have a 360 degree perspective (general overview of the entire project), concerning the way how to handle problems"*.

Challenges

In this project, different problems have been highlighted by the project manager such as communication problems with private partners: *"Companies have to manage various projects and activities in the same time and it is difficult to contact them because they do not always reply to messages. In addition, it is hard to make them understand the importance of a deadline"*.

When compared to traditional projects, in this project there were more problems related to "*the importance of working in a collaborative way in order to achieve together the goals set and the **information exchanging** between partners"*.

In this collaborative context, there was an issue regarding the draft of the consortium agreement, especially the management of intellectual property. Due to this problem, there was a delay in the lunch of the project. The main reason behind these problems is that there is a lack of trust. *"As a research institute, I feel a **lack of trust** by companies. The research institute is often perceived as an organization that does research for no clear purpose and it does not have a clear business goal. Without receiving feedback from companies, the research institute has lots of difficulties to see the market instead of the industrial partners. The main aspect is that if they do not trust of the research institute which can bring them on the market, the collaboration does not*

work". In these partnerships there are not only negative aspects because "*in the future they will collaborate with more trust*". Research for an unclear purpose does not exist anymore and it is the same for the university.

4.2.6.3 Stakeholder management

Research institutions and farmers associations were the core stakeholders, who then invited the other industrial partners. The PM stated that in this open context "*the enterprises sometimes have needs but not a clear idea, they don't have a solution, sometimes they don't have clear needs either. Then depending on specific situation the interactions and time aspects get more or less complicated. Actually in this project the* ***initial steps*** *were quite* ***easy, because the problem was really felt by industrial partners****. It was easy to align objectives, then the development was not that easy, even due the number of stakeholder involved*".

The number of stakeholder did not change over time. The **relative importance of stakeholders took a shape during the project lifecycle**, but there were not surprising situations. The most relevant stakeholder was the dialog's initiator with the science park, and then other stakeholders were outlined, forming an 18 stakeholder's collaboration among SMEs, associations, and research institutions.

The collaboration tools were the usual ones. Stakeholders' representatives from each country met once a year, not more. These are the official project meeting, but unplanned meeting occurred, such as events and fairs, thus if there is an interesting topic for every stakeholder they took the opportunity to meet each other. **Weekly conference calls** were held, both among all partners to discuss general issues and among stakeholders' group who work in a specific activity. Then "*we use every virtual tool that you could think, such as web folders shared with all partners, and lots of emails. But the focus should be to develop and maintain the* ***communication as much alive and not impersonal***".

Usually they tend to make the **project manager follow the project since the beginning of the project ideation**, but this is not happening in every project within the science park. In particular in this project the project manager was not following the project's initial steps, but "*before the project was financed there were many meeting, where the objectives were negotiated, but generally there is always a great effort in this process from the project coordinator, more than the project manager. The role of collecting needs, requirements and joint points was delegated to the coordinator, at least in this project.* ***The role of project manager and scientific coordinator are quite different*** *for us, so that's way the project manager is not really involved in the scope preparation initial phase"*.

They were trying to shape this project as simply as they could, with **classical tools**, such as deliverables, milestones, Gantt chart, etc. Every month they had to present a report linked to a deliverable, in order to monitor the project status as much as it was convenient. The project manager had to collect all data from partners to be presented at the financer: "*We put a huge effort in coordination activity, there are responsive stakeholders but also less reactive stakeholders*".

During the project there were delays due to logistic issues, mostly because of they were working with biologic material, thus some deliverables were not achieved on time. The project manager held the negotiation with the financer to make them understand what happened from her complete point of view. Then she discussed with every stakeholder the project remodelling, establishing new time schedule. The documents were distributed and each stakeholder made its **own changes consulting its legal office** or people with proper expertise. Then finally they got a shared version.

Another kind of **controversies** concerned scientific publishing, that are up to research institutes, but enterprises are deeply involved too: "*This is something that generated important discussions, on IP management, which have been managed with ad-hoc tools, some specific agreements. At the project's beginning we usually sign a* ***consortium agreement****, where we define detailed aspects about coordination and integration. Then during the project lifecycle we used specific tools. At the same time these were* ***moments were every partner were really interested*** *and put a lot of effort and commitment".*

Thus they will continue the collaboration, "*but not with every stakeholder, because during the project we saw who had competence and who was interested. The most important ones will be involved in new projects. The* ***follow-up responsibility is up to the project manager****, who collaborates with the coordinator. The project manager tries also to understand how the project's results may be* ***exploited outside the project itself****, even beyond the objectives agreed with the project's financer. It is a difficult task, and* ***specific skills in market analysis*** *are needed".*

4.2.7 Case G

4.2.7.1Project overview

The objective of this project is to increase the competitiveness of port systems in the Mediterranean area by increasing the accessibility through technology innovations, without compromising the transport sustainability. In particular, the core of the project is on the production of interoperable management information systems and on the decrease of externalities. In order to achieve these targets, the case G is concerted by different pilot projects and territorial actions. Six pilot projects have been implemented with the purpose of innovating freight and passenger logistics. Furthermore, a virtual platform has been created as a "place of sharing" among the stakeholders. All project's players had the possibility to use this instrument to meet and share ideas between the other stakeholders of the project.

4.2.7.2 Project manager Role

Roles

The roles in this project are well defined. The work package is conducted by everyone but it is the work package leader that has more responsibilities, which usually is not the lead partner. The project manager is considered as "*the mother*" of the project, who

"*calls the shots between all of the partners and his/her internal collaborators and manages the finance corporation*". He/she needs to be able to manage conflicts, to monitor continuously the balance of the project and to find solutions.

The project manager should have a "*general knowledge of the project, both on the technical and on the economical-financial sides*." As stated by the project manager, in general the characteristics of the project manager role are: *"He/she needs to know what activities are performing without knowing how to conduct specific activities. The project manager should have an overall vision of the project, during all of the lifecycle of the project. He/she represents the '**interface**' with all of the stakeholders' representatives. Other projects, that I also have been involved, have failed because the PM had been eluded. In that case, information are loss because they are not integrated and coordinated there isn't an entire point of view anymore."* Specifically, in the Open Innovation context project manager roles are considered "*the same as the traditional ones, but all of the peculiarities are elevated. There are more levels of interactions and more stakeholders."*

Competencies

Concerning project management, the activities that have to be conducted "*are always the same*" and every project has its own procedures and guideline, but in the new open context some differences have been identified: *"The major difference in this new context is that if you are or if you are not the lead partner. When you are the lead partner, you need to manage the stakeholders, the financing etc. Being a lead partner means that if one partner has a problem, you need to solve it. You need to **make contacts** with local stakeholders and to be **able to find the right stakeholder** for every activity. You need to manage and 'cuddle' them. Therefore they will participate and contribute more. It's one of the most difficult activities.*

The **experience** in the field makes the difference and it is important to be able to split the work between the collaborators. There is some team member in the project who applies often a rigid methodology of project management. Especially in these kinds of project, "*it is not possible to apply it for all types of projects. The best quality is the **adaptability**. First of all, you need to understand who you are working with and what your focus is. **A rigid methodology is not suitable**, especially when the number and the heterogeneity of the stakeholders are higher. Otherwise, it would be impossible to be flexible in terms of activities, accidents and conflicts management. The best skill is the adaptability"*.

Challenges

The project manager highlights difficulties especially related to the stakeholders: *"You can contact your stakeholders through email, letter, etc. and they sign it up. Then, when it's the time to go directly to the point, they [stakeholders] disappear, especially public authorities. You always need to keep in touch with them, regardless the particular project"*.

Specifically for this project, the financing management has been a big problem: "*In Italy, the public authority can survive, an SME cannot*". Especially for the public authority, another problem is connected with the "the ***changing of the guard***", which is referred to the change of team members within the project. "*This is a huge problem especially with the universities. The problem comes up when for example, the representative of a department, that you are working with, is not there anymore. It is difficult to resolve this problem, also because maybe the researcher had put heart and soul into a specific activity*".

4.2.7.3 Stakeholder management

The main stakeholders were known from the very beginning and "*for sure you have to have a **good relationship with local stakeholders**. You have to focus on the importance of the territorial entity, because you work in an environment and you're bringing know-how into your territory*". Moreover within the specific science park the project leader should also take care "*of different business angels, you have to be able to maintain a good relationship with these stakeholders, who saw something in the project and want to be part of it personally*".

The project manager's opinion is that when the project overview has been outlined, "*you have in mind more or less the partners that interest you. Often they are the ones with which you have already worked previously. With an experience of x years in x programs, you already know who can help you in this task. Then you move immediately, present a preliminary design, and then negotiating objectives to receive as soon as possible some feedbacks. Then the project is written together piece by piece*". Then the lead partner should be good to assemble the parts, everything must be **homogenized,** "*even because, if you see that the project is written differently by different players, **you already understand there that there isn't great cooperation***".

After the initial steps were series of contacts are quite clear, then **when writing the project "*there you really identify** who you are **interested** in and that it is time to make some lobby to industry*". The Science Park is known in the region, so they are well connected with public authorities, but this also helps when then they have to interact with firms. An endorsement letter by public administration stakeholders that says that "*you are responsible for a specific task*" really helps for the interaction with firms. Thus at end if there is "*a heterogeneous partnership united as a block is more effective. Then for each work package is distributed, concerns that there is the best for what needs to be done*". Instead if you are **new to the sector** "*then you got to seek the stakeholders, and there are **various channels**. Then according to your project you need to figure out which are the right ones. There may be **a partnership that fits perfectly with project but it isn't good in another***".

However, for what concerns the interaction with **public authorities**, the quality of communication change depending on the specific project. It may happen that public authorities follow the processes step by step, giving continuous feedbacks. But at the same time government stakeholders "*have a bureaucracy behind, that it is impossible to change something on the basis of your project. You have to **keep them updated** about*

your business though, so maybe they see that you are good on a series of tasks, you'll ***build*** *more and more* ***the name****, and more and more firms will be interested"*.

When the identification of stakeholder and objectives' negotiation among them is almost completed, i.e. when the project is approved, "***then you do the agreements, not before*** *because everything is fluffy in initial steps in this context*". There are general agreements, especially with local authorities, "*but recently they declined. Up to 5 years ago, we had several agreements with universities and public administrations in which we undertook to future collaborations, which doesn't say anything, but that one day are signed by both sides. In fact,* ***in recent years there are less numerous****. However, with local authorities a basic agreement should be written, but it has nothing to do with the project itself"*.

This is linked to the fact that it is not easy to manage **conflicts, which may be more frequent due to the openness of this context,** because *"when you collaborate with stakeholders they not the friend with whom you need to resolve an issue. Over the years* ***personal friendships*** *were born with the collaborations. But you have to always deal with conflicts thinking that your focus is your project, you need to get to your goal, the one of your organization"*. However it also depends on which is the origin of the conflict. For instance, if a law changes, "*it is not that we can do a lot, it's useless that the lender complains for the delay caused by rewriting parts of the project. But it's hard to make them understand anyway. You must find a way to address the topic"*. Instead there may be cases where one of the stakeholders is not committed and expects results, then you can also get to expel him. "*These are not only problems in terms of contracts signed but also in a psychological level"*. Usually in these cases when the lead partner has a problem with a stakeholder *"you may have a private meeting with him. But often* ***in this open context also other stakeholders will notice that the specific stakeholder is not working as planned****, so the issue is managed in the steering committee, which is a way more strong tool to influence people's behaviour"*.

Concerning the initiatives after the end of the project's life, in the project manager organization they usually try to continue the collaboration with the stakeholders, but "*it depends by the project, the contracts and the program. Some contracts require you to make a* ***series of reports at least once a year over the next few years*** *in order to show that the activity has been going on and the results accomplished. The collaborations may continue because you can* ***'recycle' a successful project*** *in other contexts. But usually the collaboration is* ***not so much focused on the individual project, but the collaboration in multiple tasks over tim****e. The collaborations continue for example if you find a new project where you want to interact with the same organizations with which you've worked efficiently. Then these organizations may recommend a stakeholder they trust. And that's a thing that you really look for and appreciate"*.

In fact stakeholders are interested although the return is not hard cash. What matters, and what is sought in these kinds of collaborations is **to look to the future**. *"That's way stakeholders are important, if you can create interest, you will* ***create value and you will be supported also in future****. The goal is to have the most possible heterogeneous collaboration"*.

4.3 Empirical Findings summary

The qualitative information gathered above has been summarized in the following tables, which point out the key aspect of each case for the variables studied in this thesis. The table 11 shows the Project Manager Roles, Competencies and Challenges for each case study:

Table 11. Roles, competencies and challenges summary

Case	Roles	Competencies	Challenges
A	• Facilitator • Motivator • Integrator • Internal and external coordinator • Vision Maker • Interessement maker	• Be flexible • Get closer to people • Able to Build trust • Be persuasive • Keep a good atmosphere • Show business cases • Keep partners interested • Engagement skills • Point out partner's needs • Be clear to define his/her own role • Keep reminding people the direction • Create back up plans • Make sure that people have the right mandate	• High level of uncertainty • Conservative steering group • How to continue the collaboration • Coordination problems • Every organization has its own agenda • Scattering of results • The project manager feels "tied down" • Re-planning • Affecting partner decisions • Trade off between openness and competitive
B	• Coordinator • Time keeper • Decision maker • Orchestra Director	• Consensus building • Able to build trust • Make people focus • Keep Integrity and not be afraid to speak • Be persuasive • Move the decision down from the bottom • Able to understand each other	• Creating common vision • Different culture/way to make decisions among partners • Make understand to organization how political process work and vice versa • Decision making slow
C	• Involvement responsible • Explorer • Vision maker • Direction maker	• Building trust • Set a clear authority line in your mind • Be able to adjust to circumstances • Don't be afraid to experiment • Make people focus toward the right direction • Use a person driven approach • Listening skills • Exploring the stakeholders	• Scepticism • Hesitance and misunderstanding of the Open Innovation concept • Fluffy nature of OI • Keep people involved • Fighting against internal priorities • Not knowing exactly what was expected • Risk related to bad personal reputation

		interests and needs • Persistency and endurance skills • Strong influencing skills • Being committed • Getting the enthusiasm	• How to create win-win
D	• Coordinator • Planner	• Communicative skills • Be intuitive • Analytical skills	• Coordination between different players • Put together a realistic plan within time frames given • Issue management and not respecting the deadlines • Strong dependency from other partners
E	• Conflict solver • Decision maker • Negotiator	• Mediation skills • Great tenancy • Able to propose new solutions • Create back up plans • Ability to interact effectively with every partner	• More challenges with public authority • Bureaucracy of public authority advances slowly • Heterogeneity of organizations in terms of size and location • Different objectives and experiences among the actors involved
F	• Coordinator	• Communicative skills • Explain to the partners the direction • Human and direct communication	• Communicate the importance of deadlines • Information exchange • Lack of trust • Management of IP • Different perception of the academy
G	• Coordinator • Decision maker • Problem solver	• Find the right stakeholder for every activities • Be able to make contacts • Problem solver • Adaptability • Use not rigid methodology	• Keep in touch with stakeholders • Financing problems • "Changing of the guard"

The stakeholders' key aspects are shown in the following table 12:

Table 12. Stakeholders' identification, engagement, future collaboration summary

Case	Identification	Engagement	Future Collaboration
A	• PM has the power to decide stakeholders • WP leader involved after stakeholders' identification • Since the beginning focal organization had a good idea of the partner to	• Discussion and setting up of commercialization should have started before • Partially hidden agenda and objectives • Scope documents were extensive detailed document,	• Extra projects in parallel. • Future actions and how results will be analysed was detailed in documents. • Need to anticipate

	involve • Stakeholders identified suggest other stakeholders • Many workshops to bring in new stakeholders • No specific methodology or tools used • Stakeholder information mostly done at the start-up, only qualitative. • No documents, just meetings • Difficult to make everyone understand the achievable objectives	but still pivotal • Scope control through much informal and individual talking • Workshop as a way to control scope • Version management pivotal to align every stakeholder • Need of more help in the economic reporting • Collaboration and interactions were properly defined • Agreements documents • No IS integration, but common virtual project place. • Real need to create a system "where everybody get the same" • Conflict solved through direct talking first, or lobbying in the steering committee, or transferring resources. • Some partners don't work because they didn't see previously the vastness of collaboration	collaboration • Need to start the evaluation before
B	• Each core stakeholder found their partner to bring into the project • Stakeholder relevance changes quickly, dynamic relationships • Identification of stakeholders was not a role up to the project manager • Create the right level of ambition in order to set high level objectives • Create enthusiasm as a way to help objective negotiation • Objectives united and then re-split • Separation between hard and soft objectives	• External coordination organization hired • Much time spent to engage right stakeholders • Bad initial commitment • Focus on time management • Focus on deadlines to manage coordination flows • Time consumption and porous boundaries were felt especially by the large industry • Documents are not so important in this collaboration, talking is more important • Double communication channel, formal and informal, to reduce publishing issues • Activity distribution and WBS not different from closed innovation, only in collaboration and integration aspects • No strict scope control among stakeholders, scope creep was sought • Scope change managed by change's initiator stakeholder • Only indirect influence.	• Ways of working was something sought with this project • They will collaborate in the future and they already know who the more interesting stakeholders are.

		• risk management tools work properly to influence indirectly stakeholders	
C	• Not clear agenda, but strong vision • Need to "sell" the project objectives to stakeholders • Large brainstorming meetings • Not much time requested to stakeholders to prepare meetings, to encourage them to take part in the project • Large stakeholders for increase credibility	• Create open and contributing but still structured atmosphere • Less formalized meetings and workshops • Look for people who felt themselves underemployed in their organizations, they had high commitment • Academy people usually felt not pragmatic can help a lot to increase openness and involvement • Need to institutionalize large industry stakeholders • Some stakeholders dropped the projects off • Try to reduce email flows, much care in this aspect • Continuous scoping among stakeholders, no methodology really useful. But applied Open Innovation theory helped to structure the work and concepts found.	• High collaboration after the end of the project, even with stakeholders who dropped the project. • A lot of informal meetings to build relationships for future projects. • Spread results even in different fields, they try to market a lot the results found.
D	• External company managed the identification and initial meetings/workshops	• Make stakeholders felt involved, the feeling that they were actually selected. • Initial financing milestone connected to risk management and assessment	• They will collaborate in the future with stakeholders to bring the project in other contexts.
E	• The identification of stakeholders was not a role completely up to the PM, but he was the stakeholder manager • The academic stakeholders were well structured to manage a collaborative project • Public administration had definitely problems in collaborative open projects. • performance evaluation criteria were chosen in a shared way, even through brainstorming	• The coordination among the actors was managed through the minimization of information flow. • Intranet to not have issues concerning loosing pieces of information and knowledge • No stakeholders management plan was created • To solve a conflict with a stakeholder, the PM asks other stakeholder before the meeting to prepare agenda to absorb additional budget. • Steering committee verbalization useful to solve conflicts • Typically in projects with many stakeholders it is better to develop the concept with a limited core of partner	• Future collaboration with core stakeholder to find out other business cases for the specific technology
F	• Initial steps were quite easy, a problem was really felt by industrial	• The collaboration tools were the usual ones	• Focus should be to develop and maintain the communication as

	stakeholders. • Number of stakeholder did not change over time • The relative importance of stakeholders took a shape during the project lifecycle, but there were not surprising situations • The PM was not really involved in stakeholders' identification and scope preparation initial phase.	• Every month they had to present a report linked to a deliverable, in order to monitor the project status as much as it was convenient • Conflicts were moments every stakeholders were really interested and put a lot of effort and commitment	much alive and not impersonal • It is possible to see who had competence and who was interested only during the project, they will the ones they will certainly continue collaboration • Specific skills to continue future collaboration
G	• Main stakeholders known since the very beginning • Need of good relationship with local stakeholders. • Take care of different business angels • Move immediately with the objectives proposal to receive fast feedbacks • Objectives must be homogenized to write an uniform project, • When writing the project "there you really identify who you are interested in • If new to the sector, need to figure out which are the right stakeholders.	• PA has a bureaucracy behind, that it is impossible to change something on the basis of a project. • Do the agreements only after initial steps that in OI are fluffier. • Conflicts more frequent due to the openness of this context, tight collaboration but still not friends. • However it also depends on which is the origin of the conflict. But it's hard to make them understand anyway. You must find a way to address the topic • Expulsion from project impacts psychological level too • In OI also other stakeholders will notice that the specific stakeholder is not working as planned	• They usually try to continue the collaboration with the stakeholder • Series of reports over the next years to show the results accomplished. • 'Recycle' a successful project in other contexts. • Collaboration not focused on an individual project. • Recommendation of trusted stakeholders • Stakeholder management important to create interest, then value, then support for future collaboration

5. Analysis and Discussion

This chapter is divided into three parts where the first one aims to answer to the first research question. Connecting the empirical findings to the theoretical background, project manager roles, personal competencies and challenges are identified. In the second part, the stakeholder management in Open Innovation projects is analyzed in order to answer to the second research question, according to the analytical framework described in the methodology chapter. In the last section some suggestions on how overcoming Open Innovation projects' challenges are provided. Finally, based on the characteristics of an Open Innovation project, implications on project management are shown.

5.1 Project manager role

Roles

In the Open Innovation projects analyzed, the project manager comes from the project lead partner, but he/she should be seen as not working for a single organization, because he/she needs to take care of interest of every stakeholder in the project. It is of interest then to highlight that there are different roles performed by project managers in this Open Innovation context.

First of all, it is important to clarify that the structure of an Open Innovation project is similar to a collaborative project (Harris, 2007). Based on the data collected in this thesis, a typical Open Innovation project would be structured by a steering committee that takes overall responsibility for the project and is built once the project is started. Its role is comparable to a board of directors in a firm (Harris, 2007) and it is usually composed by one representative from each partner involved in the project as shown in figure 13.

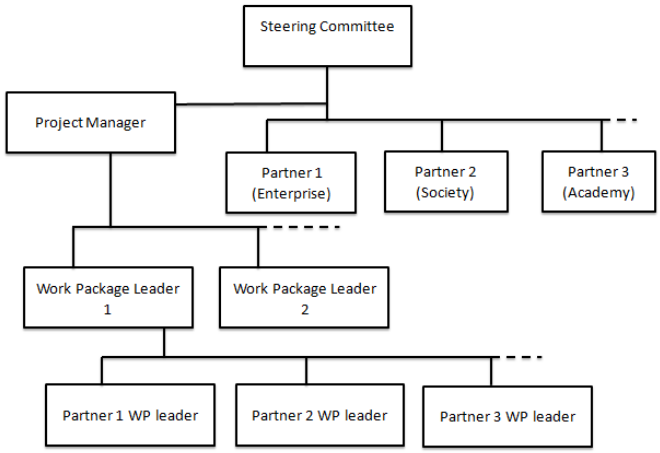


Figure 14. Structure of an OI project (Case A; Harris, 2007)

Every partner who operates in a specific field with proper competencies has its own responsibilities in the project and the project manager has the role to manage these

responsibilities. The responsibilities for the different work packages are divided among stakeholders. Typically, the project manager has the role of coordinator and facilitator between the parties involved, representing the "interface" with all of the partners' representatives. Each work package leader is responsible for the content of his/her work package and represents both an internal and external coordinator.

One of the most important aspects in Open Innovation projects is that the project manager does not only have the direct responsibility on time, cost and quality performance (Bartezzaghi, 2010). As already mention in the literature analysis, the project management theory is shifting from the "iron triangle" (Atkinson, 1999; Cooke-Davies, 1990) - which represents the main constrains of the project and permits to measure the success of a project- toward major consideration for stakeholder management (Matheis et al.,2014), which is further explored in chapter 5.2 (stakeholder management). This aspect has an important impact on project manager roles, especially in Open Innovation projects where he/she needs to interact with people within the project. According to Elmquist et al. (2009) the human side of Open Innovation is considered fundamental to understand for management.

The traditional project manager roles considered in this thesis have been described in the theoretical background (Mintzberg, 1971; Azzariti, 2006; Bartezzaghi, 2010; Ollila and Yström, 2014). This thesis addresses only the roles which have been found from the data collected compared to the literature analysis.

The authors of the thesis have outlined the traditional project manager role that **appear more relevant** in this context, as highlighted in the empirical findings section:

- **Leader:** This role entails that the project manager should be a motivator in Open Innovation projects, where there are more interactions between partners and people. It is important that a project manager connects all the players, keeping a good atmosphere and getting the enthusiasm since the beginning of the project. Furthermore the role of the project manager in this context is to involve all players and in particular keep them interested, in order to ensure a good result for the project and for future collaborations. According to Mintzberg (1971), the leader role means hiring, training staff and staffing duties which is not usually the case in OI projects.

- **Coordinator:** As describe in the literature analysis (Azzariti, 2006; Bartezzaghi, 2010), a project manager is often considered a coordinator between his/her internal organizations and the external environment. This role in this context appears to be essential because of the number of organizations involved.

- **Entrepreneur**: In traditional projects, the project manager is considered as an entrepreneur (Mintzberg, 1971). In Open Innovation projects, it entails to explore this new uncertain context without being afraid to take risks and experiment new collaborations through Open Innovation projects. In an Open Innovation setting, the project manager role can be described as an entrepreneur who apply new business models and recognize the new paradigm as a rule of business.

The authors of the thesis have outlined the traditional project manager roles that have a slightly different meaning in Open Innovation projects:

- **Decision Maker:** In traditional projects, the project manager is the person who makes decision according to time, cost and quality criteria (Azzariti, 2006; Bartezzaghi, 2010). In Open Innovation projects, the big difference lies in the way a project manager makes decisions. For example in the case B, the project manager cannot order to people what to do because he/she does not have any authority. However the project manager should make decisions involving players more and trying to get a common consensus.

- **Negotiator**: this role in Open Innovation context is more complex when compared to the traditional one (Mintzberg, 1971; Azzariti, 2006; Bartezzaghi, 2010) because a project manager interacts with more and different organizations. The main aspect is focused on the human side, such as building responsible negotiation in order to create trust relationships among partners.

- **Facilitator**: The project manager appears to be more than a facilitator of knowledge transfer because he/she does not only have the direct responsibility of respecting the budget and time, established in the contract plan (Azzariti, 2006; Bartezzaghi, 2010). This role has been identified in the literature but in open innovation projects it appears to have a different meaning. This role entails to facilitate the work among players, getting the partners all together and balancing different interests as described in case A. Furthermore, different angles and perspectives from the organizations involved in the project bring difficulties on how a project is managed. Therefore a project manager should facilitate the interaction and dialogue among players, creating a joined and open environment and making everyone feel on the same level. According to Ollila and Yström (2014), facilitation does not have the only aim to reach efficiency but in open innovation projects is more about preserve diversity among players in order to support the creativity.

Few additional project manager roles that appear to be important in an open innovation setting have been identified:

- **Sense giver:** this role entails to give a sense of a direction to the participants of the project, given the uncertainty of the project and the difficulty to predict the project output. As mentioned by the project manager in the case C, people get very disoriented and annoyed when it is not clear what to expect from the project. In this context, a project manager should make people focus on the right direction and remind them the clear vision of the project. This role has not been identified during the literature analysis (Mintzberg, 1971; Azzariti, 2006; Bartezzaghi, 2010) thus it appears new in this context (Ollila and Yström, 2014).

- **Orchestra director:** In order to guarantee a successful result from an Open Innovation project, it is crucial for a project manager to have the capability to manage knowledge flows and coordinate all of the partners involved (Ayuso et al., 2006). This means that a project manager acts as an "orchestra director", who manages complex social processes where all of the actors involved in the project contribute to the successful of the project. According to Bergman et al. (2009) innovation management means orchestrating complex social processes in which interaction between different actors creates new knowledge and new business opportunities. As an orchestra director, he/she keeps the time in order to assure a good performance. In the same way, the role of a project manager is to communicate short deadlines in order to assure that everyone within the project is synchronized and is fulfilling his/her responsibilities.

- **The Visionary:** the project manager should create a vision in order to implement joint instead of collective action. As mentioned by the project manager of the case A, having a common purpose does not mean that everyone within the project executes the same type of actions as a collective action. In this context organizations within the project come from different perspective and background with their own established processes. According to Ollila and Yström (2014), being visionary entails to secure and envision the future of the collaboration and not only set goals and aspirations as in traditional projects. Like in the case C, open innovation projects are used to experiment the collaboration for future partnerships thus visions play a central role in keeping project's participants motivated and attracting new ones (Ollila and Yström, 2014).

All of the roles identified are relevant in relation to the stakeholder management and they appear to be relevant in this context due to the impossibility of control directly the resources, when compared to traditional projects. Specifically, the project manager roles have been described in relation to the open innovation project's characteristics.

The table 13 summarizes the project manager roles identified in the data collected in compare to the theoretical background. For each role, the relevance in OI when

compared to traditional projects has been outlined. Additional roles have been highlighted in a different colour. Project manager roles that did not have found in the data collected or appear to be similar to the traditional roles are not analyzed in this section because they have been already described in the theoretical background (chapter 2.2.4.1)

Table 13. Project Manager Roles in Open Innovation projects (adapted from Mintzberg, 1971; Bartezzaghi, 2010; Azzariti, 2006; Ollila and Yström, 2014)

Project Manager Roles	**Relevance in OI (compared to traditional projects)[1]**
Figurehead	/
Leader	+
Liaison	=
Monitor	/
Disseminator	/
Spokesperson	/
Entrepreneur	+
Negotiator	≠
Resource Allocator	/
Disturbance Handler	/
Facilitator	≠
Solicitor	/
Planner	=
Coordinator	+
Decision Maker	≠
Sense Giver	
Orchestra Director	
Visionary	

Competencies

From the data collected, the figure 14 summarizes all of key findings related to the skills of project manager in OI projects. They have been categorized into units of competencies explored in the literature analysis (PMI, 2007).

[1] Legend:
/ → Not found in the data collected;
+ → More relevant in OI;
≠ → Different meaning

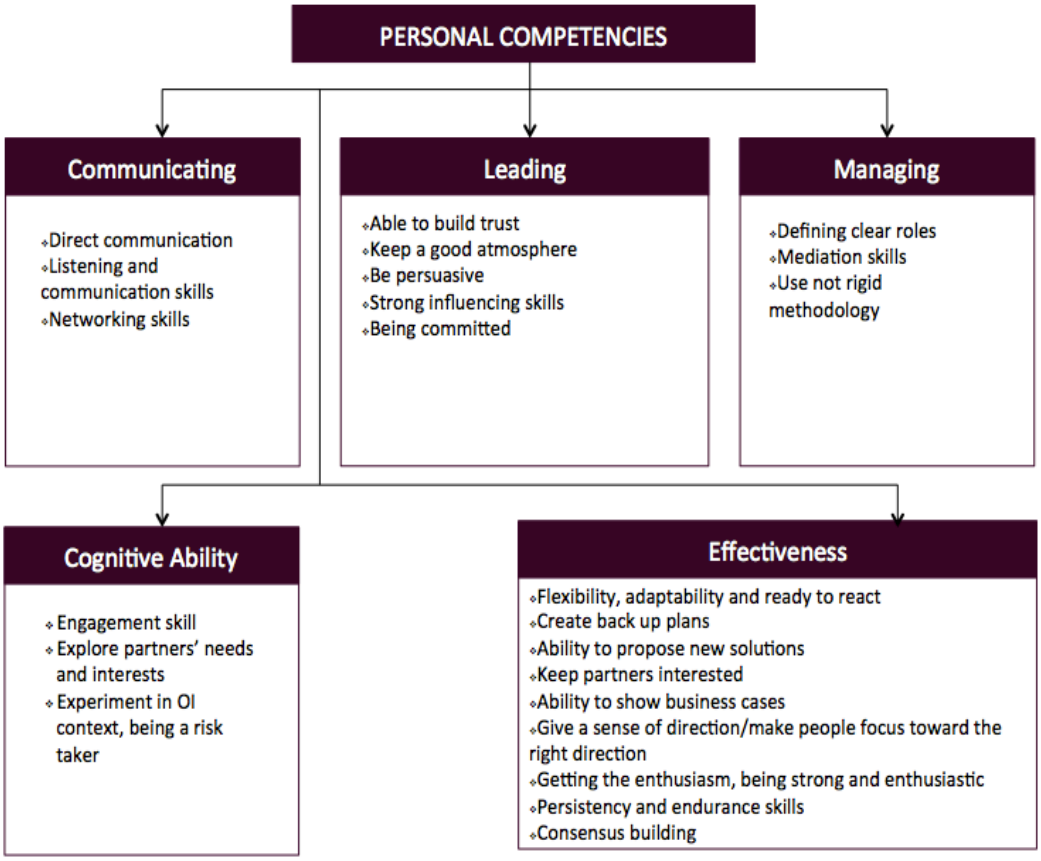


Figure 15. Project manager personal competencies in OI projects: key findings (adapted from PMI, 2007)

Project management is defined as a people-oriented profession (PMI, 2007) therefore it is essential for a project manager who interacts with people to possess skills that improve effective interactions, especially in Open Innovation projects (Schweitzer, Gassmann and Gaubinger, 2011; Buckley, 2009).

The personal competencies that a project manager should have in order to better manage the project are those *"behaviors, attitudes, and core personality characteristics that contribute to a person's ability to manage projects"* (PMI, 2007, pp. 23). In Open Innovation projects, personal competencies appear to be similar to the traditional ones described in the theoretical background, from the project management competency development framework perspective (PMI, 2007).

However, given the number and the heterogeneity of partners involved, specific skills are requested in order to get success from an Open Innovation project. Based on the data collected in this thesis, the new approach of working collaboratively with different organizations has added new skills and has improved the way of handling problems.

The authors of this thesis have identified the competencies that **appear to be more important** in Open Innovation projects in comparison to traditional projects, highlighting competencies that a project manager should posses in order to manage Open Innovation projects. The authors have also identified the competences that have a slightly different meaning or purpose when compared to the traditional ones. The comparison has been done with the personal competencies described in the theoretical background (PMI, 2007):

- **Communicating**

In general, in Open Innovation projects communicating competencies are essential to interact effectively with every partner involved in the project (case E), given the different kinds of actors. The communication **should be more direct** and the project manager should use a suitable communication according to the environment, as suggested by the project manager of the case F.

1. Actively listens, understands, and responds to stakeholders

As in traditional projects, the project manager should actively listen and understand what other players mean by their behavior (Iacob, 2013). As highlighted by the project manager of the cases B and C, the skill to understand each other and others' points of view is even more important in Open Innovation projects because it has an impact on how the decisions are made. In these kinds of projects, the project manager does not have any authority and he/she cannot control the resources directly, therefore he/she needs to hear and understand if everyone is working in the right direction.

2. Maintains lines of communication

One of the basic principles of project management is to **engage stakeholders proactively** in the project in order to reduce the level of uncertainty of the project (Bartezzaghi, 2010). This is also confirmed in case A, where anticipating the collaboration allowed every stakeholder to have time to discuss internally in their organizations. A project manager should **maintain a formal and informal communication** during the project lifecycle, as suggested in the case B.

- **Leading**

1. Create a team environment that promotes high performance

In Open Innovation projects, project manager should have a **longer-term vision** on the project, without concentrating only on the performance of the specific project, despite of traditional projects. This does not mean that the project performance is not important but they are mainly related to **future collaborations**. For this reason this competence has a slightly different purpose

when compared to traditional projects. As mentioned in case B, Open Innovation projects are often considered experiments to test new collaborations. Given the uncertain context where it is difficult to define what to expect from the project, it is even more difficult to guarantee high performance during the project lifecycle, therefore people often get discouraged and disoriented. Like the project manager in case A, he/she **should keep a good atmosphere** and everybody happy in order to make people part of the project and create an environment that encourages openness, respect and consideration of stakeholders.

Furthermore, as suggested by the case B a project manager should create an environment where delegation and creativity come from the bottom, moving the decision process from the top management of the project to the bottom.

2. Builds and maintain effective relationships

Since there are lots of different players involved in the project, being able to **build trust** (Du Chatenier, 2010) and confidence with stakeholders is even more important in Open Innovation projects. The main reason is that in this kind of projects the specific project's output is not clear, because it is not known what to expect exactly from the project.

3. Motivates and mentors project team members

A project manager should not only establish and communicate the project vision but also share it with all stakeholders. He/she needs to **support it and keep reminding** it during the project, in order to get people toward the right direction and make sure to achieve a co-creation with the players involved in the project. The vision should be concrete and clear in order to facilitate the interactions between people in the project.

4. Uses influencing skills when required

A project manager in Open Innovation projects should possess even stronger **influencing skills** (PMI, 2007) when compared to traditional projects in order to try to affect partners' decisions and time. In this sense, he/she should be **persuasive and committed** in order to convince someone else (Case B, C).

- **Managing**

1. Builds and maintains the project team

   The Open Innovation context has been defined by most of the project managers as very uncertain therefore it is really important that responsibilities and roles among the partners are at least well **defined** in order to avoid possible conflicts.

2. Plans and manages for project success in an organized manner

In Open Innovation projects, it is not possible to apply organization standards and generally accepted practices to the project, as demonstrated by some project managers interviewed. In fact, a rigid methodology that applies in a single organization appears to be neither suitable nor applicable in an Open Innovation setting, where the number and the heterogeneity of the partners involved are higher. Every organization involved in the project has different processes concerning how a project should be managed, thus a project manager should be more adaptable and dynamic for collaborative working. For this reason this competence has a different meaning when compared to traditional projects.

3. Resolves conflict involving project team or stakeholders

   A project manager should have strong **mediation skills** in order to solve conflicts between partners that come from different organizations, which can be really critical in an Open Innovation project.

- **Cognitive ability**

1. Takes a holistic view of the project

   What is really crucial in Open Innovation projects is to understand project **stakeholder needs, interests and influence** for project success. In this context the engagement is considered very important and the project manager should points out the partner's needs even if everyone in the project has its own agenda in order to create win-win.

2. Seeks opportunities to improve project outcome

   A project manager should seek new opportunities (Mintzberg, 1971) without being afraid to experiment new collaborations through Open Innovation projects. This context is more risky than traditional ones because in this case the project manager does not have all of the resources under his/her control. As highlighted by project managers in the open interviews conducted and in the cases described, a project manager should explore this uncertain context being risk taker in order to get benefits from the project.

- **Effectiveness**

1. Resolves project problems

   A project manager should resolve problems not only within his/her organization but also **partners' problems** thus this aspect differs with traditional projects. Therefore he/she is considered as a problem solver who proposes new solutions

and has back up plans. Especially in Open Innovation projects this aspect is considered very important due to the risky and uncertain nature of such projects.

2. Maintains project stakeholder involvement, motivation and support

As already mentioned in the cognitive ability competence, a project manager should point out partners' needs and interests (Davis, 2014). In addition, he/she should maintain and keep their interests and involvement during the life cycle of the project in order to affect their time and effort in the project. This is relevant in these projects where the project manager cannot order what to do just sending an email. Investing time on these aspects permits the project manager to maintain a good relationship and to continue the collaboration for future projects, even because sometimes Open Innovation projects are financed from the previous project. In order to maintain the partners' involvement, a project manager should get the enthusiasm of all the partners involved and at the same time be committed and enthusiastic so everyone can understand his/her own priorities.

The following graph (figure 15) describes the partners' enthusiasm tendency during the Open Innovation project life cycle, as described in the case C. This graph is applicable also to other Open Innovation projects analyzed, since the similar enthusiasm trend has been highlighted by other project managers. The project manager should capture the initial enthusiasm, treating everyone on the same level. The key aspect is to manage the intermediate phase where the enthusiasm of the project's participants collapses, due to skepticism concerning the project output and to the difficulties on managing and fulfilling the others' expectations.

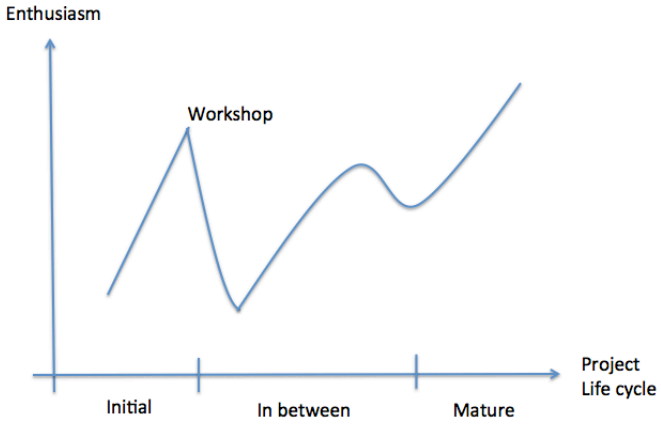


Figure 16. Enthusiasm-project lifecycle graph (Case C)

As suggested by the project manager of case A, in order to keep partners motivated, a project manager should present and improve business cases that contain the reason why the project should start and how everyone can take

advantage from that. In order to handle this "in between", i.e. intermediate phase of the project, and maintain stakeholder motivation, a project manager should also communicate the project status and what should be done, making people focus and giving a sense of direction.

3. Changes at the required pace to meet project needs

   The **adaptability and flexibility** are considered crucial in Open Innovation projects due to the higher uncertainty and number of people involved. In this context, where there are more interactions with people, it is impossible to foresee risks. Therefore a project manager should be more able to adapt to the circumstances and work as a "detective", investigating continuously and deepening the analysis of the real status of the project and its issues. This allows to react quickly to the changes and manage conflicts and unexpected events (Bartezzaghi, 2010).

4. Uses assertiveness when necessary

   Given the impossibility to control the resources, a project manager cannot make decisions without involving other stakeholders, thus he/she should build consensus among partners through **persistency** and **endurance skills**.

The authors of this thesis have identified an additional competence that a project manager should have in open innovation project in compare to traditional ones. The comparison has been done with the personal competencies described in the theoretical background (PMI, 2007). Being the relevance of the stakeholders in Open Innovation projects already pointed out in the literature analysis, the authors of this thesis have defined the following competence which appears important in an open collaborative setting:

Networking skill

In Open Innovation projects, the project manager should possess strong networking skills, given the high number of stakeholders who need to interact with in the project. He/she should be able to build and enjoy great relationships and make the right contacts. In many of the cases selected, project managers have highlighted the need to interact more with people in order to create the right level of trust between partners. As described in the previous section (chapter project manager roles 5.1), in this open and uncertain context the project manager operates as an entrepreneur who takes risks and seeks new opportunities Mintzberg (1971). In this sense it is essential to be able to create the right network in order to involve the right organizations into the project and make the collaboration more fruitful.

The personal competencies that entail more relevant aspects in this context are the communicating competences due the more interactions with people and leading

competences because of the difficulty on fulfilling the partners' expectations and on keeping them interested during the project.

The figure 16 summarizes the personal competencies of a project manager in an open innovation project compared with traditional project competencies. For each competence, the relevance in Open Innovation when compared to traditional projects has been outlined. The additional competence has been highlighted with a different colour. Personal competences that have not been found in the data collected or appear to be similar to the traditional roles are not analyzed in this section because they have been already described in the theoretical background.

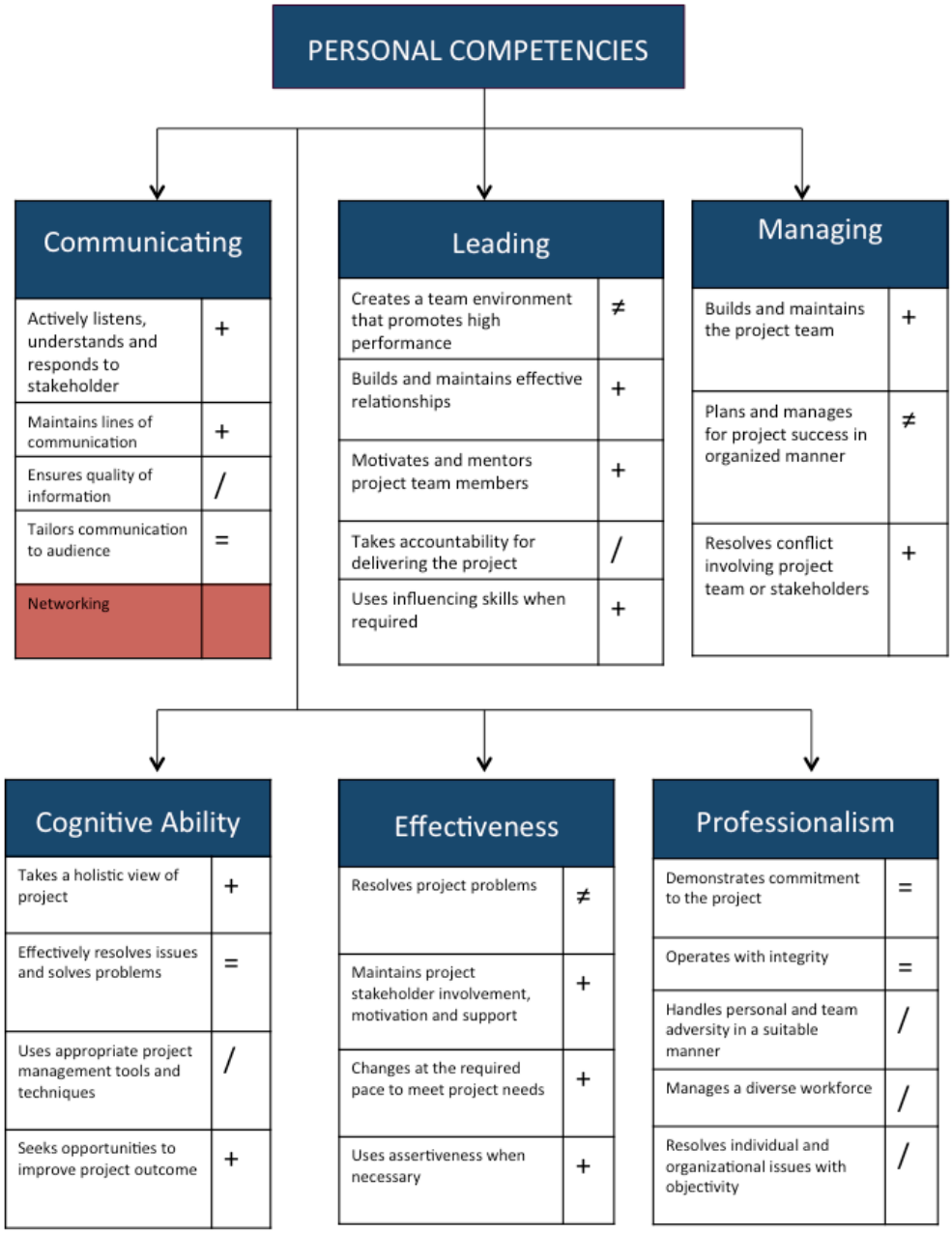


Figure 17. Personal competencies in open innovation projects[2] (adapted from PMI, 2007)

[2] Legend:

/ → Not found in the data collected;
+ → More relevant in OI;
≠ → Different meaning

Challenges

Given the open environment and the characteristics of these projects, where ideas are shared between partners involved within the project (Baldwin and Von Hippel, 2009), a project manager should promote and push ideas into the steering group that has often defined "a little bit" conservative. In this dynamic setting, he/she should be persuasive and try to convince all stakeholders' representatives in the steering group, explaining how everyone can take advantages from the specific project.

However, the result of Open Innovation projects has an impact on future collaborations because if the project output meets the stakeholders' expectations, it can contribute to develop the next project in terms of money and resources. **How to continue these types of collaboration** is one of the most important challenges from the project manager point of view. These projects are often considered "experiments" that allow to test collaborations with different organizations in order to discover a new technology or develop a new service, as in the case B described in the previous chapter. Thus, the project manager should try to keep partners interested during the project in order to continue future collaborations with the same partners. Hopefully it may reduce also the cost of sustaining such complex collaborations.

Most of the challenges identified in this thesis are related to stakeholder management, especially how the project manager can involve partners in the project and how he/she can **affect their decisions**, time and effort spent in the project. In Open Innovation projects, the project manager does not have any authority and he/she is often "tied down" due to the impossibility to control the resources directly. For instance, in the case A one of the partners was delayed so the project manager did not have the resources to continue the project. In the steering committee all of the risks like this one were discussed and it was difficult for the project manager to stress these issues because he/she cannot affect directly partners' decisions. Therefore, it is extremely hard to change the plan if there some unexpected event happens during the lifecycle of the project.

Regarding this issue, a similar concept has been identified during the literature analysis. In traditional projects, a project manager usually *"feels caught in the middle between external and internal forces"* (Lysonski, Nilakant and Wilemon, 1989) because he/she should fulfill the external expectations respecting objectives and internal priorities of the organization. In an Open Innovation setting, a project manager within a organization may feel also "caught in the middle" between priorities internal to the organization and priorities of an Open Innovation project. This new paradigm (Chesbrough 2003) it appears unclear and not well known by industry. As a result, it is really challenging for a project manager to split his/her effort between traditional projects and Open Innovation projects. In addition, partners within the project have their own "hidden" agenda and at the same time they need to work collaboratively and share their ideas. Thus, it is difficult for a project manager to find the right balance between **openness and competitiveness**.

According to Open Innovation and collaborative projects literature, the main challenges for a project manager of such collaborations are absorbing and communicating knowledge between partner organizations (Hansen, 1999) and creating the right level of trust (Inkpen and Pien, 2006; Hite, 2003, 2005; Dodgson, 1994; Ring, 1997; Doz and Hamel, 1998). In almost all of the cases described, **building trust** is confirmed to be one of the most important aspects in Open Innovation projects. This aspect has a consequence in terms of personal risk of a project manager. In fact, he/she puts lots of time and effort in creating a relationship of trust with stakeholders and, if the project fails, he/she can be associated with a failure as well, getting a bad reputation. In contrast to industry perspective, this is not considered as a challenge from the academy point of view. Even if a project fails, people within the academy can always find a way to solve this problem publishing a scientific paper on the unsuccessful result of the project.

From project managers' point of view, trust building may facilitate team members to be more willing to share their ideas with others and to **overcome skepticism and hesitancy (**Trott and Hartmann, 2009) related to the Open Innovation concept. As pointed out by some project managers in the open interviews (pre interviews), it is difficult to break up the existing and well functioning methods in favor of this new model that needs more effort and productivity from the beginning. In the authors' opinion, there is a misunderstanding and hesitance on what the Open Innovation concept means on a practical level. This is confirmed also by the project manager of the case C, who considers really hard to explain and make people understand how this concept can be implemented. Based on the findings, the authors suggest to overcome these challenges trough developing training programs to project managers on how to implement the Open Innovation paradigm in order to get a good result from an Open Innovation project. According to the Open Innovation literature, research on Open Innovation has so far neglected the practical implications of this concept. Based on this, the academy might play a crucial role in the triple helix, explaining better this concept to partners who are not used to work in an open setting and trying to make them recognize it as a business model. The sense of skepticism is not only toward this paradigm, but also toward academy, because industrial partners perceive it as a player that does research for no clear purpose or business goal. Through OI projects, industry and academia can co-create a joint vision of objectives and needs that is a process where everyone has to compromise to find a way forward.

The table 14 summarizes the challenges that a project manager encounters in the Open Innovation projects explored in this thesis. Data collected have been grouped into macro challenges as described in the methodology chapter.

Table 14. Challenges in OI projects

Challenges	Description
Building trust	Project manager encounter a personal risk that is bad reputation if the project fail.
Continuation of collaboration	It is referred on how the collaboration between partners should continue once the project is ended.
Balance between openness and competitiveness	Partners have their own "hidden" agenda and at the same time they need to work collaboratively and share their ideas

Affecting partner's decisions	Difficulty to affect partners' decisions since the project manager does not have any authority
Overcome hesitancy and scepticism of Open Innovation concept	It is difficult to explain to people within the project what the Open Innovation concepts mean. It is not recognized as a rule of business by industrial players.

5.2 Stakeholder management

Concerning the second research question, stakeholder management was the aspect considered most relevant for project management in OI, as stated in the theoretical background. This was confirmed by the empirical finding of this study. The identification, engagement and future collaboration framework proposed in methodology chapter was applied. Then the findings were analysed and compared to the literature. Table 15 groups all relevant findings from cases into these three categories. In the table is also shown each key finding's relevance in Open Innovation projects compared to traditional projects.

Table 15. Stakeholders' key findings summary

Aspect	Key findings	Relevance in OI projects compared to traditional projects[3]
Identification	Initial limited core of stakeholder	
	No stakeholder management methodologies used	
	Not always difficult identification	=
	Workshops to strengthen the relationship	+
	Importance given to documents	-
	PM not always involved since the beginning	=
	PM with enterprise background more confident with project management	=

[3] Legend :
- - → Less relevance;
- = → Same relevance;
- + → More relevance;
- ++ → Much more relevance;
- ≠ → Different meaning

	Large industry stakeholders to increase credibility on OI projects	+
	Create enthusiasm and ambition to sustain OI environment	+
	Need to align into common vision rather than a clear agenda	++
Engagement	Seek of equality among stakeholders	
	Project manager needs to manage commitment	+
	Academic people are able to increase openness	
	Manage commitment and build trust to increase disclosure among stakeholders.	≠
	Extensive detailed documents to control scope among many stakeholders	≠
	Seek also scope creep	
	Information flows rate	≠
	Use of complicated tools to collaborate	-
	Focus on time management	+
	Conflict management focus	++
	Use of risk management to influence indirectly stakeholders	
Future Collaboration	Desire to continue collaboration	+
	Continue collaboration even with stakeholders who dropped the project	
	Communication should be alive and not impersonal	+
	Anticipation and reaction (flexibility)	+
	Invitations in workshops by stakeholders	+
	Possibility to spread results in many stakeholders' fields	=
	Recommendation of trusted stakeholders	+
	Collaboration not focused on a single project, but focused on value creation and future support	

Identification

Stakeholders' identification appears to be a significant aspect in OI because it influences the success and the time performances of the project. In some cases it turned out that in projects with many stakeholders it is better to perform the first steps with an **initially limited core of stakeholders**. Then every stakeholder suggests other stakeholders to bring into the project. This process is quite similar to traditional projects (Freeman, 1984; 2007), and this was not expected in Open Innovation approach because its aim should be to involve as many sources of knowledge. This may be due risk of not controlling the expanding network of players. Workshops were the preferred means to bring into the project new stakeholders, and to strengthen the relationship with those who took part in the project since the beginning or were the target stakeholders to involve.

However, in some cases studied there was not an arduous stakeholders' identification, because since the beginning the initial organizations had already a good idea of which stakeholders to involve, especially if those responsible for this task were people experienced in a specific field. This initial step was quite easy to implement especially in case F, where a specific problem was really felt by industrial partners. Instead if the player is new to the sector, then the stakeholders must be sought through various channels, but it is not easy to figure out which are the right ones, because some relationships may fit perfectly with a project and not match with another one. This is not much different from traditional projects (Jepsen, Eskerod, 2009), but the heterogeneity of stakeholders may amplify the mismatch.

The identification of stakeholders was not a task completely up to the project manager at least in a half of the cases, which means that the project manager was involved after stakeholders' identification. But the project manager of the case G specified that in Open Innovation paradigm is more common to identify stakeholders, particularly those really interesting, when developing the concept of the project, which is when the project manager is already involved into the project. Nonetheless the project manager was the stakeholder manager in each case, except in case B where stakeholder management and coordination was assigned to a specialized organization. In case A the coordinator also had the power to decide which stakeholders to involve into the project.

However the identification task's responsible depend by project's specific characteristics. In fact in some cases described, the coordinator and the project manager had significantly different tasks, especially if the former was a scientific coordinator, and thus this was the reason why the project manager was not involved in the initial phase, such as in case F. Moreover the authors of this thesis have noticed that if project mangers come from large industry they are more confident in project management knowledge, compared to projects where the project manager comes from academia or have a scientific background (such as medicine), probably because they do not have the same training and background. Thus the different background of organization project manager may be reason why it turned out that in most cases the PM was from the industrial partner.

Even if the large number of stakeholder and the paradigm's openness seem to recommend the use of specific methodologies to identify and analyse stakeholders and literature supports this feeling (De Schepper, 2014; Parmar, 2010, Turner 2009), **no specific procedures were used in any of the**

cases studied. Understanding why this happens could be a topic to better study in future research, because it clearly turned out from cases studied that stakeholder management is considered as pivotal in Open Innovation projects. Moreover stakeholders' information gathering was only qualitative (Atkinson, 2006), and no documents were created, just meetings. This fits with the fact that in the Open Innovation projects analyzed less consideration was usually given to documents. It may also match with the trend to use less structured project management's methods in order to simplify the collaboration among stakeholders, as observed in cases studied. Moreover it fits with the difference between project management theory and practice (Kwak and Anbari, 2009; Kloppenbor and Opfer, 2002), which seems confirmed and enhanced for project management in OI, especially in stakeholders management. Only in one case stakeholders' identification and analysis has been more sophisticated, because the focal company purposively decided to assign this task to a specialized company who managed the initial steps and meetings/workshops.

Concerning the "relevance" of stakeholders (Jepsen, Eskerod, 2009), no analyses were done by any stakeholder in any case studied, which highlights again the distinction between theory and practice in project management (Jensem and Sandstrom, 2011; Ekserod and Vaagaasar, 2012). However, in some cases the relevance changed quickly, with dynamic relationships all over the process life cycle. Sometimes stakeholders tried to connect with other player to enhance their relative position and to form coalitions in order to improve success chances. Instead in other cases there were not surprising situations, the power balances were quite defined. In case F, where the project's objectives were clearer, the number of stakeholder did not even change over time. But what was quite clear for project managers interviewed, even for those who were not coming from industry, was that the most relevant stakeholders were large industry players, because they could increase credibility around the project and convince other actors to believe in this kind of collaborations, which is pivotal due to the scepticism toward openness. This relates also with the necessity for the project manager to take care personally of business angels, if they are present like in case G, because they appreciated a specific project even if it is often not well defined in this context.

Furthermore, in initial steps stakeholder management appears to be linked in Open Innovation paradigm to the identification of objectives and scope among stakeholders. In fact during stakeholders' identification and consequent project's objectives' negotiation, there should be alignment into the project's vision among stakeholders, in order to raise success chances, especially in an open environment. This helps even to understand if stakeholders identified and initially involved actually fit with the project. Thus in the OI projects seems that is more important having a strong vision, more than a clear agenda, which appears to be a bit different with traditional project management theory explored during the literature analysis (PMBOK, 2013). Huxham and Vangen (2004) have identified various types of aims in collaboration – individual, organization and collaboration aims- where every participant has his/her own perspective. They argue that in a collaborative setting many aims are hidden on purpose, other are assumed and some are explicated. As in open innovation projects, everyone has a quite hidden agenda therefore it is necessary to try to find out what are the partners' expectations and aspirations in order to get the best from the collaboration. In this uncertain and complex context, a strong vision can lead to keep partners motivated.

This may explain the use of large brainstorming meetings, sometimes too wide. However, at the same time objectives must be set, united and then re-split. This is not much different in traditional projects (PMBOK, 2013) but in an open environment it is more difficult due to the number and the heterogeneity of players. In fact objectives must be homogenized because if the project is approached differently by different players, they already understand that there is not great harmony since the beginning. The same applies for performance evaluation criteria (Munns et al., 1996). But it is difficult to make every stakeholder understand the achievable objectives, especially in an open environment. The responsible of these tasks needs to be able to "sell" the project's objectives to stakeholders. He/she needs also to move immediately presenting preliminary objectives and vision (Dooms, 2010), in order to receive as soon as possible feedbacks and to better negotiate with stakeholders.

What appears to be useful in many cases is to create the right level of ambition on stakeholders, in order to set high level targets. This is suggested by the case B where the project manager specified also that creating enthusiasm is a sought way to help objective negotiation in OI paradigm. Moreover not much time should be asked to stakeholders to prepare meetings, in order to encourage them to take part in the project, especially in initial steps.

Engagement

Stakeholders' engagement is a central aspect of stakeholder management (Gould, 2012). In the case A, the project manager expressed the **real need in OI paradigm to create a system seeking for equality among stakeholders**, in order to create an **open and contributing, but still structured, atmosphere** where to build trust and share the mission. Even though there are often more relevant stakeholder in every project, Open Innovation paradigm's aim should be to allow every actor to provide its personal opinion, or at least this is something that project managers should seek. The stakeholders involved should feel actually selected and appreciated for what they will do in the project. In case C a few stakeholders left the project because they thought that they were not appropriate. A stakeholder manager should expect this behaviour, which project managers interviewed people stated to be more frequent in Open Innovation projects than traditional projects. Then commitment should be managed since the beginning of the project.

The commitment management is an aspect that a manager should consider even in traditional projects, but which appears to be more relevant in open environment, because it may influence even the single stakeholder's level toward other stakeholders. And this can undermine the whole concept around Open Innovation (Gould, 2012; Salter, 2014). In fact it appears to be a virtuous circle. If commitment increases, the trust increases, and then the disclosure level as well, which makes people feel more interested and thus more committed. In particular, project manager of case C suggested that **academic people**, usually perceived by industrial players as not pragmatic, **may give a massive help in this process to increase openness**, even because they usually have much less budget and time constraints. This was something that was not found in the literature studied.

However, many project managers interviewed mentioned that there will be always partially hidden agenda and objectives in Open Innovation, which is normal, because one of collaboration's final targets is competitiveness. In fact contracts are often signed (Atkinson, 2006), which are needed both to protect the companies and to state clearly which are the objectives and the terms of collaboration, and thus to align the perspectives between the individual organization and the project. But the agreements should not be signed too early because many things are still uncertain in the initial steps in this environment. Besides in the case G, the project manager stated the official agreements' number is shrinking, mostly between firms and academic and public authority stakeholders.

Thus, related to the disclosure aspect, understanding how to behave with stakeholders to manage objectives and concepts appears to be a significant side. In many cases the control is informal and based on individual talking, and a strict scope control among stakeholder does not usually occur. Moreover in case B the project manager gave a gripping interpretation of Open Innovation related to project management, and in particular stakeholder management, stating that in order to really follow OI paradigm stakeholders should be managed with the **purpose of balancing scope control and scope "creep"** [case B], usually referred to uncontrolled changes or continuous growth in a project's scope (Bartezzaghi, 2010). This means that it must be clear to everybody in this environment that scope creep should be something to be sought, that is different from what is usually treated in traditional project management theory (Bartezzaghi, 2010).

However at the same time the project should not degenerate, thus scope documents in the cases analysed were extensive detailed records, but still pivotal in these kind of projects. Version management tools are quite useful too. In the case A the project manager also stated that he/she used workshops as a way to control scope among stakeholders. Thus finally what emerged from most of cases is that continuous scoping among stakeholder is usual in OI, even more than in traditional projects (Soderholm, 2008). Also it seemed that no methods were really useful to control that (Shenhar and Dvir, 2007), but Open Innovation paradigm [case C] helped to structure the work and concepts found.

The tools used to manage collaboration were not much different from traditional projects. Stakeholders' usual information systems were not integrated (Zhou, 1998), instead in many cases were used common virtual places or net drives, which helped in not having issues concerning loosing pieces of information and knowledge. This fits with the trend in OI of using simpler tools than in traditional projects, because the focus is to make people interact as easily as possible, with no sophisticated features. In case B the project manager mentioned the use of double communication channels, formal and informal, in order to reduce publishing issues. The informal channel helps to share sensitive material to a specific stakeholder who needs information to proceed in its work. In other cases the coordination among the stakeholders was managed through the minimization of information flow, especially for what concerns documents and email exchange. The project manager in Case C stated that much care should be taken care of this aspect otherwise people involved may tend to think about spam. This happens also because open projects are often quite fluffy and there may be more urgent tasks within own organizations. The minimization of information flows could be counterintuitive but often project managers confirmed that documents

and emails are not so important in this kind of collaborations, because the focus is on talking. Thus even if extensive talking could be felt as a time loss, it allows avoiding recycles, which is time consumptive especially in OI due to large number of stakeholders involved.

These considerations are aligned with a common issue through the cases, which is the focus on time management, due to high number of stakeholder and linked partners (Jepsen and Eskerod, 2009; Missioner, 2014). Especially the large industry stakeholders felt the problem of time consumption and porous boundaries, particularly for the great time spent to engage right stakeholder, such as in case B. Some remedies were to focus on deadlines to manage coordination flows and to develop the concept with a limited core of partner in order to manage the "waste" of time to speak with too many actors. Moreover the time consumption for stakeholder management may have been felt because additional activities for stakeholder engagement appear to be needed in OI (Gould, 2012). In some cases more time has been spent to define properly collaborations and interactions, even though in other cases no stakeholder management plan was created. It also appeared that some time might be spent to make large industry stakeholders be more comfortable into academia Open Innovation paradigm [case C], because they were not used to such flexible environments. Time was also wasted because some stakeholders could not properly undertake economic reporting due to high exchange on information and materials.

But what appeared to be among the most demanding activities for stakeholder management in Open Innovation was controversies management (Latour, 2005). Usually, from the industries' point of view, there were different dynamics when facing with academia and public authorities stakeholders. For what concerns academia, stakeholder management quality depended in most cases on how much these organizations were structured to handle a collaborative project. Instead public authorities in many cases had problem in these kind of open projects, because they wasted a lot of time, they missed meeting, etc., which is pivotal to keep a good relationship among the stakeholders. As already pointed out in the challenges (chapter 5.1, table 13), public authorities have also a bureaucracy behind, that it is impossible to change something on the basis of a single project, thus a good previous relationship with local stakeholders is really needed. They should be kept updated, with the purpose of making them understand that a specific stakeholder is building more and more its name. However, it also depends on which is the origin of the conflict, there were cases where people were not working, some cases where people were accused unjustly (case G), and also cases where some stakeholders did not see previously the vastness of collaboration (case A).

Conflict has also a positive side, in fact case A project manager commented that conflicts were moments were every stakeholder were really interested and put a lot of effort and commitment. However, conflict management remains a delicate task, even because the intention in Open Innovation paradigm should be to have not direct influence on other stakeholders. Thus is not easy to manage conflicts, which may be more frequent due to the openness of this environment. Furthermore, even if personal friendships created through such open collaborations over the years, conflicts should be dealt focusing on collaborative goals.

However, these conflicts have been managed in each case, and often with the ordinary means (Missioner, 2014), which nonetheless may have another weight in this kind of collaborations. An

external coordination company may be hired such as in case B, thus, being that independent from any party, the company was able to solve conflicts more easily. In cases where no coordination company was hired, conflicts were primarily solved through talking directly with the problematic stakeholder. But often in this open environment also other stakeholders will notice that the specific stakeholder is not working as planned, so the issue is managed in the steering committee, which is more robust tool to influence people's behaviour. Thus the project manager may try to do some lobbying in the steering committee, due to the fact that no direct orders should be given in OI paradigm. Ultimately the project manager may expel the stakeholder or reduce its budget, asking other stakeholder before the meeting to prepare agenda to absorb additional budget that he/she will retract from the problematic stakeholder. However this is only the eventual extreme case, which may not be representative of conflict management in OI, even because it is hard in a psychological level too. A particular and interesting way that a project manager proposed was to use risk management tools to properly influence indirectly stakeholders, given that the project manager cannot control directly the resources in this context. This practice seems to be not correlated before to Open Innovation in literature studied.

Future collaboration

A common aspect in the cases studied was the desire to continue the collaboration even after the project's end (Baden, 2010). In case C the project manager wanted to **continue it even with stakeholders who dropped the project** and this may be an example of how to manage stakeholders in such an open environment, because each actor may always provide knowledge or at least some hints. This is something that is really not usual in traditional projects. However, in many cases the collaboration might not continue with every stakeholder, because during the project's lifecycle the project manager saw who had competencies and who was actually interested in this paradigm. In fact especially in such open projects it is difficult to foresee if so many actors may work properly, and this influences future collaborations and how stakeholder management is developed.

This fits with what some interviewed people realized at the end of the project that is it could have been convenient to anticipate collaboration with stakeholders, which is also common in traditional projects (Yang, 2009). But at the same time most of project managers stated that the ability to adapt to circumstances, i.e. flexibility, and then react to change, were among the most important things to seek, as already mentioned in the project manager role chapter.

Maintaining the relationship with a stakeholder is an aspect (Freeman, 2010) that was based usually in the cases studied on establishing communication as much alive (Eskerod, Vaagaasar, 2012) and not impersonal, throughout a lot of informal meetings to build relationships for future projects. In case F the project manager talked about specific skills to promote future collaboration. In case G the project manager even spoke about contracts that require making a series of reports at least once a year over the next few years, in order to show the activity and the results accomplished related to the project developed.

Establishing and keeping a solid relationship with stakeholders may allow the development of extra project in parallel to the main one, which may continue after the main project's end. Collaborations may continue because outcomes and processes from a successful project can be partially 'recycled' another project within another context, and results may be spread even in different fields. A stakeholder may be invited by trusted stakeholder into future workshops where they can market the concepts found in previous collaborations and expand the network. In fact, usually the collaboration is not so much focused on the individual project (Baden, 2010), but in multiple tasks over time. **Basically organizations seek through these project ways of working in such an open environment**. Then these organizations may recommend stakeholders they trust, which seemed to be among the most appreciated things by the player in such collaboration projects, because building trust is an important goal of stakeholder management. What is sought in this kind of collaborations is to **look to the future:** "That's why stakeholders are important, if you can create interest, you will **create value and you will be supported also in future**" [case G]. Organizations adopting Open Innovation paradigm seemed to have understand this new perspective of considering a project just a part of a broader collaboration, in order to create value for each stakeholder involved.

5.3 Implications

5.3.1 How to overcome challenges in Open Innovation projects

The table 16 attempts to merge the two main aspects studied in this thesis, i.e. Project manager roles and stakeholder management in OI environment. In order to answer the second research question, the authors of thesis assembled a set of good practices of stakeholder management, which were derived from the issues that appeared to be well managed in cases studied.

Table 146. Challenges and Suggestions

Challenges	Suggestions
Building trust	Workshops to strengthen the relationship
	Large industry stakeholders to increase credibility on OI projects
	Create enthusiasm and ambition to sustain OI environment
	More focus on managing commitment since the beginning of the project
	Establishing alive, not impersonal, informal communication
How to continue collaboration	Networking skills
	Workshops to strengthen the relationship
	Point out stakeholders' needs and keep them interested
	Spread results in many stakeholders' fields
	Recommendation of trusted stakeholders to expand network
	Establishing alive, not impersonal, informal communication

Overcome hesitancy and scepticism of Open Innovation concept	Training programs about Open Innovation concept Workshops to strengthen the relationship Large industry stakeholders to increase credibility on OI projects Create enthusiasm and ambition to sustain OI environment Involve more academic people to increase openness and to institutionalize large industry stakeholders Influencing skills Stronger focus on alignment into the project's vision More focus on managing commitment since the beginning of the project Be persuasive
Affecting partner's decisions	Strong influencing skills Keep partners interested
Balance openness and competitiveness	Trade-off between controlling scope and seeking scope creep Involve more academic people to increase openness and to institutionalize large industry stakeholders

The challenges discussed regarding project manager's role are grouped by the authors into five macro-challenges that a project manager may encounter in an Open Innovation project. The suggestions in table 16 are matched with each specific challenge. Although these recommendations are based on a limited number of cases, the suggestions derived from the interviewed project managers resonate through all the cases, thus indicating high credibility and transferability across different cases.

5.3.2 OI project characteristics and Implications on Project Management

From the data collected and the literature analysis, the authors have defined the characteristics of an OI project in order to mitigate the misunderstanding and hesitancy of the Open Innovation concept and to clarify the meaning of these types of projects. Furthermore the implications on project management have been outlined and summarized from the data analysis (project manager role chapter 5.1; stakeholder management chapter 5.2). This section aims to answer to the second research question, showing how open innovation projects have an impact on project management.

From the data collected, it has been noticed that Open Innovation projects are defined by a **higher level of uncertainty** in comparison to traditional projects. As a result, from the project manager's point of view it is extremely hard to anticipate and foresee risks due to the **higher number of stakeholders** involved in the project. This high level of uncertainty is caused by Open Innovation projects' characteristics, which make difficult to **predict the project output** and fulfill the stakeholders' expectations (Kreowski, 2009). Specifically, since people involved in Open Innovation collaborations do not know what to expect from the project, they get annoyed and disoriented. Therefore in this context, a project manager should address these issues giving a sense of direction and keep reminding people the right vision as already highlighted in the project manager roles chapter 5.1.

Due to the **heterogeneity** of the organizations involved in the project, the decision making process is really slow and it is hard to take decisions when compared to traditional projects where there is only one organization involved. This is caused by different structure on how every partner in the triple helix makes decisions. Large companies are used to operate in a context where the top management gives directions, makes decisions and explains how to implement activities to the team members. Public authority instead cannot implement the same strategy because are considered democratic institutions. From a project manager point of view, it is difficult to coordinate these organizations and make them understand the decisional processes of each partner involved because everyone has its own perspective, different background (Du Chatenier, 2010) and different objectives. Specifically, one of the main problems reported by Italian project managers is that the bureaucracy of public authority advances really slowly thus it is more difficult to collaborate with these organizations.

This heterogeneity between partners lies in the fact that these projects are characterized by the difficulty on **applying internal organization project management methodology**, thus different organizations have their own processes and terminology. As suggested by project managers in the pre interviews, it is necessary for a project manager to have at least ten years of experience from some large international industries where he/she had the possibility to work with members from different cultures and lots of customers. The main reason is that if a project manager has had experience only from one organization without working in an international context, he/she is disadvantaged in an Open Innovation setting. A project manager should understand the necessity to have a common terminology in order to facilitate the information exchange between partners.

Finally, another characteristic of OI projects studied in this thesis that appear to be meaningful is related to the **absence of traditional hierarchical lines** as pointed out during the literature analysis (Du Chatenier, 2009). In general the hierarchy is referred to the division of power and the locus of decision authority and control within an organization. As suggested by (West and Gallagher, 2006), there is a negative correlation between knowledge creation process and hierarchy due to the difficulty of communication and ideas flow. From the case analyzed, it appears that no one in the project has the authority to control over people which makes controlling, efficient coordination of the project, affecting and influencing partners' decisions more complicated. Therefore this characteristic has a consequence in terms of difficulty to affect partner decision.

To put the findings if this thesis in perspective, the authors have defined the characteristics of an Open Innovation project according to the literature analysis and the empirical findings. In the table 17 are summarizing all of the implications on traditional project management practices for each characteristic identified. Furthermore, it has been highlighted in which cases analyzed in this thesis the characteristics and the implications have been found.

Table 157. OI project characteristics and Implications on Project Management

Characteristics of Open Innovation projects	Key aspects	Implications PM	Case
1.Hetereogeneity and high number of stakeholders	Different decisional processes and perspectives: decision making slow	• Mediation skills • Communication skills • Use less structured project management's methods in order to simplify the collaboration among stakeholders • Stronger focus on alignment into the project's vision • Focus on time management	B D E G
	Different objectives and experiences between partners	• Initial limited core of stakeholders • Stronger focus on alignment into the project's vision • Be able to "sell" the project's objectives to stakeholders • Create enthusiasm and ambition to sustain OI environment	A B C E
2.Uncertain and risky environment	Impossibility to foresee risks	•Flexibility and adaptability • improve reaction ability	A C
3. Difficulties in applying internal organization Pm methodology	Information exchange between partner Different processes and terminology	• Flexibility and adaptability • Use less structured project management's methods in order to simplify the collaboration among stakeholders • Minimization of information flows, more focus is on talking quality • Not use complicated tools to collaborate • Use a common terminology	F G
4.Difficulty in predicting project output	Disorientation during project and drop of interest	• Stronger focus on alignment into the project's vision • Remind the right and clear vision • Minimization of information flows, more focus is on talking quality • Give a sense of direction	A B C
	Focus on people involvement/engagement Difficult to fulfill the stakeholders' expectations	• Workshops to strengthen the relationship • Create enthusiasm and ambition to sustain OI environment	A C F
5.Not traditional hierarchical line	Not directly control on the resources	• Strong influencing skills • Get closer to people • Initial limited core of stakeholders • Stronger focus on alignment into the project's vision • Be able to "sell" the project's objectives to stakeholders • Operate influencing only indirectly other stakeholders	A B C E

	• Use risk management tools to properly influence indirectly stakeholders.

Future Development of Open Innovation Project Management

From the data results, it seems that Open Innovation is not a clear concept for project managers interviewed in this study. Partners involved within the project feel often disoriented and confused since it may not be evident what right direction should be followed. This may lead to the difficulty of managing these kinds of projects and ensuring high performance. Based on the characteristics of an Open Innovation project, it appears that a rigid methodology cannot be applied in this context where there are more interactions with people. From the data collected, the project manager performs the same roles of traditional projects but he/she acts also like a psychologist who gets closer to the partners involved in the project.

Future researches on project management should be focus on soft skills that project managers should possess in order to keep partner interested during the project and guarantee a successful project's result. The authors of this thesis suggest to develop training programs about Open Innovation addressed to project managers who are not familiar whit this concept. Specifically, training and education may be focus on how to improve communication and soft skills and manage the project network. Furthermore, another subject than can be useful to include in these training programs for project managers is how to develop a responsible negotiation with stakeholders. Based on the project manager roles described in the chapter, the negotiation is more complex in Open Innovation context when compared to traditional one because there are more interactions with organizations.

A responsible negotiation appears to be relevant in a context where it is necessary to create a win-win situation among partners, establish long-term relationships and put people first. According to A. Lempereur (2011, p.1) this approach means "*integrating people care, problem solving and process facilitation. Caring for people supposes to go from "I" to "We": from myself to the other negotiator, the principals and all the stakeholders. Problem-solving requires to go beyond the crossed demands of the parties, uncover their real motivations, and look for creating-value solutions which are justifiable. Process facilitation involves a communication process where the others are empowered so that they can co-develop the solutions and own them*".

Understanding project management in Open Innovation may help project managers to establish long term relationship with partners and maintain contacts with the right organization for future collaborations.

It would be interesting to understand if there are particular sectors where Open Innovation is more effective than others. From the cases selected, the authors have noticed that particularly in the energy sector is often necessary to collaborate with different organizations. Being a regulated sector, the projects are often constituted by the Triple Helix which is a hot Open Innovation topic in the last year (table 3, chapter 2.1.1). Future researches can be conducted toward a deeper analysis of how these projects are performed and managed in this specific sector.

6. Conclusions

The purpose of the study has been to explore and analyse how project management in Open Innovation projects is conducted. Reviewing both Project Management and Open Innovation literature, two aspects appeared to be more interesting to focus on. Concerning the first aspect, traditional project manager roles and personal competencies have been analysed to further understand if they can be used to overcome difficulties and challenges that a project manager may encounter in Open Innovation projects.

What are the main roles, competencies and challenges for project managers in Open Innovation projects?

Relating to the managerial roles identified by Mintzberg (1971) and Bartezzaghi (2010), the authors of this thesis have identified few additional project manager roles in open innovation projects when compared to traditional projects (**sensegiver, orchestra director, visionary**) and project manager roles that appear more relevant in this context with a slightly different meaning (entrepreneur, decision maker, coordinator, negotiator, leader, facilitator). All of the roles identified are relevant in relation to the stakeholder management and they appear to be relevant in this context due to the impossibility to control the resources directly, when compared to traditional projects. Specifically, the project manager roles have been described in relation to the open innovation project's characteristics. Concerning the personal competencies that a project manager should possess in an open innovation project, the authors have determined the units of competencies that appear to be more important in this context related to PMCD framework (communicating, leading, managing, cognitive ability and effectiveness). Given the heterogeneity and the number of stakeholders involved, the project manager should be able to build trust, use a not rigid project management methodology and possess strong influencing and engagement skills. Because of the high uncertainty of this context, flexibility and adaptability appear to be fundamental in these projects. The personal competencies that entail more relevant aspects in this context are the communicating competences due the more interactions with people and leading competences because of the difficulty on fulfilling the partners' expectations and keeping them interested during the project. Finally, the authors have determined a new aspect when compared to PMCD which is related to the networking skill, since in these projects there are more interactions with people. The authors have been identified five macro challenges that a project manager may encounter in these projects (building trust, continuation of collaboration, balancing between openness and competitiveness, affecting partners' decisions and overcoming hesitancy and scepticism of OI concept).

What are the essential aspects of project management in Open Innovation, and how do they impact on traditional project management methods?

The second relevant aspect was to understand which project management facets appeared to be more significant in Open Innovation projects. After the literature analysis and the analysis of empirical findings, the authors of this thesis proposed stakeholder management as a field to be observed with particular attention in Open Innovation project management. The topics examined were the identification of stakeholders, their engagement, and how future collaboration should be prepared. Various key findings were then grouped into this classification and their relevance in Open Innovation projects was compared to traditional projects. Some of the key findings appeared to be new interesting aspects, in compare to the theoretical background chapter. Initially limited core of stakeholder to manage project's first phases and the fact of not using specific stakeholder management methods and tools were two interesting finding for the identification category. Stakeholder engagement seemed the most interesting topic in order to comprehend the connection between stakeholder management and Open Innovation model. The most relevant findings for this topic were the real need in OI paradigm to create a system seeking for equality among stakeholders, the a massive help given by academic players to increase openness toward other stakeholders, the purpose of seeking scope control as well as scope creep and the use of risk management to influence indirectly stakeholders. Concerning future collaboration topic, it appeared to be a real purpose of Open Innovation projects, in order to create value for organizations involved. Moreover it seemed that organizations are actually seeking through these project some ways of working in such an open environment. However stakeholder management did not appear to be a well structured set of processes in the cases studied, even if its role is considered crucial. Moreover stakeholder management theory differed from practice quite often in the cases studied.

Finally, joining the two main aspects examined, the authors of this thesis presented some suggestions for project manager on how to mitigate challenges found, due to the difficulties of achieving joint goals and realizing expectations. Furthermore the authors summarize the characteristics of an Open Innovation project and their impact on project management (Chapter 5.3.2, table 17).

The empirical analysis has been made upon a selection of seven OI projects. The nature of the information acquired is qualitative because due to the explorative nature the specific topic analysed and the limited number of cases that allowed for in-depth investigation. Thus the study is limited in terms of offering opportunities for statistical generalization, but that was not intended with the research design chosen. In order to validate the presented findings, further research should include more cases and could utilize quantitative methods. Another limitation of this study is that the case studies included only projects from two countries, Sweden and Italy, thus a broader sample of nations may be needed to make recommendations on project management in open innovation on a global level.

Although this thesis proposes some suggestions and implications on project management in OI projects, it is still an explorative study and it represents only a starting point for future researches.

To complement and extend the findings in this thesis, alternative research designs, such as a single case study, could be relevant to conduct with the purpose of deepening stakeholder management aspects in these collaborations. Furthermore, a quantitative approach could be adopted to explore other aspects of project management in Open Innovation projects such as the traditional tools use. Specifically, a questionnaire to project managers could be conducted to understand if traditional tools are applicable in an Open Innovation setting. The researchers should pay attention on the selection of the sample because, as pointed out by this thesis, one of the main problems in these types of projects is the misunderstanding of the Open Innovation paradigm.

This study has intended to contribute to developing knowledge around project management in open innovation. Hopefully, conclusions drawn from this study will bring further theory development within the field of project management and inspire researches to explore other traditional project management knowledge areas as scope management, which may better support such an open and collaborative setting. Scope management could be relevant in Open Innovation projects, where the scoping processes appear to be more dynamic and continuous than in traditional setting, due to the number and heterogeneity of stakeholders involved and the experimental nature of OI projects.

Moreover different national and organizational cultures may influence Open Innovation project management, because the ways of working suggested by Open Innovation paradigm, in order to treat everyone on the same level, may not be aligned between every player involved. Thus future research could focus on what are the consequences in Open Innovation projects on an international level.

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