An exploratory study of integration mechanisms in Open Innovation Projects within inter-organizational networks: private companies and universities

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Paula Novokmet
Andrés Ramírez Portilla
Abstract

It is visible in the innovation literature the tendency to evolve the innovation process into a more open and flexible model where innovators of all types can interact freely. This fairly recent paradigm known as Open Innovation is a phenomenon with still a considerable amount of open gaps and challenges. Therefore the question of how integration is achieved between different types of outside innovators remains unanswered. Many organizations, some in more extent than others, are already applying Open Innovation within networks; however there is still not a clear understanding or a formal theory that describes the mechanisms that can help integrate the innovation activities with other actors. To address this challenge, we conducted an exploratory study in 7 different organizations representing two types of innovators (private firms and academic institutions) and a nexus agency that acts as an integrator between them. The first part of the results consist of an extensive list of 27 integration mechanisms applicable in open innovation projects later categorized in 5 new main categories for their practical study and discussion. More abstractly, as relationships between these integration mechanisms and inter-organizational networks have not been analyzed yet, we want to propose a framework that can provide an initial notion of their role and interaction in Open Innovation Projects. This framework is valuable to consider the applicability of the proposed integration mechanisms categories in different OI settings and supports the understanding of how the harmonization of OI efforts occurs with different types of innovators. Having a framework of this type considerably extends the understanding of integration in the Open Innovation field and provides as well a guide for organizations to identify how to integrate open innovation efforts.

**Keywords:** Open Innovation integration, Open Innovation Projects, integration mechanisms, inter-organizational networks integration, Open Innovation between universities, private companies and nexus agencies.
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<tr>
<td>CAD/CAM</td>
<td>Computer-aided Design / Computer-aided Manufacturing</td>
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<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CIM</td>
<td>Closed Innovation Model</td>
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<td>HTC</td>
<td>High Tech Camp</td>
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<tr>
<td>IM</td>
<td>Integration Mechanism</td>
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<td>IoNs</td>
<td>Inter-organizational networks</td>
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<tr>
<td>IP</td>
<td>Intellectual Property</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
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<td>ITCs</td>
<td>Information and Communication Technologies</td>
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<tr>
<td>MNEs</td>
<td>Multinational Enterprises</td>
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<td>OI</td>
<td>Open Innovation</td>
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<td>OIM</td>
<td>Open Innovation Model</td>
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<td>OINs</td>
<td>Open Innovation Networks</td>
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<td>OIP</td>
<td>Open Innovation Project</td>
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<td>QDA</td>
<td>Qualitative Data Analysis</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<td>SMEs</td>
<td>Small and Medium Enterprises</td>
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“In these challenging times enterprises can survive the downturn and emerge stronger if they use the right tool to integrate their systems and processes through the whole enterprise and their partners to become best-run businesses.”

Léo Apotheker, CEO SAP, 2009

In Mr. Apotheker’s words apart from the underlying advertising for his company services, lies another important message and advice about integration. In the IBM 2006 CEO study (Chapman, 2006), another CEO stated, “It is as important as water is for sea traffic”, referring specifically to the significance of integration in open innovation projects. The comparison is truly fitting: to properly facilitate Open Innovation (OI) within an organisation, it is necessary to set in place integration processes which vary depending of the context in question. Surprisingly, even though its significance is great it has so far received little academic attention (Fredberg, Elmquist and Ollila, 2008; Neyer, Bullinger and Moeslein, 2009). The question of how does integration happen in Open Innovation Projects (OIP) still stands open.

According to Chesbrough, Vanhaverbeke and West (2006, p. 1) “Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.” Since Chesbrough (2003) first introduced this concept of OI and expanded the capacity of innovation paradigm, increasing number of companies are trying to incorporate open innovation in their organizations and obtain the benefits it offers (De Ridder, 2008; Innoget, 2009; OpenInnovation.eu, 2009; OpenInnovation.net, 2009; West, 2009b). Though Chesbroughs’ OI paradigm has been criticized for being too prescriptive and for offering little new to innovation research or practice (Trott and Hartmann, 2009, cited in Brem, 2009), his model has contributed to previous concepts of employees cumulative innovation (Chandler, 1969; Reuter, 1977; Scotchmer, 2004) as well as von Hippel’s (1986, 1988, 2005) supplier and user innovation paradigm by adding competitors as possible external source of innovation.

The idea of OI came from a clear reality that an innovative process nowadays usually demands a combination of distinct sets of competences and resources that are rarely found within one individual or even within one company which more and more tend to be industry and knowledge specific (Enkel, Gassmann and Chesbrough, 2009). However, having this diversity in skills and, very often, mindsets of OI participants brings out the challenge of synergising the various interdependent areas of the project they are working on. Referring to inter-firm cooperation teams that are usually employed in OIPs, DeFillippi (2002, p. 9) stated “there are important challenges in aligning disparate performance incentives, work processes and project priorities”. Undeniably, the effective communication, cooperation and integration between specialists and functions are of great importance (Sicotte and Langley, 2000). This conceptual tension between the need for differentiation and for integration lies at the centre of the study of organizations and becomes quite a characteristic challenge for OIPs.

The difficulty of understanding how inter-organizational integration takes place in the innovation process is inherent in the OI model (Fredberg, et al., 2008). It draws an
increasing interest in the business world, but lacks the formal literature and is open for future research (Chesbrough et al. 2006). Just recently the International Journal of Innovation Management has called for papers on “Open innovation and suppliers integration” following the interest on this emerging field. Following this research trend, the main question we are concentrating on is how integration is achieved in OIPs between inter-organizational networks of “outside innovators” (Neyer, et al., 2009), specifically in projects between private companies and universities. Universities are widely considered as centres of idea conception where young and creative people develop extraordinary number and variety of innovative concepts. This innovation association type has, however, received little or no attention from academia so far. In addition, the authors of this work, being students themselves, became aware of the lack in more concrete university/industry connections. While there are strong ties in few technology related areas, more complex association between these two actors can be highly beneficial for their R&D efforts. With this in mind, the purpose of our thesis is to reflect on both theoretical and practitioners’ integration approaches in the innovation process among different innovation sources and analyze their applicability in the context of OIPs at an inter-organizational network level, more concretely between universities and industry.

The data on approaches to coordination and integration will be derived from literature review of articles and books, as well as anecdotal evidence reported on-line to develop an appropriate theoretical framework. To investigate their applicability in context of OIPs, we will conduct semi structured interviews with people working in two companies from food industry, as well as researchers in three universities with industry liaisons. These organizations were selected because of their strong innovation and entrepreneurial culture which indeed is reflected in some of their practices related to an open innovation approach in different levels and contexts. The interviewees are chosen from different organizations and departments so we can be provided with a wider spectrum of perspectives and experiences but at the same time focusing on our specific research contexts. All this is the desired result when using semi structured interviews and when the topic is fairly clear focused (Bryman and Bell, 2007).

As for the limitations of our research, we are focusing only on the inter-organizational networks level. Vanhaverbeke and Cloodt (2006) have identified five units of analysis in OI paradigm: individuals, firms, dyads, inter-organizational networks and national innovation systems. They affirm that firm level has been the most studied leaving an opportunity for a network perspective as a complementary approach of OI. Our selection is based on this fact being that key innovators require setting up and managing inter-organizational networks to develop and exploit innovation. They reason that the dynamics of open innovation networks have not been studied enough in depth. In addition, we are concentrating on the integration process itself and leaving out the complexity of assessing its effectiveness (Zeng, Xie and Tam, 2009) and their impact on OI strategies (Sarkar and Costa, 2008) e.g. on the technological innovation capabilities of the organization.

According to DeFillippi (2002), the challenges of inter-organisational team-based cooperation in innovation projects are not only technological but also managerial. Our findings will reflect more in-depth managerial contribution instead of suggesting just a state of the art Enterprise Resource Planning (ERP) solution. The framework proposed as a result of this research would be of benefit to the reader by providing him or her with a clearer understanding of the OIP implications not only in an optimal resource allocation, but also of managerial challenges when trying to successfully bring out a novelty from various different sources.
CHAPTER 2 - LITERATURE REVIEW

In academic literature Fredberg et al. (2008) provided an overview of the emerging research field of OI considering publications found in key databases and journals. This report is used as a starting point for our literature review. However, we feel it is not extensive enough in addressing our research question. We do not claim that there is no existing or useful literature about Open Innovation, but we stress on the possibilities to expand it on specific topics. We confirm that other than defining OI, the literature also identifies main differences in comparison with the traditional innovation process and principles. Solid models are provided as well as the theory concerning its generation. Numerous authors have recommended how to foster OI and promote it to market. Among them there are even employees (Kirschbaum, 2005), of companies practicing OI, who propose steps for OI implementation from an internal perspective. But still there is no clear understanding of the mechanisms (Enkel, Gassmann and Chesbrough, 2009) and integration process (Neyer, et al., 2009) on how Open Innovation takes place when executed in different levels of analysis (Chesbrough, et al., 2006). Thus, the principal aim of this chapter is to show the results of a more extensive review regarding integration in OIPs and what we can conclude from it.

In order to clarify our research field and the need for it, we consider it important to explain and make clear the basic OI concepts and its current significance, gaps, and challenges based on the perspectives of different authors (Chesbrough, et al., 2006; Chesbrough, 2003; Enkel, et al., 2009; Gassmann, 2006; Vanhaverbeke and Cloodt, 2006). The theoretical framework will be developed consisting of the integration mechanisms identified in organizational theory as well as in the innovation processes followed by examples on how integration in Open Innovation projects actually happens. We based this analysis mainly in study cases from known companies, both from academic and practitioner’s literature. Finally, in the last part we summarize our findings on the literature review and set up the starting point to develop our methodology and empirical research in the next sections of the thesis.

Indeed the literature about OI has increased in the last six years, not only in the publications number but also comprising more study research areas, which does not make the scrutiny easy. As Drucker (1985, p. 29), the father of modern management, pointed out “like most super-stars, knowledge-based innovation is temperamental, capricious and hard to manage” and in the case of Open and Networks Innovation, we would add “complicated to understand how it works”, however we think it is not impossible if attempted in a structured and methodic way.

2.1 Open Innovation and Networks main insights

Innovation has always been associated as a positive noun, especially in the business environment (van der Meer, 2007). There is evidence to a large extent that identifies innovation as the principal driver for companies to flourish, grow, maintain a high profitability and sustain in the long term (Fredberg, et al., 2008). Therefore understanding how to innovate and use this innovation as a useful artefact is important for organizations in order to profit and grow. Even so if a company knows its innovation strategy it may encounter barriers obstructing the innovation process. For example, in a recent study (Koudal and Coleman, 2005), executives from top-performing global companies mention that investing on innovation is seen as the key source to guide growth. However they also
say it is hard because of the lack of appropriate tools and the researchers confirm it through the evidence that a very big number of the 650 organizations in their study lack the capacity for implementing a growth strategy through innovation.

Consequently, it might be very useful for an organization first to identify its innovation process, understand where it starts and then assess how it can properly be managed and integrated with proper mechanisms. For this reason, we will present key aspects associated with OI with the purpose of explaining the reader the context of OI networks and why the importance to harmonize its parts i.e. for studying how integration is done in a specific environment, first we need to clearly understand what can be integrated in this environment. For instance, as Sakkab (2007, p. 61) says “It's not about outsourcing R&D — it's about in-sourcing the creativity of many people from many places to help us generate ideas, solve problems and implement solutions”. Thus based on ideas like this, we will be able to focus better our research efforts to search for the integration essence of these elements. The idea of transitioning from one centralized CIM to a decentralized one or from a transnational to a global network community is just a little part of the picture of what we want to clarify. The part we centred is the difficulty of making this a useful model by using integration mechanisms throughout the innovation process.

2.1.1 From Conventional to Open Innovation

Organizations have historically invested lots of resources and efforts in research and development departments to drive innovation and obtaining a sustainable strategy. However Chesbrough and Crowther (2006) suggest that in the last years there is practice of a more open model where companies are aware that not all good ideas will come from the interior and not all innovations created within the company can be successfully marketed internally. In the same way Gassmann (2006), confirms that in the last decade, stronger global competition guided a higher knowledge sharing and collaboration between firm’s innovation process. So the “do-it yourself” mindset in R&D management is going out of use and in order to have innovation, firms are opening their boundaries to external inputs. Considering this, the open innovation model was shaped.

OI model is part of the innovation process evolution needed in organizations. This need is related to the fact that innovation begins with the management of ideas (Berkhout, Hartmann, van der Duin and Ortt, 2006). Which is strictly related to the management of innovation i.e. the process of bringing economic value to knowledge and creativity (van der Meer, 2007). Thus the innovation process itself should be innovated and not restricted to only one perpetual model, which has been a tendency followed by organizations in the last decades. One of the first authors to describe the innovation process evolution was Rothwell (1992a, 1992b) who states that there have been 5 accepted generations, which are:

- **1st** Generation (up to 1960’s) known as “technology-push” is characterized by neither strategic goals nor chain management. It applies a simple linear process of stepwise progression with markets at the end of the pipeline.
- **2nd** Generation (1960’s to 1970) known as “market-pull” maintains the linear process emphasizing more the role of the market place at the end of the tube. It had still weak stress on corporate strategy and chain management.
- **3rd** generation (1970’s) or “coupling” process is a more general process that couples science, technology and the market-place. It is logically sequential; though not necessarily linear e.g. it contained feedback loops.
4th generation (1980’s) or “integrated” innovation is truly parallel, characterized by inter-function integration as well as vertical and horizontal integration with other companies.

5th generation (from 1990’s) or “systems integration and networking” mode, includes fully integrated parallel development, strategic integration with suppliers, linkages with inter-company networking and a new electronic toolkit.

More recently Berkhout, et al. (2006) argued that the evolution process should be synthesized to only 4 major innovation process progressions. They concurred in the 1st and 2nd ones with Rothwell, however they suggested that the 3rd generation concerns more to the linkage between R&D and company goals having a hard accent on chain management and could be seen as “Open R&D”. This gave space to the 4th generation of innovation processes to arise as the “open innovation” model. Although this 4th generation is similar in the networking principles stated by Rothwell (1994), it also encompasses entrepreneurship influence and lay more emphasis on managing networks with potential specialised innovation actors.

Other authors synthesized even more the innovation evolution to emphasize the novelty of the new trends, for example van der Meer (2007) stated that OI is considered to be more the third stage in the evolution of systems for innovation management. Some author’s ideas are not chronological restricted, for example Pilditch (1987) mentioned that strengthening the R&D department was just not enough more than a decade before the term OI was coined. He correctly predicted that in order to be innovative, organizations must embrace a whole set of new attitudes and perspectives. So it is probable that some companies were in a middle stage between the 3rd and 4th generation of innovation process for the last couple of years. Whichever authors’ perspective its chosen, the bottom-line is that OI is seen as the breakthrough in the way organizations innovate, so much needed in recent years.

For instance, Sakkab (2007), a former executive from P&G, agrees that Research and Development needs urgently to change, in fact R&D is an old term belonging to an old fashion mindset usually associated with scientists in labs experimenting and inventing. Companies are realizing the lost opportunities of not evolving their innovation practices and only relying on their R&D geniuses. For instance, in the IBM global 2006 CEOs study (Chapman, 2006) only 14 percent of the CEOs positioned Internal R&D department as a major source for new ideas. The current trend is clear, the time when ideas were protected in bunkers and worked only by some researchers in white coats has passed (De Ridder, 2008). An analogy describing the contemporary approach applied by companies is suggested by Sakkab (2007, p. 62): “Companies have transitioned from being a Kremlin to the vision of an Acropolis, with no windows and only a roof and floor so that change and ideas can flow in and out”.

Another visible example of this trend in industry is the Dutch electronics manufacturer Philips who evolved from the 3rd to the 4th generation in innovation models. Several years ago the company adopted the essence of open networks and innovation after understanding its traditional structure based on closed in-house innovation was deterring the entrance to the company of smart ideas from very smart “no Philips” people (Blau, 2007). Cases like the previous ones, in which companies embrace a new innovation paradigm, could go filling down this section. For a good illustration of just some of the most known examples of companies involving in OINs and OIPs refer to Appendix 1.

The belief that corporations and organizations in general will be successful in this century by means of getting ideas from the smartest and more knowledgeable people, not only
within the company but from anywhere, has gained momentum over the last five years (De Ridder, 2008). The trend is visible and is probable that more and more companies will start if not switching in a big extent at least applying some open innovation practices in its daily activities and innovation process.

2.1.2 Open Innovation and Networks contemporary relevance

Since OI entered the scholars’ perception due to its novelty and related benefits, a lot has been written in the academic, but also in the best-practice literature. Below we synthesized open innovation and networks importance first from theoretical and then from practitioner perspectives. The rationale to present these relevance aspects are because first it shows the reader some of the most known efforts to study and understand OI. And second, this also helps to start exhibiting the fact that although organizations are aware of its importance, studies have virtually neglected the subject of OI integration until now. Besides, having in mind the general OI relevance perceptions from scholars and practitioners will provide a better argumentation notion when discussing and relating the phenomena with the empirical data in further chapters.

Academic perception

Even though the term Open Innovation originated only six years ago, a lot has already been written about its advantages (Rafols, 2009). For example, studies like the one from (Lichtenthaler, 2009) provide evidence based on empirical data of the direct positive effect of practicing outbound open innovation across diverse environments. Sarkar and Costa (2008) provide a reliable study if the impact of open innovation strategies in the food industry. Fowles and Clark's (2005) research conclude that increasingly the best innovative products and services from companies are coming from entering in innovation networks with suppliers, freelance scientists, university researchers and even competitors. Another argumentative paper by (van der Meer, 2007) explains the several major advantages of the open system model over the closed one. The main ones are; first, it allows money to be made in every stage, not only by selling, but also by licensing our or spinning out at earlier stages; and second, it allows and promotes the full use of human resource potential as it tolerates a “thinking out of the box” approach. The general contribution of these academic testimonies is providing executives with factual reasons to open up the innovation processes of their organizations.

Moreover, an evidence that OI is being considered more formally in academia is the fact that in September of this year, the journal R&DManagement (2009) published an special issue on Open Innovation and Open R&D. In this special issue, edited by Enkel, Gassman and Chesbrough, is important to remark that almost all the articles relate directly to OI. West (2009b) adds that finding articles talking about OI is not astonishing but the fact that in June 2006 at a “special user innovation” issue of the same journal, R&D Management, the articles barely touched the concept of OI. Thus it confirms the idea that researchers and academicians are increasing its efforts to explain the effects, benefits, dynamics, challenges, methods, practices and in general the phenomenon insights of open innovation and networks.

Practitioner perception

The idea that OI is growing in popularity (De Ridder, 2008; West, 2009b) is also being seriously considered based on real cases. On Internet there are several websites (Innoget, 2009; OpenInnovation.eu, 2009; OpenInnovation.net, 2009) promoting OI and Networks by showing the rewards it can bring as well as the results of companies that have taken the next step to rely now on OI as a model of innovation management. For instance, based on
the relationships experienced with European companies practicing OI (OpenInnovation.eu, 2009) confirms that OI allows firms to react in a fast and flexible way to remain competitive. In fact, the idea of OI bringing profits from any kind of innovation sounds terrifically attractive in today crisis economy so it is not surprising that companies have begun looking for other means to enhance the efficiency and effectiveness of their innovation processes (Innoget, 2009).

Leading organizations have explored mechanisms of obtaining competitive advantage under OI, especially firms keeping innovation as a pillar of their strategy (Rafols, 2009). These firms e.g. IBM, Intel, P&G and Cisco, more than seeing Open Innovation business model as a “kamikaze” strategy, have considered the risks of its endeavouring lesser than its advantages (Chesbrough, 2008). More and more examples can be extracted from articles, magazines, internet blogs and websites (del Moral, 2008; OpenInnovators.net, 2009; Rae, 2008; Scocco, 2006; Viskari, Salmi and Torkkeli, 2007), however particularly when confirming the evidence of practical application and feasibility of OI, we can refer to a popular expression “the proof is in eating the pudding”, hence the best way is to show a list of real OI stories in some industries listed in Appendix 1 – List of known Open Innovation examples.

Also top management is already aware of open innovation value, in (Chapman, 2006) study, 41% of the CEOs from different firms said the most significant sources of innovative ideas came from employees, 30% percent from business partners and 36% from customers. They know that two of the three most noteworthy sources of innovation nowadays are outside the organizations. On the other hand, managers of companies are also increasingly discovering OI to improve the innovation based strategies, as a major challenge because it is not yet fully developed as a new management practice to drive innovation at least in European firms (OpenInnovation.eu, 2009). Therefore many organizations are still struggling with some specific OI challenges e.g. its correct integration, which is the subject of the next part.

2.1.3 Open Innovation definition and models

After a first glance of Open Innovation and Networks we consider it is important to properly define and explain the new innovation model. When defining OI it is necessary to mention H. W. Chesbrough (2003), who conceived the term six years ago and who extensively promotes it making it widely accepted in the academic and business community. He called this the “New era of Open Innovation” pointing out how the industry newcomers made little or no research with their own resources, but instead obtaining innovative ideas through an alternative process to bring them to the market. He decomposes open innovation into three main elements combined in his model which are culture, structure and business model.

Model Structure

In Figure 1 we can appreciate the conventional model in comparison with the new model of Open Innovation. Traditionally companies apply a process that limit the utilization of internal knowledge within the company and make no use of external knowledge, this paradigm was described as Closed Innovation Model by Chesbrough (2003). As Gassmann (2006) reasons, the nuclear and military industries, in which confidentiality of technology and process is essential, are typical examples closed models. Within this paradigm companies keep their inventions highly secret and make no effort to give away information outside their own R&D labs (OpenInnovation.eu, 2009). However Chesbrough (2003)
argues that factors like the availability of educated people, venture capital, external ideas and technology and more actors involving in the innovation process, have caused an erosion of closed innovation.

In contrast, Open Innovation Model as seen in Figure 1 refers to combining internal and external ideas as well as inner and outer pathways to market to advance in innovation development. In the OI paradigm, the ideal environment is the one where exchange and collaboration efforts between companies and experts facilitate the introduction and implementation of Open Innovation processes between companies, suppliers, scientists, universities and of course, customers among other stakeholders in the value chain. As a proof, researchers Chesbrough and Crowther (2006), identified that many OI concepts are already in use in a variety of industries.

**Culture and company’s attitude**

With their consultancy and research experience in Deloitte, Koudal and Coleman (2005) affirm that managers in real practice prefer secure sales from current products over disruptive innovations. They state that managers in companies will not sacrifice short term assured profits for long term uncertain innovation opportunities. For that reason OI implementation needs a different mindset not only from managers but the whole company. This implies that within the organization a change should take place in the way people perceive the organization and its environment i.e. it involves a new culture (De Ridder, 2008). In the same way van der Meer (2007) states that OI culture relates to shifting towards an open systems view which requires a different way of thinking. The basic set of
beliefs, norms and values involved in an open innovation culture or open innovation system are illustrated in Appendix 2.1 – “Open innovation principles” (Chesbrough, 2003). Moreover Gassmann (2006) adds that the use of open innovation is more appropriate as higher corresponds a firm’s idiosyncrasy to current trends like globalization, knowledge leveraging, new business models, technology fusion and technology intensity.

**Business Model**

Due to major advances in technology nowadays information can be transferred easier than ever before, thus the open innovation model theorise that since companies cannot stop this phenomenon, they must learn to adapt and take advantage of it by proper business models (Kirschbaum, 2005; Viskari, et al., 2007; West and Gallagher, 2006). Thus opening up the innovation process by shifting the culture e.g. involving new management styles, it also requires new systems and processes tailored to develop the potential of OI and to reduce risks (West and Gallagher, 2006). For instance, a few tools for importing and exporting knowledge, ideas and projects are listed in Appendix 2.2 – Mechanisms of OI (van der Meer, 2007). Such mechanisms include structure and methods at every stage of the innovation process that allow inflow and outflow of ideas. Regarding a company’s process point of view three key processes can be differentiated in OI (Chesbrough, 2007; Enkel, et al., 2009; Gassmann, 2006):

- The outside-in process: gaining knowledge of the company by the integration of suppliers, customers and any kind of external knowledge source.
- The inside-out process: gaining profits by bringing ideas to market, selling intellectual property and increasing technology by transferring ideas to the external environment.
- The coupled process: co-creation with partners e.g. alliances, cooperation and joint ventures, to give and receive beneficial profits and knowledge.

A perfect example of the first type of process and in general of OI essence is a form of practice very popular in the last couple of years, the Crowdsourcing (Scocco, 2006). This term was originated by Howe (2006, p. 1) which described that clever companies have discovered ways to use the latent talent of the crowd and thus benefiting from millions of minds, or as he wrote: “It’s not outsourcing; it’s crowdsourcing”. The main idea of the OI concept is that in a world where useful knowledge is widely distributed and of general high quality, companies cannot afford to rely entirely on its own research and development but they must buy or license processes and inventions, such as patents from or to other organizations (Chesbrough, et al., 2006). Besides, developed inventions that are not being used must be taken outside the company to be fully exploited for example through licensing or joint ventures.

**2.1.4 Stance of the OI model with networks and its analysis levels**

Almost by definition OI is related to the innovation relationships with other organizations. It is a reality that companies are working evermore through networks to create customer value (Vanhaverbeke, 2006). An editorial in the Strategic Direction Journal (2009) mentions that as innovation force continues expanding, a more diverse group of organizations are becoming gradually more open to networks. As an effect, companies trying to start or increase their OI initiatives are using the service of other actors to find external sources of innovation. Gwynne (2007) called them “knowledge brokers”, institutions that bring firms together, individual inventors and people with problems to find solutions and vice versa e.g. Ninesigma, Innocentive and Innoget.
But networking can also include cooperation with other partners not necessarily in the same industry. The types of partners can be very different depending on the organization’s innovation purpose. Companies can develop relations with “outside innovators” (Neyer, et al., 2009) or external innovative actors i.e. the entirety of external partners, clients, end customers, users, retailers, suppliers and competitors. Linked to this, Vanhaverbeke and Cloodt (2006) assert that to enlarge the scope and enhance the understanding of OI actors, a breakdown should be made on different level of analysis. These levels are a) individuals; b) Firms/organizations; c) Dyads/alliances, d) Inter-organizational networks and e) National/Regional innovation systems.

In Figure 1, the OI model shown is basically analyzed at the level of the innovating firms i.e. the boundaries with other organizations and networks is not defined explicitly. Although Vanhaverbeke (2006) reasons that inter-organizational relation and networking are implicitly present in the OI framework when external ideas are in sourced or external ideas taken to the market (Chesbrough, 2004), we believe is necessary to draw a bigger picture of the model. Therefore based on value constellations, defined as inter-organizational networks established to create value based on new business models, situated at the right-hand of the OI model and innovation networks at the left-hand side (Vanhaverbeke and Cloodt, 2006), we can map the OI model in a greater scope as illustrated in Figure 2 – Open Innovation “Big Picture”. This way the role of inter-organizational innovation networks is clear in OI and thus the necessity to know the mechanisms involved in the integration of innovation projects.
2.2 The need for integration in Open Innovation Networks

At this point we have already given the big picture about open innovation and open networks; we have explained it and show its relevance. However it is necessary also to focus on the knowledge gap that exists in the OI field for two main reasons. First to justify our research and second and most important to clearly understand where are the OI issues so we know exactly where to look for their answers. For example, although top management in many companies are now considering stepping into OI model (Bughin, Chui and Johnson, 2008), they do not have a transparent idea of the OI possible issues. Therefore when making the choice to switch its innovation process for a more openly one, organizations should consider some pitfalls. In the same way, this research should explore first the general possible issues in the OIM to draw some preliminary suppositions and then be able to focus in the integration problem. Some of the pitfalls we have noticed when looking in literature are:

- OI is continuously developing, or as literature reveals is still an extremely fluid and young research field. Therefore model mechanisms e.g. for integration, are still not reported or widely spread within academia and practitioners.
- Although mechanisms are available, globalization is increasing the interrelationships between innovators which in turn are increasing the complexity to manage them properly, thus the mechanisms should be assessed continuously. Philips Research manager stated that the problem is not being creative enough, but the complexity needed to continuously integrate all kinds of competencies in the areas where additional expertise is required (Blau, 2007).
- There is always a debate between theory and practice value. While researchers may say that information and communications technologies facilitate the integration of customers and suppliers into the design and development process (Gassmann, 2006) a CEO may say that is easy to say it in theory but is a different story in reality.
- As OI model was not designed from scratch it may use mechanisms from its past contributors although there is no warranty of their usefulness. Concepts like employees cumulative innovation (Chandler, 1969; Reuter, 1977; Scotchmer, 2004), supplier and user innovation (von Hippel, 1986, 1988, 2005) and early supplier involvement process (Bidault, Despres, and Butler, 1998) may give or not a hint on how to integrate the innovators.
- In today’s business reality, organizations invest simultaneously in closed as well as open innovation activities and practices (Enkel, et al., 2009) thus the mechanisms that can be useful for one approach may not be necessarily appropriate for the other.

The idea of these points is the need for research to find a balance between different innovations approaches and the mechanisms used. Indeed in the OI paradigm some white spots in research remain open (Gassmann, 2006) hence below there is a synthesis of the major gaps and challenges in the field of open innovation focusing the reader’s attention on the challenge of understanding how inter-organizational integration takes place in the innovation process.

As we mentioned before Enkel, et al. (2009) stress the necessity for a correct balance between classical innovation and open innovation models. This stipulation creates a growing urgency for 3 things: recognizing the cause-and-effect correlations of open and closed innovation activities, discovering non-economic approaches to improve firms’ portfolios and even more important, finding the appropriate contributors and integration
mechanisms. Particularly in the innovation networks area, another integration related necessity is the urgent need to understand how to reduce the risk of losing Intellectual Property (IP) through coordination and integration mechanisms (Fowles and Clark, 2005). This issue, just in the US, affects $300 billion per year. Thus companies are in constant search, looking for the procedures and attributes to harmonize effectively relationships and manage IP issues.

The integration weight in the innovation process within the business and technology aspects of the organization is visible. In the IBM 2006 CEO study (Chapman, 2006) 80 percent of the interviewees rated integration, including within innovation process, as of huge importance. The reason is related to the benefits obtained when organizations invest extensively in process integration like greater customer satisfaction, speed and flexibility (Chapman, 2006). Another study conducted by Enkel, et al. (2009) in 107 large companies and SME, showed the risks and barriers found when investing in OI projects and ventures. Figure 3 summarizes the most frequent implementation and profiting obstacles mentioned by the organizations studied. Among them we highlight the importance stressed on the barrier of high complexity in integration to continue justifying our research question.

![Figure 3. Most frequent internal barriers and risks in EU companies (Enkel, et al., 2009)](image)

Indeed good integration can be done in practice; an organization that has integrate its innovation process including open innovation and networks activities is the case of Philips (Blau, 2007). The company invested in the creation of a High Tech Camp in Eindhoven where the central idea is to have an open company policy to enable the free flow of ideas inside and outside the organization but at the same time controlled, coordinated and integrated by Philips. Although is a good example of how integration can be done is not very practical, as the integration “mechanism” used in this case is a millionaire venture that not all organizations can afford.

Koudal and Coleman (2005) as well state in their study, that the major reason for growth achievement through innovation is the proper integration and concatenation of their operational capabilities and processes. They confirm that companies which have invested adequately in infrastructure to support innovation internally and externally have generated up to 70 percent higher performance. But again this avowal does not suggest detailed mechanisms that organizations can use to integrate open innovation projects. More related though still too general, Neyer, et al. (2009) propose two suggestions to integrate innovators in the open innovation process. First – when executing different innovation
practices to open the innovation process, the organization should be aware of which kind of innovators are in reality integrated in its innovation process. Second – an organization aiming the integration of a particular kind of innovator e.g. suppliers, must use the proper innovation practices to integrate the knowledge of this kind of innovator, because not all innovation actors are equal.

2.2.1 Open Innovation gap: the integration challenge

In the field of management, with every new idea it is very probable that there will be some uncertainties and open gaps. For example, Drucker (1985, p. 138) said that “we cannot yet develop a theory of innovation... but through study we now know enough to develop the practice of Innovation”, referring to closing theory vs. practice gaps by conducting further research. Regarding the OI paradigm, in theory the idea looks simple and straightforward, yet the reality of OI seems to be that it is easier said than done (van der Meer, 2007). For instance, although theory points out that open innovation perspective gives advantages to organizations and innovation actors, the measurement of these benefits is very subjective. There is still not an appropriate measurement scheme that assesses the investment and impact of open against closed innovation activities to support firms to find their right equilibrium (Enkel, et al., 2009). Fredberg, et al. (2008) identified the main OI themes in literature and they suggest the research frontiers based on interviews to key open innovation researchers. They conclude that OI literature is still limited and a large part of it, is practitioner accounts of OI, which indeed are valuable as specific situations and case description but do not give much theoretical progress.

Many relevant existing gaps in OI areas are pending to be closed yet we focused in the ones that question the modus operandi i.e. integration during open innovation. For instance Neyer, et al. (2009) agree that innovation literature emphasizes the magnitude of unlocking the innovation process to internal and external innovation actors. However the doubt of what determines the integration of these types of innovators in the innovation process remains open. Also almost all research on open innovation proposes no systematic approach of why and how firms vary the degree to which they execute and integrate OI efforts (Keupp and Gassmann, 2009). Laursen and Salter (2006) remark that further examination is needed on the causes and sources of external exploration at the firm and inter-organizational level to improve the complexity integration between innovativeness, search, and R&D intensity. Particularly of inter-organizational integration is what Vanhaverbeke (2006) affirms that alliances or other types of transactions between organizations typically do not add the extra value and support to firm’s success by themselves, but it is determined by the way the firm integrates its external relations.

Future challenges: integration in the OI process

Since two decades ago Drucker (1985) suggested that organizations and entrepreneurs need to learn to practise systematic innovation by means of innovative opportunities outside the organization. This aspect relates directly to open innovation and the opportunities that may arise for a company if planned, implemented and integrated correctly. Nonetheless this is also an OI intrinsic challenge (Fredberg, et al., 2008) because one general issue identified with the model is that although open innovation increases the potential creativity in the innovation process, it also increases the complexity involved in managing it.

Authors stress the complexity of OI but also the substantial operation costs for the seek and valuation of exterior knowledge sources whose quality cannot be identified a priori (van de
Vrande, de Jong, Vanhaverbeke and de Rochemont, 2009). Lichtenthaler (2009) disagrees with the approaches taken, claiming that prior OI research has focused only on few areas, e.g. firm and alliances analysis levels leaving other analysis levels ignored. Even outbound OI (West and Gallagher, 2006) like licensing practices in IBM, Lucent, DuPont and P&G (Viskari, et al., 2007) or DSM and Philips (Sakkab, 2007) which is subject not very often studied in literature is still focusing only in at firm level. The key point is that while most researchers and practitioners focus on the outside-in process i.e. only one flow direction, theoretical literature lacks of a clear understanding of the inside-out and bidirectional flow process (Enkel, et al., 2009). Consequently, this research explores a specific area not touched very often by literature i.e. bidirectional integration in inter-organizational analysis level between particular actors.

Some authors go more in detail and try to define particular set of challenges existing in open innovation. West and Gallagher (2006) indentified three fundamental groups of challenges for organizations in applying the open innovation paradigm: finding creative forms to exploit internal innovation, incorporating-integrating external innovation intro internal development and motivating external actors to provide a continuous flow of external innovative ideas. As we identified from Fredberg, et al. (2008) report the coming areas of open innovation were grouped in potential clusters to be further theoretically developed. These series of issues of relevance proposed for future research in the OI field are listed in Table 1. We centre our attention on the organizational side of open innovation, because as the authors assert, further research on open innovation and networks is still required in terms of how to create mechanisms that allow a high degree of collaboration and integration in the innovation process.

A practical example taken from the business environment is that empirical research of Koudal and Coleman (2005) that proved the companies that can orchestrate complex global value chains are better off. In fact, these firms that can also integrate their innovation process are 73 percent more profitable than other without proper integration abilities. Examples of this are Samsung Electronics and Porsche AG whose key growth factor in international markets is their capacity to coordinate and integrate innovation across their global operations but also through their partner networks.

As we have synthesized in this part there are still a lot of gaps and challenges in the open innovation field that if researched can contribute both, to better theory and practice understanding. We remarked specifically the “integration challenge” in the innovation process not only identified in present literature but also highlighted as relevant. Therefore the integration challenge related to the open innovation process is review in detail in the next part. First to recognize that the planned research of the thesis would provide a benefit to address this challenge and second to make clear to the reader the importance of understanding how does integration actually takes place in open innovation and networks activities and projects.

Table 1. Suggestions for Future Research in Open Innovation field (Fredberg, et al, 2008)
There is evidence that organizations are aware of the need to integrate its innovation process, especially regarding open innovation in the business organization, which can be very complex as explained before. However the most important issue is still a question mark and remains largely untouched: How? (Veldt, Koning and De Ridder, 2009). In the IBM study (Chapman, 2006) CEOs expressed that they want to improve the integration of any of their innovation processes e.g. the OI process, but they do not know how to do it or find the task too complicated. If the lack of integration in the innovation area frustrates many CEOs, there is an important opportunity to provide interesting findings with our research. Nevertheless we cannot research without considering analytical and logical aspects, for that reason in the next section of the chapter we examine useful theoretical frameworks and structures related to integration and innovation to support our methodology and research.

2.3 Theoretical Framework

As seen in the literature, the existing open innovation paradigms do not consider in great extent, or even at all, neither the implementation nor the integration of OI. I.e. the OI model describes in a general way what is the idea proposed but it does not specify the exact steps to implement it in an organization. The same happens the other way around with other types of models regarding OI. For instance, an interesting practitioner view on how to implement open innovation is the OI Chess Paradigm (Veldt, 2009). This implementation model uses a diagram based on a chess metaphor which provides a structured approach to change from closed to open innovation using leadership styles and organizational identity. Although it is a valuable contribution to OI field it is not purely based on the first OI model (Chesbrough, 2003) and moreover it disregards the integration part. Thus it supports the idea, which is legitimately practical for parsimony (West, 2009), that OI models not necessarily include aspects of OI implementation or OI integration and conversely. Therefore the simple OI models, the models for implementation and the ones that may exist for integration are seeing as linked but different for their analysis. For this reason, the search for integration elements in OI cannot be restricted only to the OI model per se. Below we focus and describe the integration mechanisms applicable for the innovation process starting from a general organizational theory view to a more specific innovation process context.

2.3.1. Integration mechanisms in organizational theory

From organization theory perspective integration is defined as any administrative tools whose implementation assist in achieving coordination among different units within an organization (Martinez and Jarillo, 1989). Taking into account contributions of various scholars, integration mechanisms could be roughly divided into two groups of structural and formal mechanisms, and more subtle and less formal mechanisms.

The first group of integration mechanisms include five kinds of managerial tools. Departmentalization is a result of formal organisational structure based on the principle of labour division as a mechanism of “organizational influence” (Simon, 1976). This mechanism achieves the grouping of activities within organizational units. The second mechanism, centralization or decentralization, refers to the way the processes are conducted and determines if the decision-making authority is in the lower or higher levels of the command (Child, 1972; Galbraith, 1973; Galbraith and Kazanjian, 1986; Lawrence and Lorsch, 1967; Pugh, Hickson, Hinings and Turner, 1968; Simon, 1976). In the third
mechanism, formalization and standardization, procedures are established through standard routines (Pugh, et al., 1968), in form of rules, policies, job descriptions, etc. that are being documented in manuals. To this mechanism were annotated different names throughout organizational theory literature: standardization (March and Simon, 1958; Thompson, 1967), paper system (Lawrence and Lorsch, 1967), standard practices (Simon, 1976), rules (Galbraith, 1973; Galbraith and Kazanjian, 1986). Planning, as the fourth mechanism, refers to processes and systems like strategic planning, establishment of schedules, budgeting, (March and Simon, 1958; Thompson, 1967), setting of goals (Galbraith, 1973; Galbraith and Kazanjian, 1986), which intend to channel and guide actions and activities of interdependent units. The fifth mechanism, output and behavioural control (Ouchi, 1977; Ouchi and Maguire, 1975), include two separate forms of exerting control in organizations. Output control is based on the evaluation of records, files, and reports submitted to corporate management by organizational units. Other authors call it differently: impersonal control (Blau and Scott, 1962), bureaucratic control (Child, 1972), control systems (Grandori and Soda, 1995) or performance control (Mintzberg, 1979). Behaviour control, on the other hand, is based on direct, personal surveillance by the supervisors.

The second group, subtle and informal, consists of three integration mechanisms. First of them, lateral relations which cut across the formal structure, include direct contact among managers of different units of the company with common problems, teams, permanent or temporary forces, integrating roles and departments, committees, etc. (Lawrence and Lorsch, 1967; Galbraith, 1973; Galbraith and Kazanjian, 1986; Grandori and Soda, 1995; Gittell, 2002; Perlow, Gittell and Katz, 2004, Jones, 2007). Informal communication, the second mechanism, supplements the formal communication (Simon, 1976) by creating a “network” (Kotter, 1982) formed by personal and informal contacts between managers across different departments; personal visits; management trips; corporate meetings and conferences; transfers of managers; etc. (Grandori and Soda, 1995). The third is the development of an organizational culture by socialization process of individuals. This is done by communicating to them the decision-making style, the way of doing things and the values and objectives of the company (Pfeffer, 1982). This process is performed by training and transferring managers across different departments (Galbraith and Edstrom, 1976), using career path management as well as various measurement and incentive or reward systems (Grandori and Soda, 1995).

Martinez and Jarillo (1989) argue that the pattern of evolution of integration mechanisms in organizational theory moves towards more subtler and informal mechanisms as an answer to the managerial challenge of coordinating an increasing number of dispersed and independent inter-organizational activities.
All organizational mechanisms they (ibid) identified are summarized in Table 2.

<table>
<thead>
<tr>
<th>Structural and formal mechanisms</th>
<th>Subtle and less formal mechanisms</th>
</tr>
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<tr>
<td>Departmentalization or grouping of organizational units, shaping the formal structure</td>
<td>Lateral or cross-departmental relations: direct managerial contact, temporary or permanent teams, task forces, committees, integrators, and integrative departments</td>
</tr>
<tr>
<td>Centralization or decentralization of decision making through the hierarchy of formal authority</td>
<td>Informal communication: personal contacts among managers, management trips, meetings, conferences, transfer of managers, etc.</td>
</tr>
<tr>
<td>Formalization and standardization: written policies, rules, job descriptions, and standard procedures, through instruments such as manuals, charts, etc.</td>
<td>Socialization: building an organizational culture of known and shared strategic objectives and values by training, transfer of managers, career path management, measurement and reward systems, etc.</td>
</tr>
<tr>
<td>Planning: strategic planning, budgeting, functional plans, scheduling, etc.</td>
<td>Output and behaviour control: financial performance, technical reports, sales and marketing data, etc. as well as direct supervision</td>
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Table 2. Integration mechanisms in organizational theory (Martinez and Jarillo, 1989, p. 503)

### 2.3.2 Integration mechanisms in innovation processes

The integration in innovation projects has been described by Clancy (cited in Putzger, 1998) as an attempt to elevate the linkages within each project component, enable more effective interaction among them and facilitate decision making as well as, in doing so, create visibility that allows identification of bottlenecks. As for the main drivers of integration, Handfield and Nichols (1999) identified the information revolution, increased levels of global competition, more demanding customer and markets driven by demand, as well as the emergence of new types of inter-organizational relationships. They describe the three principal elements of integration as being information systems (managing financial and information flows), inventory management (management of material and product flows), and supply chain relationships (managing relationships between partners).

According to Akkermans, Bogerd and Vos (1999), fundamentals of integration of an innovation process are considered to be collaboration, cooperation, trust, partnerships, information and technology sharing, and a shift from individual functional process management, to the management of integrated chains of processes. The integration can range from product design, and encompass all phases leading to the final sale of the product (Ballou, Gilbert and Mukherjee, 2000). Cottrill (1997) stated that the evolution of the integration concept changed towards one in which the value chain spans a virtual enterprise without regard to established company boundaries, and can be reached directly by customer demand through access to electronic storefronts. The selection of the most appropriate integration mechanisms will, according to Daft and Lengel (1986), vary depending on levels of innovation project’s uncertainty and ambiguousness.

In order to form the theoretical framework, integration mechanisms most commonly referred to by academics relating specifically to R&D projects, which are more directly related to our research context, have to be considered. The following mechanisms were broadly discussed by numerous authors (Daft and Lengel, 1986; Larson and Gobeli, 1988; Moenaert and Souder, 1990; von Hippel, 1990; Dean and Snell, 1991; Ancona and Caldwell, 1992; Ford and Randolph, 1992; Wheelwright and Clark, 1992; Emmanueldies, 1993; Hitt, Hoskisson and Nixon, 1993; May and Pearson, 1993; Adler, 1995; Brown and Eisenhardt, 1995; Fulk and DeSanctis, 1995; Cooper, 1996; Daft, 1998).
**Horizontal structures**

Horizontal structures entwine with established functional structures. According to Daft (1998) they are achieved through information systems, direct contact, task forces (temporary assignments), full-time integrator and teams. Although the functional authority continues to be dominant, Ford and Randolph (1992), state that the dual lines of authority are deeply set in the organization and cross-functional project teams are the dominant innovation project units. These mechanisms are intended to counter the forces created by high levels of functional specialization among actors in R&D projects by implementing personal contact, mutual adaptation and agile communication. The effectiveness of information flow at the project level that is achieved in this way, the appropriate allocation of resources can be established in a more timely manner (Larson and Gobeli, 1988). However, they also stressed that while horizontal structures tend to improve coordination and communication, they can prove be time-consuming and costly. Vagueness of responsibility as well as conflicts between project and functional managers on issues of project priorities, resources and schedule can easily be brought by dual lines of authority (Barker, Tjosvold and Andrews, 1988; de Laat, 1994; Ford and Randolph, 1992; Nonaka, 1990). With these limitations the benefits of horizontal structures should be carefully weighed against the associated costs. Nevertheless, R&D projects that usually have high levels of ambiguity and novelty can greatly benefit from contribution of these structures.

**Formal leadership (project management)**

Formal project leadership in innovation projects has been characterised throughout integration literature as having a crucial integrative role within the project team as well as between the team and outside players. Brown and Eisenhardt (1995) stated that strong project leadership is highly related with effectiveness by having an internal integrating role and as such can inspire team members to resolve differences and problems. This effect is mainly a result of their personal integrity, knowledge and authority. Furthermore, Brown and Eisenhardt (1995) state that formal project leaders, as external integrators, act as a “bridge between the project team and senior management”. Positive correlation between the influence formal leaders hold and their ability to allocate resources as well as create an integrated team has been noted by various authors (Clark and Fujimoto, 1991; Ancona and Caldwell, 1990, 1992). Formal leaders with overall authority of the innovation project, according to Ancona and Caldwell (1992) and Emmanuelides (1993), will be more able to manage the communication with top management as well as internal dynamics of the team.

**Planning and process specification**

By breaking down a project into components and projecting milestones and timelines for each of them can contribute towards better coordination of the project as a whole (Cooper, 1996; Moenaert and Souder, 1990; von Hippel, 1990; Wheelwright and Clark, 1992). When the tasks and responsibilities are effectively delegated in this way the overall team performance is improved (Cooper, 1996). Therefore, planning and process specification can be a powerful integration mechanism and greatly improve project performance (Cooper, 1996; Zirger and Hartley, 1994). Nonetheless, Mintzberg (1994) argues that creativity necessary for innovation process can be hindered by the constraints of formal planning, while Eisenhardt and Tabrizi (1995) also found that planning holds back product development. Adler (1995) found planning mechanisms are appropriate for R&D projects with a moderate level of novelty and less so for routine projects or extremely novel innovation projects. According to Daft and Lengel (1986) planning is a “dynamic process that includes elements of both equivocality reduction and data sharing.” Based on this logic, planning and process specification can be considered as generally beneficial, but most useful under conditions of high uncertainty and ambiguousness.
**Information technologies**

According to several authors (Adler, 1995; Dean and Snell, 1991; Fulk and DeSanctis, 1995; Hitt, Hoskisson, and Nixon, 1993), information technology has a role of facilitating coordination of innovation projects by increasing communication speed and reducing its cost, widening the information network as well as allowing access to communal information. Some of the technologies useful in this regard are electronic mail, fax, voice mail, decision support systems, CAD/CAM, and electronic data management. Adler (1995) stated that CAD/CAM technologies allow a shared access to ongoing product designs, while Fulk and DeSanctis (1995) emphasize the facilitation of horizontal communications by information technologies across intra-organizational as well as inter-organizational boundaries, lessening the need for physical proximity in the process. There is a considerable disagreement in the literature over the role of information technologies, where some authors deem that they do not contribute to the reduction of ambiguousness (Schnitz and Fulk, 1991) and the others argue that they can mediate distribution of richer information (Kiesler, 1986; Rice and Gail, 1989). In respect to the both stances Markus (1994) asserted that those communications are not naturally “rich” or “lean” and that various social groups construct them in a way that they support the exchange of information in a richer and more structured fashion. Even though electronic mail may not be suitable for a more open and flexible thoughts formulation or an immediate feedback as is the case with face-to-face communication, social groups are in a position to use them in these purposes. Baring this possibility in mind, information technologies can contribute in reduction of ambiguousness by being socially constructed and context-dependent. Nonetheless, as stated by Hinds and Kiesler (1995), desynchronised information exchange characteristic for information technologies do not seem favourable for rich communication to the extent that personal and group meetings and telephone calls do.

**Informal leadership**

Formal leadership refers to the role of project champions who may not necessarily hold formal leadership positions. The studies of some authors (Cooper, 1996; Hise, O’Neal, Parasuraman and McNeal, 1990; May and Pearson, 1993) have shown that technical champions who are devoted to the project success and direct their efforts in persuade others contribute to the overall project performance. Howell and Higgins (1990) asserted that project champions demonstrate in an informal way certain behaviours and characteristics usually associated with transformational leadership, such as persistence, influence, risk-taking and persuasiveness. In this perspective, project champions can act as “informal integrators” by reducing ambiguousness in direct personal contacts. Owing to their commitment to the project and power of persuasion, they also contribute in creating enthusiasm related to the common goals and their convergence. The limitations to their integrative role and influence may be associated to the fact that they hold limited formal power comparing to the formally appointed leaders. This is even more pronounced when project uncertainty and task variety is high, making it very difficult to gain acceptance of a large number of actors in the project who have diverse expertise.

When we align these mechanisms to those defined by organizational theory, it is obvious that both structural and formal as well as informal and subtle managerial tools are implemented. Being that integration mechanisms are used to implement strategies, Martinez and Jarillo (1989) stated that simple strategies need little integration and are therefore implemented through structural and formal mechanisms, whereas complex strategies (which is usually the case in inter-organizational R&D projects) demand enormous integrating efforts, and are consequently implemented by using both types of mechanisms. These combined and joined efforts of integration are usually very costly in terms of time and money, which is why, according to Martinez and Jarillo (1989),
companies usually set in place structured and formal integration mechanisms and continue adding subtle and informal tools only to the extend which is necessary for strategy implementation.

2.3.3 Open Innovation and Networks Integration

Identifying all the integration mechanisms in OI may not be simple. As Enkel, et al. (2009, p. 312) clarifies: “Although the era of open innovation has begun for many firms, we still lack a clear understanding of the mechanisms, inside and outside of the organization, when and how to fully profit from the concept.” There are, however, generic mechanisms that are also applicable in OI context. For example, one of the most mentioned ones is technology as a catalyst to drive and enable innovation. And as Chapman (2006) claims, technology can facilitate other innovation enablers as cooperation and integration. Fredberg, et al. (2008) classified the technologies, tools and processes in use for OI, mentioned in contemporary papers, into three categories; coordinating/aggregating, liberating and allowing/including. Based on their extensive literature review (ibid) then we can assume that technology infrastructure is evident in literatures as a key instrument for OI integration.

In inter-organizational R&D projects, where collaborative efforts increase the complexity of operations, the ability to integrate these inter-organizational activities becomes a key factor of success. Most companies, however, prefer to structure themselves in a way that makes these processes tightly managed. Tightly coupled processes are often characterised by inflexibility where dependence on its key components can prove to be very obstructing (Brown, Durchslag and Hagel, 2002). This is the reason why companies with advanced process management ability deal with the critical inter-organizational innovation processes as though they were networks rather than production lines. In doing so, they replaced their tightly joined processes for ones that are loosely connected, which has in turn gained them the desired flexibility that positively influenced their overall performance.

Other than these rather basic guidelines, there are no concrete and accepted mechanisms that support the implementation and integration of the OI processes (Veldt, et al., 2009). We will, therefore, examine study cases in order to identify and synthesize the integration mechanisms in companies that had implemented OI in the last years. As Gassmann (2006) mentions, analyzing cases can prove to be necessary since OI has different characteristics and has to be considered from several angles. He maintains the idea that innovation research and practice can benefit by cherry-picking some ideas and concepts from different sources.

Other mechanisms in Open Innovation - “OI in practice”

Philips has been the subject of study by several authors (Broer and Zeper, 2004; Chapman, 2006; Viskari, et al., 2007) because of its advanced open innovation business model. The company has adopted OI as a part of its R&D strategy and it relies on research collaboration and spinning out new ventures. Its biggest OI achievement was the creation of the High Tech Camp (HTC) to foster OI but also as a method to integrate people, technology and knowledge between the firm and innovators (Vaughan, 2009). As mentioned before, the HTC is a novel strategy to integrate OI projects but is not practical due to its high construction and maintenance costs. Yet we should consider what a Philips Research manager said “The idea is to build an innovation ecosystem...in the right environment, people with good ideas will find each other and cooperate” (Blau, 2007, p.
10). Therefore the integration mechanism identified is the creation of an innovation ecosystem, either physical or virtual e.g. an online innovation platform, where actors interact freely and communicate openly.

P&G is another very frequently cited company suitable for OI practices analysis. The firm uses information and communication technologies to enable the exchange of distributed sources of information in the open innovation process (Viskari, et al., 2007). This technological interface enables the firm to integrate with different groups of innovators. However together with the use of interface, a shift in the firm capability to absorb ideas from outside is necessary, which is an aspect that P&G had developed over decades (Dodgson, Gann and Salter, 2006). For that reason, the technique called Connect and Develop proved to be successful in leveraging the innovative capacity with the internal and external sources. The C&D technique is based on using a large interface of multinational organizations and outside parties worldwide to gather innovative ideas (Sakkab, 2007). Then based on P&G strategy, a mechanism to support OI integration identified is what Dodgson, et al. (2006) called “innovation technology” reinforced by a learning and open culture to adapt and accept external ideas which needs to be achieved over time.

Nokia also leads OI practices. The firm has shifted from an M&A tactic to increasingly engage in strategic alliances. Nokia’s OI performance is directly related to its renowned worldwide innovation network. This OI collaborative network gives the firm the ability to multiply efforts on projects, improve innovation efficiency, create new innovation ecosystems and create more shared value (Dittrich and Duysters, 2007). The network’s knowledge sharing approach is visible in other OI efforts like the Nokia Innovation Centre, newsletters, forums, communities, training, online learning, events and contests. The mechanism recognized within Nokia is a sociable system to share relevant knowledge which is important because knowledge is the currency in joint ventures and alliances (Walker, 2009) like in Nokia’s innovation network. Without trading knowledge one cannot make partners to commit and thus not be fully integrated.

Although Deloitte is not related as a leading firm in OI, two of its executives Koudal and Coleman (2005) provide a model for synchronizing innovation, probably applicable to OI. This model is based on Deloitte research on the analysis of best practices over two years of nearly 650 companies worldwide. The Deloitte model for synchronizing innovation is aimed to overcome the innovation paradox and generate profitable growth through innovation. The model is centred in 3 principles: creating innovation, exploiting innovation and building innovation capabilities. Behind the ability to create and exploit innovation, the model suggests four core capabilities:

a) **Visibility enablers.** Instruments to improve visibility upstream and downstream the value chain, through access to valuable information and thus better capacity to model future scenarios.

b) **Flexibility enablers.** System and methods with a wide range of flexibility in the supply chain that allow quick product modification to meet market demands and satisfy internal and external clients.

c) **Collaboration toolkit.** Tools to allow extensive communication with customers, suppliers and innovators in general to define product requirements.

d) **Advanced technology.** Used for product lifecycle management, customer relationship management and advanced planning and scheduling.

Although these capabilities are not exactly considered as specific tools, all of them could be linked to similar integration mechanisms already described. This supports the previous
research on literature but at the same time adds an extra element considering the practitioners view. In sum, the model proposes that these capabilities should be applied through tools and mechanisms that will give the firm an edge in creating, evaluating, exploiting and integrating innovation throughout the entire lifecycle. Koudal and Coleman (2005) affirm that success innovators are the ones that strength their capabilities in two areas: integrating activities within each of three value chain processes i.e. product development, supply chain, and the customer operations of marketing, sales, and service, and integrating across those three major processes.

Following ideas were not taken from a particular company but from practitioners’ anecdotal evidence reported on-line regarding the ways to integrate OI in their organizations. A common technique is the involvement of a third party to guide through the closed-open process e.g. Innoget, Ideavents or Ninesigma, which are companies specialized in encouraging open innovation implementation but also give support in the integration aspect. These innovation mediators or ‘nexus agents’ perform co-ordinating and integrating functions and have a role of knowledge transmitter among areas and actors of the broadly defined innovation system. The literature on innovative networks and innovation systems defines them differently, various authors refer to them as central agencies (Teubal, Yinnon and Zuscovitch, 1991), central firms (Sawhney and Prandelli, 2000), and systems integrators (Brusoni and Prencipe, 2001).

Also common procedures, related with the management of the human factor, are the involvement of stakeholders, empowerment of employees and support of innovation ambassadors. Frequently, practitioners mention the use of systems to assign suitable or transformational leaders to guide the integration of resources, objectives, actors and the OI project in general. Slightly, more drastic but still valid is the process of defining a new organizational identity and culture to foster but at the same time try to integrate open innovation throughout the entire company (Veldt, 2009).
2.4 Point of departure

We have reviewed extant literature regarding OI, innovation process integration and the application of integration mechanism in OI projects. Moreover, we analysed the mechanisms used by leading companies in OI practices as well as anecdotal practitioners’ evidence reported on-line. This literature review shows that OI integration efforts come in a variety of forms and, as such, are also associated with a variety of mechanisms not yet standardised. Therefore there is clear call for a better understanding of the integration mechanisms in OI projects, which should be addressed by more focused case studies and empirical research.

In addition, we have identified potential actors that can be integrated in OI and the elements that can be innovated and developed through this new model. We created the Matrix of Open Innovation applications illustrated in Appendix 3 which considers the different types of collaboration (Tidd et al., 2005, cited in Viskari, et al., 2007), the 3rd category of innovators i.e. outside innovators (Neyer, et al., 2009) and the OI analysis levels (Vanhaverbeke and Cloodt, 2006). The rows of the matrix list the principal innovators in the OI process with whom a firm can integrate its innovation projects. The columns refer to the applications in which OI can actually support innovation. In the examples for reference is visible that some firms are located in two or more cells, which exemplifies the degree of OI depending on the organization’s innovation strategy. Based on the matrix, we concluded that our data collection was going to be centred on inter-organizational level, exploring the integration mechanisms between firms and academic institutions in any of the five potential elements to innovate.

Following the earlier defined logic behind OI and the applicability of integration mechanisms in its context, we expect to find that beside structural and formal mechanisms the integration in OI projects will also include subtle and informal mechanisms. These mechanisms forming our theoretical framework are summarized in Table 3. in the next page. Comparing with classic inter-organizational innovation projects where all collaborative actors are known and have been integrated in the process by established and firmly imbedded mechanisms, OIPs use external sources that can be unexpected and are rarely known in advance. Therefore, the integration mechanisms used in OI have to be able to support inter-changeability of networks involved and enable integration infrastructure to be flexible and easily accommodating for various potential participants.
### Framework for integration mechanisms in non conventional innovation process.

<table>
<thead>
<tr>
<th>Structural and formal mechanisms</th>
<th>Subtle and less formal mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrations mechanisms accepted within organizational theory.</strong> (Organizational Theorists according to Martinez and jarilo, 1989)</td>
<td></td>
</tr>
<tr>
<td><strong>Departmentalization or grouping of organizational units</strong>, shaping the formal structure.</td>
<td></td>
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<tr>
<td><strong>Centralization or decentralization of decision making through the hierarchy of formal authority</strong>.</td>
<td></td>
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<tr>
<td><strong>Formalization and standardization</strong>: written policies, rules, job descriptions, and standard procedures, through instruments such as manuals, charts, etc.</td>
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<tr>
<td><strong>Planning</strong>: strategic planning, budgeting, functional plans, scheduling, etc.</td>
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<tr>
<td><strong>Output and behaviour control</strong>: financial performance, technical reports, sales and marketing data, etc. as well as direct supervision.</td>
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<tr>
<td><strong>Lateral or cross-departmental relations</strong>: direct managerial contact, <em>temporary or permanent teams</em>, task forces, committees, integrators, and integrative departments.</td>
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<tr>
<td><strong>Informal communication</strong>: personal contacts among managers, management trips, meetings, conferences, transfer of managers, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Socialization</strong>: building an organizational culture of known and shared strategic objectives and values by training, managers exchange, career path management, measurement and reward systems, etc.</td>
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### Possible types of integration mechanisms in R&D projects (Sicotte and Langley, 2000)

| Formal Leadership – Delegation of power. |
| Motivation of team members. Use of personal credibility, expertise and authority. Formal project leaders seen as external integrators. |
| Planning and process specification – Project breakdown into components and milestones. Tasks and responsibilities effectively delegated. |
| Information Technologies – Allow communal information (electronic mail, fax, voice mail, decision support systems, CAD/CAM, and electronic data management). |

| Horizontal Structures – Information systems, direct contact, task forces (temporary assignments), full-time integrator and teams. |
| Informal leadership – Project and technical champions showing transformational leadership, such as persistence, influence, risk-taking and persuasiveness. Motivate team members. Act as “informal integrators” though they hold limited formal power. |

### Possible integration mechanisms identified to be applied in OI projects and practices. (Extracted and synthesized from some company cases as well as practitioners points of view)

- State of the art technological infrastructure or Innovation Technology.
- Involvement of a third party mediator or ‘nexus agents’.
- Redefining a new organizational identity (a more drastic mechanism)
- Creation of an innovation ecosystem.
- Sociable system for knowledge sharing (between actors inside and outside the organization).
- Tools and methods promoting better visibility and flexibility within the innovation processes.
- Activities to involve stakeholders e.g. empowerment or delegation of decision making.

**Table 3. Theoretical framework of integration mechanisms used in OIPs**
CHAPTER 3: RESEARCH METHODOLOGY

As we made clear in the last chapter one of the challenges within new innovation practices, like Open Innovation, is to understand how to integrate the various processes, knowledge, systems among other elements, which allow an organization to innovate effectively. The well known dilemma in this challenge is the continuous changing integration circumstances in organizations. And as Blomquist, Häggren and Nilsson (Blomquist, Häggren and Nilsson, 2008) mention there are still no valid and empirically based descriptions of how daily integration looks. In the same way Dodgson, et al. (2006) confirm that “as with all new ideas, the concept of Open Innovation requires extensive empirical investigation, testing and development”. Thus this research focuses on trying to fill this gap by conducting an empirical research collecting data that can provide us with relevant conclusions useful to enrich OI theory but also practical ones for managers in organisations. In general terms, the type of our research could be defined as a fundamental or basic research and as an exploratory study.

Due to the nature of our topic this thesis was conducted following the widespread logic of basic research, confirmed by Saunders, Thornhill and Lewis (2003), rather than applied research. Although applied research is done with the intention of relating the results of the findings to understand and solve a particular management problem, like CEO’s have expressed about integration in innovation process (Chapman, 2006), this study fits more with basic research for two rationales. First, because basic research is useful in contexts where researchers are involved academically, with fairly flexible timeframes and where the topic and objectives are determined by the researcher (Saunders, et al., 2003), which is precisely in our case. And second, the inherent aspiration of this thesis is aligned with basic research purpose of expanding knowledge of management processes and providing significant and valuable findings to society in general (ibid). In our case, it is translated as looking to improve the understanding of how integration is achieved in OI projects, which is seen as a problem that commonly occurs in organizational settings. Also as Sekaran (2003) highlights, beside the relevance of this type of research throwing findings and conclusions that will contribute to the body of knowledge, it is possible that some organizations may later use this results to solve their own difficulties, which is the practical implication we want to attain. By carrying on basic research we intend to generate more knowledge and understanding of OI integration mechanisms and if possible theorize them, which subsequently as Sekaran (2003) suggests, may be the foundation of further studies of other aspects on this subject.

Our research is also considered as an exploratory study being that it is undertaken to better understand the nature of the phenomena, in our case the integration mechanisms in OI, since very few or almost none of the researchers have focused in this area. Certainly there is integration mechanisms research as previously mentioned, but considering them in OI context, we agree with Sekaran (2003) when he suggested that exploratory study is necessary when some facts are known, but more information is needed for developing a viable theoretical framework.

Once described our study in broad outlines, in the next pages we will explain in more detail the methodology and research paradigms used for our research. Rather than a literature review of all the possible research methods in business, we focus more on linking clearly
and coherently the methodological position chosen. The main reason is to prove how our investigation is supported but also to show the reader that through accepted approaches and techniques we are achieving credible results giving validity and reliability to the study and therefore supporting its authenticity.

### 3.1 Research Philosophy

Certainly it is vital to describe the philosophical assumptions on how the search and development of knowledge is perceived in this thesis. The reason is because as Saunders, et al. (2003) mentioned, this will directly influence the conduct of our research and determine the stance when selecting our research design and method for collecting data. When choosing among the main research paradigms, we needed to consider two philosophical fundamentals that are interlinked, the types of ontology and epistemology suitable for our research process.

The ontology as Bryman and Bell (2007) state, refers to the way the researcher may perceive the nature of the social entities and the world in general. They mention that this perspective will be based on seeing organizations either as independently objective i.e. objectivism or as social constructions made by social actors actions i.e. constructionism. Easterby-Smith, Thorpe and Lowe (2002) mention the same type of social actors related ontology although with a different name: *interpretivism*. The later one is the ontology we considered because of its characteristics remarked by the authors (ibid); i.e. in order to carry out this research our basic beliefs were centred on the idea that we are part of a socially constructed and subjective world. Therefore we should focus on understanding what is happening through a wide vision and try to develop ideas through induction from the interviews. We are aware that this type of ontology influences directly the way we will consider the knowledge gained from the interviews. Although the interviews will not provide an absolute truth in a strictly objective world, in our study context, they will provide the participants’ reality which is the desired effect to narrow the understanding of the phenomena. Besides having “subjective” interviews on small samples should give us a more practical way to analyse in depth different views and perspectives of the phenomena (ibid) nevertheless this will be explained later on.

The epistemology relates to the study of knowledge and science per se or in our context, the different ways the researchers undertake to perceive the general truth (Easterby-Smith, et al., 2002). Then in the search to know what can be regarded as acceptable knowledge in a discipline, we may follow either an exact sciences research epistemology or a more flexible one. Bryman and Bell (2007) referred to the later as interpretivism and even though we agree with its characteristics in order to differentiate it from the ontology chosen with the same name, we prefer to use another similar term applied in business research: *phenomenology* (Hair, Money, Samouel and Page, 2007; Saunders, et al., 2003; Van Manen, 1990). According to Saunders, et al. (2003) a phenomenologist viewpoint establishes that as the situations in the world are complex and unique, especially in business, they cannot be studied with definite laws as the ones used in physical sciences. We are aware that a phenomenologist epistemology could be criticized because of its lack of generalization; however we coincide with the view of its defenders that the environment of business organizations is constantly changing and thus generalization of universal laws and theories applicable to every type of organization is less valuable nowadays.
Owing to the lectures on research methods we are aware that epistemology and ontology relationship should be of coherence and logic to develop correctly our thesis. We also noticed that several business research methods authors (Adams, Khan, Raeside and White, 2007; Bryman and Bell, 2007; Saunders, et al., 2003; Sekaran, 2003) agree that in reality research in management rarely falls precisely within just one of the research philosophies. They mention that it is often a blend between the two. However for practical effects in this thesis, we centred our theoretical research posture on just one kind of epistemology and ontology to make clearer our philosophical view to the reader. In general, the importance and benefits of understanding the philosophical position are to support the assumptions that we have about the way the world works. Or as Bryman and Bell (2007) affirmed, researchers should explore the assumptions of the studied social world and the way it can be studied to conduct a better research. Similarly we consider carefully what Saunders, et al. (2003, p. 86) stated: “only if we have such an understanding can we examine these assumptions, challenge them if we think it appropriate, and behave in a different way”, which was the directive followed in our research.

3.2 Research Approach

There is a wide range of literature that reflects on various qualitative research approaches. Many of them regard specific traditions or approaches such as grounded theory (Strauss and Corbin, 1990), phenomenology (Van Manen, 1990), narrative analysis (Leiblich, 1998) and discourse analysis (Potter and Wetherall, 1994). Nevertheless some approaches can be considered as “generic” (Ezzy, 2002; Pope, Ziebland and Mays, 2000; Silverman, 2000), and therefore more suitable for general and subjective situations aligning to our interpretivist ontology. In the same way, as we considered an epistemology which considers management as having distinctive contexts, we opted to look for a general research approach that have a better chance of including a wider range of settings. A considerable number of authors on qualitative data analysis refer to a strategy that can be categorized as a “general inductive approach” which represents a systematic procedure for qualitative data analysis guided by specific objectives. The main purpose of the inductive approach is to enable the emergence of research findings from the significant, frequent or dominant themes that can be found in raw data without having to cope with the rigidity of structured methodologies and for this reason we believe it is suitable for our research.

Other purposes for using an inductive approach are to (1) to compress extensive and varied raw text data into a brief, summary format; (2) to establish clear links between the research objectives and the summary findings derived from the raw data as well as to ensure these links are both transparent and defensible and (3) to develop a model or theory about the underlying structure of experiences or processes which are evident in the raw data. The inductive approach also helps to reflect frequently reported patterns used in qualitative data analysis justifying its use given the objectives. We justify its use for the simple reason that a general inductive approach provides a convenient and efficient way of analysing qualitative data for many research purposes (Bryman and Bell, 2007; Saunders, et al., 2003).

The inductive approach is identifiable in several types of qualitative data analyses, particularly in grounded theory (Strauss and Corbin, 1990). It is very much alike to the general qualitative data analysis pattern as described by Miles and Huberman (1994), Pope, et al. (2000) and Seidel (1998). In the same way, this approach is evident in many other qualitative data analyses. Some have characterized their approach clearly as “inductive” (Backett and Davison, 1995; Stolee, Zaza, Pedlar and Myers, 1999) while others employ
this approach without giving it this exact label (Jain and Ogden, 1999; Marshall, 1999). But the advantages are clear, one used in our research, for which Saunders, et al. (2003) suggested that an inductive approach contributes in the comprehension of the meaning in complex data by developing categories or summary themes derived from it.

Baring these characteristics and considerations in mind, in order to verify and potentially modify the model of integration mechanisms derived from the literature review, we will be undertaking an inductive research approach that moves from specific observations to broader generalizations and theories. By conducting semi-structured interviews, we will strive to observe and indentify patterns in interviewee’s responses and based on them, form tentative hypothesis which will in turn lead us to theoretical conclusions. We are reluctant to claim that results of this research can be considered as a newly created theory (which is usually the result of an inductive research approach). The conclusions of this thesis will take a form of reconfiguration and combination of previous theories and mechanisms that have already been identified. Even though this research topic is rather new and therefore open for and suitable to establish new theories, due to the time constraints, limited research scope and availability of research sources, this is not feasible.

3.3 Research Design and Research Strategy

The research design of this thesis is related with the time horizons in which our study took place. Saunders, et al. (2003) remarked two types of design: cross-sectional and longitudinal. The difference is that while the later one is carried during a continuous period of time the former one is a static study in terms of the point in time. To be clearer, during our study the data collection was not made with the analogy of video recording but rather like taking snapshots of the organizations. Therefore, as our research is based on interviews which were only conducted during a single point in time e.g. like pictures; we will use a cross-sectional design.

For our research strategy, we considered different approaches in order to have the best suited strategy for our study. For example we paid close attention to grounded theory which is most precisely defined as a research method in which the theory is developed from the data, rather than the other way around. This makes it an inductive approach, moving from the specific to the more general, which in fact is the approach we had in mind since we undertook this research. Therefore we captured the main idea of this strategy basically being founded on three elements: concepts, categories and propositions, which were originally considered as “hypotheses”. However, as we do not want to focus on the evaluation of hypothesis, we prefer to emphasize its essential suggestions e.g. concepts are the key elements of analysis since the theory is developed from the conceptualization of data, rather than the actual data.

If we look at Strauss and Corbin (1998) definition of grounded theory in which they argue that it is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomena, then it fits the purpose of our methodology. We agreed that the findings of the analysis should be similar as the main objective of grounded theory. This is to expand upon an explanation of a phenomenon by identifying its key elements, and then categorizing the relationships of those elements to the context and process of the phenomena. Using a research strategy of this type may look skewed however we emphasized the interpretist ontology that we are using to understand the innovation process in the organizations. Therefore, our goal when using partially this strategy is to go from the general to the specific without losing sight of what makes the
subject of a study unique, which is also directly influenced by the phenomenologist philosophy that we selected because of the unique situations we expected to find.

The advantage we knew of when employing grounded theory is that although it is often perceived as a method which separates theory and data, the method actually combines the two (Saunders, et al., 2003). We understood that the data collection, analysis and theory formulation were undeniably connected in a reciprocal sense, and the grounded theory approach incorporates explicit procedures to guide this. This is especially evident in the processes of asking questions and making comparisons which are particularly detailed to guide analysis and to facilitate theorizing process. For example, it is distinctively stated by Bryman and Bell (2007) that the research questions must be open and general rather than formed as specific hypotheses, and that the emergent theory should account for a phenomena that is relevant to participants, just as we will show in subsequent chapters.

In addition, grounded theory provides detailed and systematic procedures for data collection, analysis and theorizing, but it is also concerned with the quality of emergent theory. Strauss and Corbin (1990) widen their suggestions and state that there are four primary requirements for judging a good theory based on an inductive approach: 1) It should fit the phenomenon, provided it has been carefully derived from diverse data and is adherent to the common reality of the area; 2) It should provide understanding, and be understandable; 3) Because the data is comprehensive, it should provide generality, in that the theory includes extensive variation and is abstract enough to be applicable to a wide variety of contexts; and 4) It should provide control, in the sense of stating the conditions under which the theory applies and describing a reasonable basis for action. Although these requirements fit more with the creation of a general theory, we did pay attention on them to guide our analysis of data.

In the other hand, we also found disadvantages of solely using a much formalized strategy like grounded theory. The first one is that the outcomes of inductive data analysis may be indistinguishable from those derived from a grounded theory approach. Thus by the principle of parsimony, which states that in order to avoid complexity, things should always be kept in the simplest possible way, we considered not to solely use this strict strategy. In fact, as many researchers agree, it is probably more likely to find theories using a general inductive approach that are more straightforward than some of the other traditional approaches to qualitative data analysis (Sekaran, 2003). The second one is that grounded theory is considered by many as a painstakingly precise method of study, which requires high levels of both experience and insight on the part of the researcher. For this reason, as Hair, et al. (2007) correctly suggested, novice researchers should avoid this method of study until they have achieved the proper qualities needed to effectively implement the approach.

Taking these considerations in mind, we thought to act more prudent and use other types of strategies to analyze the data in an inductive way. We do not argue that grounded theory is not useful for our study; indeed we are considering several basic aspects of this method. However we want to use other strategies that are more comprehensible, feasible and suitable for our research. Therefore we chose to follow a more eclectic approach and we additionally selected a model proposed by Seidel (1998) which seems to be more straightforward and generic. This model is also aligned with our interpretist way of perceiving the world subjectively and still can deal with the complexity expected when using a phenomenology epistemological view. The three basic elements of this model are represented in Figure 4 which is also based on grounded theory and ethnography crucial
aspects. This model and the specific steps that we undertook are explained with more detail in the analysis and findings chapter.

In general, using a mixed strategy will give us better flexibility for our research and at the same time enable us to be aware of the basic notions. For example, with the mixed strategy that we selected as data collection and analysis are consciously combined, we designed both parts in advance. This provided us with opportunities to increase the ‘density’ and ‘saturation’ of recurring categories, as well as to assist in providing follow-up procedures in regards to unanticipated results. Besides, interlacing data collection and analysis in this manner is also designed to increase insights and clarify the parameters of the emerging theory. At the same time, our method supports the actions of initial data collection and preliminary analyses while attempting to incorporate previous research literature. This is supposed to guarantee that the analysis is based on the data but at the same time on pre-existing constructs. We agree that there is a possibility that the previous knowledge may influence the analysis but in fact this is the logic when using the inductive approach previously explained. We took this risk in order to achieve a result or theory that could have a wider comprehensive perspective.

3.4 Data collection Method: Semi-structured interviews

The two main methods that social science researchers use in their studies are qualitative and quantitative, which directly influences the type of data collection method used in the research (Kekäle, de Weerd-Nederhof, Cervai and Borelli, 2009). As we already mentioned, we use a qualitative strategy for our research and thus will conduct semi-structured interviews for data collection. These decisions were also strictly related to our ontological philosophy chosen in the sense that we believed a qualitative interview of this kind could deal better with the subjectivity from participants’ responses. Thus, semi-structured interviews are used to collect qualitative data by setting up a situation (the interview) that allows a respondent the time and scope to talk about their opinions on a particular subject. The focus of the interview is decided by the researcher and there may be areas the researcher is interested in exploring. With interviews it is assumed that the respondent projects into the responses his own thoughts, feelings, attitudes and expectations, all of which can be interpreted (Sekaran, 2003). According to Bryman and Bell (2007) the objective is to understand the respondent's point of view rather than make generalisations about behaviour, which we believed could contribute extensively to our research. In addition this lack of generalization fits appropriately with our phenomenology philosophy as we know that none of the interviewees’ answers were going to be exactly the same as each organization is completely different.

In semi-structured interviews, open-ended questions are used, suggested by the researcher (“Tell me about...”) or they arise logically during the interview (“You just mentioned... could you elaborate?”). The interview is like a conversation and the researcher tries to build a relationship with the respondent. Questions are asked when the interviewer feels it is
appropriate to ask them. These questions may be prepared or can occur to the researcher during the interview. The wording of questions will not necessarily be the same for all respondents. In respect to this, we have constructed sets of general (trigger) questions as well as sets of additional questions each of which are appropriate and adapted to the individual interviewee’s context.

The purpose of semi-structured interviews is to obtain specific qualitative information from a sample of the population, as well as the general information relevant to a specific topic, and finally to gain a range of insights on it. A major benefit of this method is that it’s less intrusive to the interviewees as it encourages two-way communication. Additionally, it confirms what is already known but also provides the opportunity for learning. Often the information obtained from semi-structured interviews will provide not just answers, but the reasons for the answers, which gave us a wider perspective from the interviewees’ context.

**Validity and Reliability**

The aspects of validity and reliability when obtaining data is essential in research and as Hair, et al. (2007) remark, this is directly linked with the use of a valid and reliable data collection method in the correct way. The authors suggest that in order to ensure the research findings are valid and reliable; one way is to include the right questions in the correct sequence. We followed their advice only partially as with semi-structured interviews the sequence of the questions may distort the data, but this is better explained in section 3.5 of data collection process of our research.

According to Bryman and Bell (2007) validity in qualitative research involves determining the degree to which researchers’ claims about knowledge corresponded to the reality (or research participants’ construction of reality) under research. We applied in the most possible extent what LeCompte and Goetz (1982) and Kirk and Miller (1986) have indentified:

*External reliability* represents the extent to which the research can be replicated and is usually a difficult criterion to meet since, according to the authors, it is impossible to ‘freeze’ a research setting as well as the circumstances of an original study which is necessary for it to be replicable. Nevertheless, they suggest several strategies that can be employed to achieve these requirements. These being that the qualitative researcher has to replicate research needs and adopt a similar role to the one of the original researcher. In that way, a researcher conducting a replication will see and hear things compatible to the original research.

*Internal reliability* in situations when there is more than one researcher, meaning that all of them have to agree on what they see and hear.

*Internal validity* concerns with the match between researchers’ observation and the theoretical concepts they develop. LeCompte and Goetz (1982) stated that this quality is strength of qualitative research, being that the prolonged participation in long term enables the researcher to provide a high level of congruence between observations and concepts.

*External validity*, which is the extent to which the findings are generic across social settings. The authors argue that this can pose a problem for qualitative researchers because of their inclination to employ case studies and small samples.

In sum, we concurred with Sekaran’s (2003) idea that each of the data collection methods has its own advantages and disadvantages even though choosing the appropriate one can
improve the value, validity and reliability of the research. Therefore we consider that semi-structured interview is the best method to gather information fitting in our research for two reasons. First since the interviewees were chosen from different organizations, they could provide answers that represent their different perspectives and experiences, so we could have relevant data to analyze for our research question (Bryman and Bell, 2007). And second because as Sekaran (2003) correctly mentions, the advantage of this method is its flexibility i.e. it is useful for adapting, adopting and changing questions as the researcher proceeds with the interview, which was an essential tactic when researching about a hazy and unclear topic as integration mechanisms in OI which we have previously explained.

3.5 Data collection process

We just confirmed our choice to use semi-structured interviews as the data collection method and the detailed process of how this data was actually gathered is explained next. To start clarifying this process to the reader, we consider important to refer again to our research question because as Hair, et al. (2007) remarked, the type of data collection approach that is suitable depends upon the questions being asked by the researcher. Therefore the main objective of the semi-structured interviews conducted was to answer:

“How integration is achieved in Open Innovation Projects between inter-organizational networks of innovators, specifically in projects between private companies and universities?”

Hair, et al. (2007) propose a series of structured steps to collect data when interviewing. We followed the ones that applied to our data collection stage which could be summarized as: formulating the research, planning the data collection method, actively gathering the information, checking for errors, coding or transcribing the interviews and finally storing the data in a way that allows it to be analysed quickly and conveniently. The formulation was thought since the beginning of the research and is linked with the sampling design used explained in section 3.6 of this thesis. The second step of the data collection process was contacting the participants and setting up a viable date and hour to make the interviews. As we both did not know the participants in person, from the first communication for requesting the interviews we tried to establish a relationship of respect but also of empathy and support with our participants (Adams, et al., 2007; Bryman and Bell, 2007; Sekaran, 2003).

During the same planning stage, we first thought about not engaging the interviews with a strict planned sequence of questions but just with some hint questions to ask the participants if applicable. As Sekaran (2003) highlights, the objective of an interview like the ones conducted by us, is first to get some preliminary issues to the surface to decide later which aspects need further in depth questioning and enquiry. However we modified our overall strategy after considering more carefully what other authors mention about using semi-structured interviews if researchers are beginning the study with a fairly clear focus. We thought that semi-structured interviews could be useful to address more specific issues if designed correctly or at least as Bryman and Bell (2007) point out, to have a structure or to follow a script to a certain extent. As we were making interviews in different contexts and organizations the requirement of a structure of interview questions was desired to ensure cross-interviews comparability (ibid). Therefore before the interviews some possible questions were designed and reviewed. This activity was fairly manageable due to our previous clear idea of how we were going to analyze the data.
Nevertheless we were also conscious of not following strictly the order of the questions proposed because as Bryman and Bell (2007) remark, due to the flexibility in qualitative interviews information may flow differently and sometimes easier. Therefore the possibility was latent that during the interviews we might ask new questions that follow up the interviewees’ replies and we might even change the order of the questions that we had.

After formulating and planning the interviews for our study, the next step was to actively gather information from our interviewees. It is important to mention that all semi-structured interviews were made with computer assisted telephonic tools which as Sekaran (2003) mentions, they have the advantages of gathering information simply and quickly but mainly more are efficient in terms of costs and time. Time was a decisive factor as we needed to reach different people in a short period of time. We also thought upon what Adams, et al. (2007) highlighted as an advantage of telephonic interviews over face to face ones, this being the ease of geographic coverage which in our case was essential since all the interviewees were located overseas. Not critical but relevant to mention is that telephonic interviews nowadays have lower costs and are less expensive in comparison with other data collection methods due to modern special software and tools (Hair, et al., 2007).

In order to conduct the best possible interviews we considered to minimize some of the pitfalls that people associate with telephonic interviews. For instance, a common issue is the feeling of time pressure leading to a tendency to rush through the interview (Adams, et al., 2007), which we avoided by mutually establishing with interviews the best available hour of the day to conduct the interview. Also telephonic interviews have the reputation of being easily interrupted or early terminated affecting the quality of the data; however this issue was also avoided by verifying with the participants their full availability during the interview period. On the other hand, some issues could not be avoided, for example the high sense of impersonality which make rapport difficult to achieve (Adams, et al., 2007) and the loss of nonverbal communication due to the lack of visual contact and interaction (Sekaran, 2003). We believe this could be minimized with webcam hardware, though most of our respondents did not have the appropriate software or hardware available at the moment of the interviews.

We can confirm that the dialogue with our participants during telephonic interviews was straightforward and homogeneous. We started asking only broad open questions to primarily understand the perceptions of the interviewees (Sekaran, 2003). When doing this, we listened carefully to their answers to identify the critical elements related with the integration in the innovation process. It may seem during the interviews that answers were going off at tangents or not following a strict logic but as Bryman and Bell (2007) stated, this gives insight into what the interviewee sees relevant and important, thus making a good contribution to our research. After identifying ideas related with our research question with potential to expand and provide us with more data, we made follow-up questions regarding specifically the integration mechanisms used in the participant’s context. To reduce biasness during the interviews we were consistent with our questioning mode for each participant e.g. by not influencing the responses in any way (ibid).

We also tended to, as other authors advised for qualitative interviewing, create a non hierarchical relationship and establish a high level of reciprocity (Bryman and Bell, 2007; Saunders, et al., 2003) by maintaining a sense of informality in the interview as well as showing an enthusiasm and a genuine interest in what he or she has to say. Our attitude during this process was also aligned with Sekaran (2003) idea, when conducting telephonic interviews, of building up a relation with a solid level of trust and rapport. All these types
of relationships and recommendations helped us lower the degree of biased data by bringing respondents’ defences down and making them keener to share information.

We followed the next step in qualitative studies as Hair, et al. (2007) mentioned, which is the examination of data during as well as after their collection. Therefore after conducting the interviews we ensured that we obtained most of the desired information for our study. None of our participants needed to be contacted again for a second interview or follow up session, even though they were keen to do it in case we needed additional clarification. In addition, non-sampling errors were not detected during the checking phase yet we are conscious that other kind of errors may be inherent in our research because of our inadequate interviewer training skills. However as Hair, et al. (2007) highlights, errors in research can never be totally eliminated thus we followed the authors’ advice and we anticipated potential problems to later design controls to minimize them or if possible avoid them completely.

Finally, the resources used for the interviews were mainly technological. As previously mentioned all the interviews were made by telephonic means assisted with VoIP (Voice over Internet Protocol) tools and the software Skype©. We also used voice recorder as well as additional software to record the interviews, which was previously authorized by participants, in order to have them available for future examination. This proved to be extremely useful when transcribing the interviews for analysis. However we were also aware of the cons and pros of recording the interviews. As Sekaran (2003) mentioned, recorded interviews might bias participants answers because they feel their anonymity is not preserved. However we weighed with more importance the fact that (ibid, p. 231) “interviewers should not rely on memory because information recalled from memory is imprecise and often likely to be incorrect”. Thus by recording the interviews we avoided some level of biasness into our research. Also reviewing the records of the interviews helped us to check for inconsistencies and later we followed Hair, et al. (2007) suggestion of coding the data and created a file with all the interviews ready for the analysis phase.

In general, it was clear for us just as Sekaran (2003) highlights, that technology plays a key role in shaping the data collection method used by researchers nowadays. Also we agree with his idea that the choice of data collection method and process depends on the facilities available, the degree of accuracy required and the expertise of the researchers, among other factors. However we were satisfied that after conducting seven semi-structured interviews with people in different contexts we got sufficient data to continue the analysis, which is explained in the next chapter.

3.6 Sampling

Sampling is the process or technique of selecting a suitable sample for the purpose of determining parameters or characteristics of the population according to Adams, et al. (2007). However due to the scope of our research we agreed more with another authors’ concept which states that sampling in general is useful to draw any conclusion about the real world or in our case a real challenge in organizations. It is also known that sampling design is part of every structured research process and in our thesis it involved collecting data through contacting people who are well-informed and could make a relevant contribution for our study. Choosing the sampling design that best fits our research is of great importance. As Hair, et al. (2007) stated the proper selection of a sample is crucial to provide fairly accurate data and information for the study. Thus we further justify our
sampling design, not only based on different authors fundamentals but especially on the sample needed for our study.

In broad, when researching in business there are two basic sampling techniques: probability and non-probability sampling (Saunders, et al., 2003). As we selected the sample units on the basis of our personal common sense, the sampling method is catalogued as a non-probability sample. The two main pitfalls when using this type of basic sampling is the proximity or even the total lack of representativeness (Adams, et al., 2007) and the impossibility for the researchers to generalize the findings to the target population with any measured degree of confidence (Hair, et al., 2007). However in non-probability sampling the elements of the sample, in our case the interviewees, are not selected with the aim of being statistically representative of the universe but rather by subjective methods (ibid) for example in our case by personal contacts, experience and own judgement. Besides, we considered the advantages of cost and time of non-probability sampling (Adams, et al., 2007) and the more likely opportunity to establish an information-rich data collection environment to help explore and answer our research question when using this type of sampling (Saunders, et al., 2003).

Bryman and Bell (2007) pointed out that quite often researchers using qualitative methods admit that their samples will have a degree of convenience sampling. The reason is that qualitative research aims to search for deeper analysis instead of looking mainly for representativeness as quantitative research does. We agree with this idea and thus the non-probability sampling technique that we chose is purposive sampling. It is simply a form of convenience sampling where the judgement of the researchers is used to select the sample elements (Hair, et al., 2007). We also consider purposive sampling because as Saunders, et al. (2003) states when using it, the issue of sample size is indistinct. The sample size rather depends on the research question, what do we want to find out and what can be done with the available resources, all these issues are considered from the beginning of this study.

Our sampling may appear to have a simple convenience sampling based on our arbitrary selection of sample elements. However our study has more of a purposive sampling being that all the participants conformed to certain criteria for our research (Adams, et al., 2007) e.g. to be pertinent to the topic of OI field in private companies or universities. Besides, as Sekaran (2003) mentions the sampling is considered purposive if the participants are selected on the basis of who is conveniently available to provide valid and reliable information, and in our case easily accessible through personal contacts and networks of known people. Nevertheless we researched previously on the interviewees profile to assure that they were going to provide us with relevant data.

In addition, we were aware of the disadvantages of purposive sampling as a non-probability and convenience type of design. The main one is that it cannot be used to confidently generalize the findings to the population, however as Sekaran (2003) correctly affirms, researchers as in our case, can be less concerned about generalizing than obtaining some preliminary information in rapid and low-cost way. Also the sample elements were chosen based on the belief that they represented the target population, but they were not necessarily representative which is valid according to Hair, et al. (2007). All these ideas if reviewed together can clearly reflect influence of the research philosophy chosen and already described. By not being able through this type of sampling to fully generalize our findings we are demonstrating the phenomenology approach used which focus in the in depth analysis of each unique setting. In the same way when selecting the sample in none statistically forms we are applying an interpretist viewpoint i.e. when studying a subjective
world it may be necessary to also apply subjective methods, in this case of selecting the participants for the sample.

In brief, when using a type of convenience sampling like *purposive sampling* we knew in advance that our findings would not be generalizable but as Sekaran (2003, p. 279) remarked “*convenience sampling types... sometimes may be the only viable alternative when quick and timely information is needed, or for exploratory research purposes*”. Bryman and Bell (2007) also state that when using a qualitative research strategy, the sample design decision should emphasize the theorizing opportunities rather than the statistical adequacy of the sample. Therefore we consider purposive sampling as the right selection of sampling design for our research. However we are conscious that if we had more time on our disposal for this research we may have chosen another type of sampling to obtain more general results.

**Data sources and participants**

Within the purposive sampling design that we undertook, a direct relation exists with the strategy for selecting cases and sources of data (Saunders, et al., 2003). Among these common strategies we have chosen the *heterogeneous* or maximum variation sampling option which enabled us to collect data and explain the key themes from different scenarios. The logic for this selection is in its ability to provide us the opportunity to identify emerging patterns between the samples and add value to the study (ibid).

Among the organizations selected to provide sources of data from the perspective of academic institutions, there are three universities from two different countries in North America. The two universities from Mexico and the one from United States are not only renowned in terms of quality education but also in activities of entrepreneurship and innovation contributing to the growth of the society and in some cases the entire country. A brief description of the academic institutions is explained below however some aspects are not mentioned to avoid the name identification of the university. This is not due to the fact of confidentiality like in the case of the two private companies or the specific names of the interviewees, but rather to avoid the generalization of the whole university stance with only one interview. I.e. we are conscious that with one participant we will not be able to simplify all the practices adopted in the university however it will help the purpose of this study. In addition we are also aware that by mentioning some unique highlights of the universities some of them could be identified by the reader, but again we want to clearly emphasize more the importance of the type of context rather than the name of the organization.

The first university in Mexico has 33 campuses throughout the country with another 42 technical schools, forming the second biggest network of learning institutions in the country just after the national university. Its learning strategy is totally oriented towards the development of students with entrepreneurial skills and thus it is involved in several types of innovation projects with current students, partners in the industry and alumni. The selected campus is one of the four located in Mexico City and the second most important at system level in terms of number of alliances and projects with industries within the region. The second university in Mexico has 3 main campuses in Mexico City, each one of them more focused in certain disciplines according to their staff and location. Although this university doesn’t have a known entrepreneurial culture, this is balanced with a strong and famous technological innovation in the local industry. We selected one of the campuses that is close to an industrial zone and therefore the activities involving innovation projects are widely known and practiced.
These two universities were chosen from Mexico which in spite of having different structure and funding i.e. one is a public institution and the other one is a private, for sure both have in common the element of innovation embedded in their culture. These universities are recognized for making a great deal of research in different areas and having projects linking universities and industry in entrepreneurial and innovative efforts; however in a country like Mexico where researchers are not encouraged and rewarded properly their innovation activities do not always achieve satisfying results. As we wanted to have other viewpoints from universities in the same geographical region, we chose a public university from the south of the U.S.A. which is also renowned by having a strong research department that collaborates with MNEs. Some of its most known projects are with electronic and high tech companies as well as sustainable development projects across the south of the country with other organizations and the government. Academic institutions from the United States are widely known to encourage more research and development of new technologies for later application on the industry which was a reason to select a university of this type.

From the perspective of industry, we chose two private multi-national companies from the food industry with offices and production facilities in Mexico. These two companies based their growing strategies on market expansion by offering innovative and quality products to customers. Although each company has a different target market and segments, they both agree that only through innovation in the current difficult times the companies will be able to gain new customers. The food industry in Mexico, as different to other types of industries that are more fashionable to other regions of the world, has the potential of many niche markets. These two food companies are aware that consumers will not be satisfied with other regions products or just a “tropicalization” of them and therefore they are always for the search of new products by any means.

The first company is dedicated to the production and commercialization of different types of cereals. Although it is not located in Mexico City but in a neighbour city, it also has a close involvement with the main industry and education centres in the central region of Mexico and thus it has an extensive number of innovation projects involving different types of actors. In some segments of the market it is a wide known leader due to its innovative products, however in other segments is constantly struggling to be the number one and therefore the necessity to continue innovating. The company has recently (5 years ago) created a specialized division of Innovation under the supervision of the Marketing department. This strategy is executed when the company realized that innovation should be prioritized as a core activity practiced more often and with bigger efforts.

The second company is dedicated to the production and commercialization of dairy products. In the same way it is also the market leader in the country and it has a wide variety of types of products achieved by creating innovative ideas for customers. This company is more focused on the strategy previously explained of customizing the products specifically for a region or the country and therefore emphasizing the innovation opportunities close to them. As its main offices are located in the centre of one of the commercial and financial zones in Mexico City, together with several academic institutions close to it, it has an strategic location to develop innovation projects with innovators ranging from normal customer to specialized communities of scientists in universities or research centres in the central region of Mexico.

We have also selected one nexus agency, a mediator between these two types of innovators. However as previously explained, the nexus agency per se is not a type of innovator, its main function is to integrate and coordinate the efforts between different types of actors in
the innovation process. This nexus agency is located geographically in a private university in Mexico therefore the entrepreneurial and innovation culture of the institution influences it indirectly but positively. In spite its location this agency works with other universities in the country, in fact it belongs to a network of similar agencies all around the country. Although the idea of having a third party helping integrate industry and university activities is not new, it is the formal structure of these agencies in Mexico. Nevertheless the nexus agency selected has experience in OIP, in the same way as the other organizations selected.

The selection criterion for the participants was based on the contribution derived from their professional background and the specific context useful for our study. Seven participants were selected and could be categorized based on their expected perceptions in three groups: companies, academic institutions and nexus agents. In the first group there were three participants, one current innovation manager, one former innovation manager and a brand coordinator in marketing department working constantly with innovation. In the second group there are three professors, each one with different innovation activities. One of them is more dedicated to research and investigation, another is committed to working practically with private companies to solve specific problems and the last one has strong liaisons with researchers and industry. The last group is only formed by one person based on a university which plays the role of a nexus agent or actually an integrator in the area of innovation between universities and industry. Although it would have been desired to interview more participants from this third group considering the contributions they might give us, we believe ourselves fortunate to have found one interviewee from this context.

Because of their high rank within the organizations they are in, there is a concern that interviewees might give us a more management related perspective where more emphasis is put on formal integration mechanisms. A clearer perception on ‘soft’ integration mechanisms would be more evident by interviewing the people from operational levels, like students participating in innovation projects under the supervision of our academic interviewees or subordinates of our company interviewees like project managers and developers. Consequently, this aspect would be taken into consideration in our analysis because of its potential influence on final results.

For clarification, instead of interviewing ten people from just one setting to increase and robust the sample we believe that for this exploratory study, more important is the potential of selecting a varied type of samples (Saunders, et al., 2003). Concretely, the rationale for choosing the participants from different organizations is to be able to compare and refine ideas regarding the integration mechanisms used in diverse contexts. Also it is important to mention that since the first e-mail sent to the participants and before starting the interviews, as Sekaran (2003) suggested, we clearly stated the purpose of the interview and we guarantied complete confidentiality as of the source of responses provided.

<table>
<thead>
<tr>
<th>Interviewee 1 (Int1)</th>
<th>Context</th>
<th>Position</th>
<th>Length of the interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Company</td>
<td>Innovation manager</td>
<td>48 min</td>
</tr>
<tr>
<td>Interviewee 2 (Int2)</td>
<td>Nexus agency</td>
<td>Liaisons coordinator</td>
<td>55 min</td>
</tr>
<tr>
<td>Interviewee 3 (Int3)</td>
<td>Company</td>
<td>Sales manager and former innovation manager</td>
<td>40 min</td>
</tr>
<tr>
<td>Interviewee 4 (Int4)</td>
<td>Company</td>
<td>Brand Manager</td>
<td>64 min</td>
</tr>
<tr>
<td>Interviewee 5 (Int5)</td>
<td>Researcher</td>
<td>Professor</td>
<td>58 min</td>
</tr>
<tr>
<td>Interviewee 6 (Int6)</td>
<td>Researcher</td>
<td>Professor</td>
<td>53 min</td>
</tr>
<tr>
<td>Interviewee 7 (Int7)</td>
<td>Researcher</td>
<td>Professor</td>
<td>61 min</td>
</tr>
</tbody>
</table>

Table 4. Participants’ contexts, positions and the length of the interviews
Type of data collected

Data are the facts and figures collected for records or any statistical investigation (Saunders, et al., 2003). Based on their sources, there are primarily two types of data normally collected for research purposes: primary and secondary data (Adams, et al., 2007). In our study we collected primary data as we needed to conduct new activities for gathering information on the aspects of interest for the specific purpose of understanding the integration mechanisms. As Sekaran (2003) highlighted, primary data can be interviews specifically set up by the researcher and whom from opinions may be sought on specific issues from time to time, just as the process we follow with our interviewees and was already explained.

Also we reinstate that the type of data collected in the interviews was purely qualitative and thus hardly to quantify with normal measuring scales. To explain the type of data collected, we can consider what Bryman and Bell (2007) stated that with semi-structured interviews, the emphasis is on how participants frame and understand issues and events. And for that reason, interviewees often give as main data their views for explaining and understanding events, patterns and forms of behaviour. Therefore the types of data collected through semi-structured interviews were mainly ideas, experiences and perspectives.

3.7 Ethical considerations

Since the beginning and throughout the whole process of our research we had a strong and clear ethical position. In general, we followed what Sekaran (2003) suggested, practicing ethical behaviour in each step of our thesis, accentuating the parts of data collection, data analysis and reporting. The ethical stance that we have taken could be compared with the Universalism, which is one of the social research ethics positions synthesized by Bryman and Bell (2007). The authors (2007, p. 129) defined it like “a stance that takes the view that ethical precepts should never be broken”, which is the guideline that we strictly followed in our research. Some research, especially using interviews as data collection method, may possibly use an “end justifies the means” stance, which claims that in order to get real, honest and unbiased information from the participants, it is necessary to break some ethical rules. However in our thesis it is not the case and we consider a fully ethical responsibility first because as Adams, Khan, Raeside and White (2007) affirmed, it is a way to do the work honestly and responsibly, and second because we are aware that ethical issues cannot be ignored because they relate directly to the integrity of the research (Bryman and Bell, 2007) but also reflect the integrity of the researchers.

The ethical aspects we considered for our thesis range from personal perspectives of moral learned in studying and working environments, to more specific considerations when writing an academic paper. For instance, all the material used in the our research as a secondary source like books, academic journal articles and other documents are properly cited and referenced to avoid any plagiarism. In addition, during our study the four main areas of ethical principles categorized by Diener and Grandall (cited in Bryman and Bell, 2007) were never transgressed: harm to participants, lack of informed consent, invasion of privacy and deception. The first three for the simple reason that all the interviewees accepted gladly to take part in the study and the last one, because of the deception avoidance aspects considered. These include most of the suggestions that Adams, et al. (2007) recommend to avoid fraud and deception in research. For example: properly selecting sampling, not biasing the interviews e.g. asking leading questions, not inventing
data or falsifying results, justifying the data elimination that does not fit in the study and in general have an unbiased analysis.

We also appraised Bryman and Bell’s (2007) view that in business research it is desired that researchers are aware of the ethical issues and concerns involved so they can make knowledgeable decisions. However regarding research made by students, they suggested that more attention should be paid to the ethical issues between the researchers and participants relations e.g. reciprocity and trust. In the same way Saunders, et al. (2003) remarked that ethics is centred on the appropriateness of the researchers behaviour in relation to the persons that become subject of the study. Consequently, to avoid affecting the respondents of the interviews, data confidentiality was assured as well as their anonymity. One reason is that some of the interviewees requested their organisations and identities not to be revealed for personal motives. Another one is that the findings of this research may include activities or processes sensitive to freely distribute them. Thus is clear that we did follow with special attention the ethics regarding our interviewees or as Sekaran (2003) reasoned, the ethical conduct of our interaction with the participants who provide data and information.

Finally an ethical aspect that we paid much attention to is the avoidance of obfuscation, which may not be so easy to identify and review when writing a thesis but indeed is needed. Adams, et al. (2007, p. 35) describe this term as “Obscuring the research findings by the reporting style—for example, by not highlighting the results that are important or those that the researcher does not like”. In our case, we were very conscious since the start of the research, about reporting the actual information and findings of the interviews even in the case they might look contradictory to our literature review conclusions. Also we established the rule of not trying to hide information or mislead the reader by writing a very verbose thesis full of specialised terminology (ibid) or long paragraphs with long unreadable sentences. In sum, this thesis was written firstly thinking on academic purposes but also on practical ones and for that reason during all our thesis we have consider ethics to achieve a reliable work that any type of reader might find authentic and interesting.

3.8 Summary

In this chapter along with our ethical position, we have explained our chosen research method and research methodology, which Adams, et al. (2007) affirm, are not the same thing. When describing our research method we showed the way our study was conducted and implemented and while explaining our entire research methodology we clearly defined the science and philosophy behind it. This is very important for several reasons; first it allowed us to understand the ways in which knowledge can be created and thus recognize why it might be flawed (ibid); second, it enable us to be critical and analytical about the knowledge searched and third, it provides the reader with the most important assumptions of how this study was developed in case they want to undertake a similar research. In essence we have followed what Kekäle, de Weerd-Nederhof, Cervai and Borelli (2009) suggested when writing a thesis, which is describing what is known about the chosen method and linked it to our study to show its suitability for the research question and thus emphasizing our selection of the proper methodology. For closing this chapter, we present Table 5 with the outline of the main characteristics of our research.

In sum, our thesis was carried out as a basic research with the purpose of an exploratory study i.e. to enhance the knowledge of integration in OI with empirical data. In order to understand the integration mechanisms in OIPs we have considered in our research
philosophy an interpretist viewpoint for the ontological part and a phenomenologist approach for the epistemological one. Thesis research is based on an inductive approach and it uses a qualitative method, more specifically semi-structured interviews as data collection technique. As explained before this method to gather information was useful for our research as we could collect not only the perspectives and experiences from the interviewees but also their attitudes and thoughts towards the research question. Due to the nature and scope of our research we chose a mixed research strategy which uses mainly the basics of Grounded Theory. It is clear, that the research is a cross-sectional study as the interviews were carried out only during a single point in time within the organizations. Regarding the sampling design, it is linked with the selection of participants who were not only aware of the field of OI but strictly who could provide arguments to understand the integration mechanisms occurring in it. For that reason we consider it a purposive sampling with heterogeneous participants, as they were chosen from different organizations and departments. Finally the ethical stance that we took during all our research was the one of universalism, which might sound strict but for us is a way to reflect the researchers’ integrity but also of the research itself. Once all the methodology elements are explained there is a clearer perspective of how this thesis was conducted so now we can proceed in the next part to show the analysis of the interviews undertaken.

<table>
<thead>
<tr>
<th>Research element</th>
<th>Chosen for this thesis</th>
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<tr>
<td>Type:</td>
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<tr>
<td>Purpose:</td>
<td>Exploratory study</td>
</tr>
<tr>
<td>Philosophy:</td>
<td>Ontology: Interpretist Epistemology: Phenomenologist</td>
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<td>Approach:</td>
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<tr>
<td>Strategy:</td>
<td>Mixed - mainly basics from grounded theory</td>
</tr>
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<td>Design:</td>
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<tr>
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<td>How? In what way? By what means?</td>
</tr>
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</tr>
<tr>
<td>Sampling:</td>
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<tr>
<td>Type of data collected:</td>
<td>Perspectives and perceptions</td>
</tr>
<tr>
<td>Ethical stance:</td>
<td>Universalism</td>
</tr>
</tbody>
</table>

Table 5. Characteristics of the research methodology for this thesis
CHAPTER 4: ANALYSIS AND FINDINGS

The general process to analyse the qualitative data collected in business research can have several approaches, as visible in the suggestions from the authors (Adams, et al., 2007; Bryman and Bell, 2007; Saunders, et al., 2003; Sekaran, 2003) considered to guide our research process. For instance, some of them remark the use of specialized computer software to analyze the data. However we believe this approach is not suitable for our research, first because this type of software may require a lot of time to learn to operate with and second because as Adams, et al. (2007) stated it would be more useful to use if we had more than 40 interviews to analyze. Being that we analyzed seven interviews, this number is still within the manageable amount and type of data to be examined with more traditional manual techniques. Besides, some authors (ibid) suggest that for the research type involved in a Masters level thesis, the data collected tends to be analyzed more by traditional means.

These traditional approaches for doing qualitative data analysis (QDA) can also vary from one author’s model to another. However, most of them comprise more or less the same basic stages or steps needed for drawing results. In our thesis we first picked up general ideas from some of authors to understand the best way to analyze our data. For example, we paid attention to LeCompte (2000) proposal of five clear steps to reduce the data and make discoveries; these are tidying up, finding items, creating stable sets of items, creating patterns and assembling structures. We also considered what Hair, et al. (2007) mentioned about the QDA framework developed by Miles and Huberman, which consists of four main steps: data collection, data reduction, data display and drawing and verifying conclusions.

Although these models would seemed useful for our purposes, we agreed more with the idea of the QDA process described by Seidel (1998). We chose his proposed process which is an inclusive, possibly generic, model because of its clarity and logical steps. The model shown in Figure 5 is centred in three main activities of the qualitative data analysis process done by the researcher about important things: noticing, collecting and thinking. There are also three rectangle shape boxes that represent the three basic processes undertaken: examining the interviews transcripts, coding the interviews and looking for segments of relevant data.

A flag box symbolizes the analytic “discoveries” found during our QDA process which is a distinct stage from the report findings. This is clear with the other two figures in light green, the box/arrow representing the interviews to collect data and the papyrus corresponding to the findings. Both respectively represent the entry and exit points of our QDA process. The model also illustrates that the qualitative data analysis process is not linear i.e. there are iterative and recursive aspects in the process that allow going back and forward as needed.
What we considered more important about this model, is that grounded theory, a very common strategy for analysing qualitative data (Bryman and Bell, 2007), can also be encompassed by its basics stages. For example, Seidel (1998, p. 6) exemplifies how in a discussion from grounded theory by Corbin and Strauss, three main parts of his QDA model can be found: noticing interesting things in your data, collecting sets of those interesting things and thinking about those things. For this reason among others, we considered to follow this model as the best option to analyze our interview transcripts and report our findings.

4.1 Preparing data for analysis

Interview transcripts edition

As suggested by several authors, it is important to first prepare the data before attempting analysis. Thus our first task after conducting the interviews was to make an inventory of the interviews in form of transcripts and to print them in order to mark some comments and notes. Hair, et al. (2007) stated that when transcribing interviews in the QDA process, as researchers differ in their resources, assumptions and objectives, it is valid to transcribe only portions of the interviews. We agreed with this idea and for that reason a first filter to reduce the quantity of data to a controllable amount was to only transcribe the parts of the interviews strictly related and relevant to our research objective. We also organized and shared the individual memos and notes written during the interviews, as Bryman and Bell (2007) suggested, to help us in the coding process but also to remember ideas at the moment of the interviews that might generate potential concepts and categories.
Another important aspect before the analysis was to understand and agree in a type of coding in order to focus on meaningful aspects of our interview transcripts (Hair, et al., 2007). As we already had a theoretical framework as a basis to assess which integration mechanisms may be present in OIPs, we began assigning coding units to each of them.

This was a vital task for two reasons. Firstly, as the authors (ibid) remarked, properly selected coding units can enable the researchers in an easier way to link the data with topics, themes, concepts and other types of abstractions. Even though this was simple due to our familiarity with the mechanisms, it was needed as our next clear goal was trying to obtain data using this type of coding and eventually categorize it.

The second and probably more important reason is that the coding units selected were useful for both researchers to have a standardized way to examine and analyse the transcripts. It is crucial to mention the nomenclature of the theoretical concepts, shown in Table 6, because it relates to the fact that during the analysis part we consented to proceed individually in reading and coding the interviews. After each researcher had read, examined and coded all transcripts, it was possible to compare both sets of coded data. In doing so we established that there were no greater inconsistencies in identifying and coding the mechanisms. We believe this notion contributed in lowering the level of biasness from our part and as the outcome the coding is more reliable for subsequent parts of our study. This relates to the aspect of trustworthiness and reliability of our analysis which will be explained in more depth in the following section.

### Table 6. Theoretical Concepts Nomenclature

<table>
<thead>
<tr>
<th>Integration Mechanism from TF</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Centralization or decentralization</td>
<td>OT-CEN</td>
</tr>
<tr>
<td>Output and behaviour control</td>
<td>OT-CON</td>
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<td>Lateral or cross-departmental relations</td>
<td>OT-CROSS</td>
</tr>
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<td>Departamentalization</td>
<td>OT-DEP</td>
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<td>OT-FORSTA</td>
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<td>OT-INFOCOM</td>
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<td>RD-INFOTECH</td>
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<td>Innovation Ecosystem</td>
<td>OI-INNOECO</td>
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<td>OI-INNOTECH</td>
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<td>OI-NEX</td>
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<td>OI-ORGID</td>
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<td>Sociable system for knowledge sharing</td>
<td>OI-SOCSYS</td>
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<td>OI-STAKE</td>
</tr>
<tr>
<td>Visibility tools</td>
<td>OI-VIS</td>
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</table>

#### 4.2 Coding the data: searching for segments and categories

The coding in qualitative analysis can also have several approaches and techniques. For example, some authors (Bryman and Bell, 2007; Saunders, et al., 2003) emphasize the use of open, axial and selective coding. Charmaz (2002, cited in Bryman and Bell, 2007) defines only two main forms of coding: initial coding and focused coding. However all the former types of coding practices align more with a pure grounded theory strategy, which we did not use in order not to restrict our examination techniques and thus having a more flexible route to analysis (King, 2004, cited in Saunders, et al., 2003). Therefore, for this task we applied other types of methods and process, mainly because the model proposed by Seidel (1998) illustrated in Figure 5, did not specify a technique to code the data or a method to identify and define categories. An overview of the main coding and categorization process employed is illustrated in Figure 6. It is an adaptation from Creswell (2002) coding process used in inductive analysis made by Thomas (2003, p. 6), which in principle matches with the inductive approach stated in our methodology.
The process consists of six steps that can be used together with other methods as later exemplified. But in essence the basic process is straightforward and it initiates with the reading of the interview transcripts by each of the researchers. While reviewing the documents, some annotations and marks were made first to identify segments with relevant information. We centred only on elements related to OIPs i.e. focused on our research purpose, instead of regarding every single one of them. At the same time, in step # 3, we summarized the main idea of each of the segments also with the help of marks and notes but trying to write a label in form of just few concrete words. After this, in step # 4, we use the basics of another procedure to analyze qualitative data, called Template Analysis (King, 2004, cited in Saunders, et al., 2003). We took its basic idea of combining deductive and inductive approach in some extent, in the sense that codes can be predetermined and then modified as the analysis progresses. In our case, we had predetermined integration mechanisms obtained deductively by using existing literature and theory before starting the data collection and analysis. Therefore we managed to interpret the segments and the labels to fit their main concepts in one of our pre-established categories and then assign them one or more of the nomenclature codes previously shown in Figure 6.

In particular, steps 1 to 4 have two important considerations which are represented with the arrows forming a loop. The first one is that the steps were done almost at the same time, this for the reason that Hair, et al. (2007) mention, it can be useful not to lose the whole context of the reviewed concepts i.e. to see the big picture. The second relates to the fact that we followed this loop three times. The first time was done as the initial individual task of the analysis, the second time to review the annotations and marks of our thesis partner to add personal comments and the third time between both researchers to compare the two sets of transcripts. By doing so, we not only explored relationships between categories preparing for the next steps for the process, but also enhanced the reliability and validity of our analysis and ensured that both researchers were satisfied with the partial results.

The fifth and sixth steps were done similar to the last steps in the sense that both researchers consented in each part of the process. There were other procedures between steps 5 and 6 that are not presented in Table 6 to avoid visual saturation. However we did undertake them to get credible results but are explained and synthesized further, as they fit to the findings section. In brief, in the first steps of the process we coded the transcripts and through constant comparisons of concepts, the data was categorized appropriately. The main objective of reducing our data to a manageable quantity was achieved but at the same time we tended not to eliminate relevant information for our research.
4.3 Data display and analysis supporting the findings

During the data coding which was done by using the pre-established categories we obtained from our literature review, we noticed some of the partial findings of our study. This task is related with step #5 in which we identified six categories that did not fit in any of the categories determined by our theoretical framework. These new 6 categories are described in more detail in section 4.4 where an overall synopsis is given of the mechanisms found in the contexts studied. However this new categories were not present in all or most of the interviews, as other 21 categories, which then opens discussion possibilities.

After the identification of all the potential categories, 21 predetermined plus another 6 new ones, we needed to summarize them in a proper way including the variables associated to them. Having this in mind, we applied the basics of data display and analysis approach developed by Miles and Huberman (1994, cited in Saunders, et al., 2003) as an intermediate method between step 5 and 6. The approach involves organising and gathering the reduced data into visual displays that can help to recognise relationships and patterns in the data as well as drawing conclusions. They remarked on two main types of data display: matrices and networks. Considering the type of data obtained when examining the transcripts we decided that a matrix was the most suitable data display. This matrix is illustrated in Table 7, which summarizes the integration mechanisms, its corresponding codes and the number mentions in the interviews. Organizational context is also shown of each interviewee: private company, academic institution and nexus/integration agency.

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Table 7. Matrix of results including new categories found from the interviewees
Another visible arrangement in the matrix is the division between “soft” and “hard” mechanisms. We agreed to use this classification as all the categories found fitted into one of these labels. The common criterion used to catalogue them was basically the difference on how formalized, structured and controlled each category was perceived in the interviewees contexts in general. It is important to mention that this table and its divisions/classification are the final result of a considerable time spent on discussion of possible options. In fact, this is supported by the display and analysis technique (ibid) employed by us, in the sense that when building the matrix, it helped us to develop our analytical thinking as we worked through several iterations to develop a visual form that represented our data well and easily.

Once the matrix was created we explored the relationships between the categories, thus premises about the connections between them emerged. The idea that most of the integration mechanisms seem to overlap in or have very similarly related concepts and examples brought forth the opportunity to group them within a concept with higher order of abstraction. This idea, suggested by Hair, et al. (2007) is useful firstly because higher order patterns are extracted from the data and second because the end result of the data display step can be a preliminary final opinions. Therefore the result was the creation of 5 core categories: social, technological, organizational, operational and environmental. We confirm that the matrix was useful to compare the variables, identifying any possible associations that may be formed between them and create new categories. In addition, it was also useful to start forming conclusions.

4.4 Discoveries: identified OI integration Mechanisms

4.4.1. Organizational Mechanisms

This core category includes all the mechanisms related to the subject of an organisation. These include departmentalization, centralization or decentralization, new organizational identity, lateral or cross-departmental relations, visibility tools and strategic prioritization.

**OT-DEP: Departmentalization (8)** – Reference to departments as integrators in OIPs has been brought up by five interviewees. The R&D department has been mentioned as having an integrating role in OIPs by being “responsible of gathering all the advertising agencies, suppliers (flavour, packaging)” (Int4) and bringing together all innovation conceptualisation efforts after which “process continues with the Internal Development departments, which create and develop the product” (Int1). In academic world, special university departments have been identified as integrators between the industry and researchers: “there is a special unit here in the university in charge of linking up universities projects with external actors, as for example enterprises” (Int5).

**OT-CENDEC – Centralization or decentralization (4)** – Whether the decision-making authority is in the lower or higher levels of the command chain, the four of the interviewees have briefly referred to it in several forms as an integration mechanism. In industry it was identified in statements like “The innovation process could be seen like happening in several branches” (Int1) indicating on each of their ability of decentralized decision-making. It was also evident through “international meetings in headquarters ... where top management gather with the ‘developers’ and innovation personnel” (Int3) with a purpose of deciding on future innovation course as well as corresponding resource and effort allocation. In academia, interviewees made reference to the fact that when the industry/researcher contact is done by the university certain decisions go through that
institution, whereas when the contact is established directly between the industry and the researcher, the decision-making is more decentralised.

**OI-ORIGID – New organizational identity (3)** – Only two interviewees have brought up the establishment of a new organizational identity. Once the company decided innovation was a way to grow in their industry, a department that previously did not exist was formed. “Innovation Department was created to make a more committed area and team to pursue innovations as opposing to how the things were previously done” (Int1). Consequently, this evoked considerable modifications in the way their innovation process was integrated: “That is when we moved from using external agencies to using our own innovation department exclusively” (Int3). In this sense, a redefinition of organisational identity, though radical and not frequent in occurrence, can significantly affect the way integration in OIPs is achieved.

**OT-CROSS – Lateral or cross-departmental relations (43)** – All the participants pointed out this integration mechanism in several occasions making it the third mechanisms most mentioned in the interviews. These were mainly related to various types of collaboration efforts and activities between departments or the formation of multidisciplinary teams. For example, one of the interviewees mentioned a multi-region team of 10 people in charge of linking innovation globally and responsible for transferring new ideas. Most of the participants mention the constant interaction with other innovation areas from other companies, associations, institutions but the common denominators was the relation with an innovating counterpart or similar. The three participants from the companies mention the existence of a part time committee or in charge of monitoring the integration activities done in OIP. The nexus agent mentioned being a full time integrator working closely with researchers from universities and scientists and managers from private companies, which tend to have communication issues.

**OI-VIS – Visibility tools (29)** – Although not mentioned as frequently as some other mechanisms, the interviewees have emphasized the use of visibility tools in OIP and their role as an integrator. “It is very important to have a systematic view of the problem. You need to understand the whole process... and be aware of and completely understand the value that each of different areas involved can add to your project.” (Int1) One of the visibility tools used are so called ‘innovation calendars’ which are constantly updated and uploaded “globally to all innovation departments in all the countries. That way, innovation departments can easily see which innovations and which projects are being worked on” (Int4). Further on, continuous meetings, reunions and communication was mentioned with a goal of showing “who is doing what and what is happening in different branches” (Int1). Another visibility tool is a ‘Groupier’, a person that is constantly travelling around “to assure that all the regions are aligned and that we are not spending double resources to creating the same things” (Int3). The use of IT has also contributed to the overall visibility where “projects have collaborative site where they post all their documents” (Int2). Another way of ensuring visibility is the manner in which the communication during OIP is done and was described by an interviewee as being “very simple and transparent” (Int5) emphasizing the importance of “communicating the innovation properly” (Int5).

**NW-SPRI – Strategic prioritization (5)** – Two interviewees who work in the industry have identified Strategic Prioritization as what they also perceive as an integration mechanism. Their companies presented a clear attitude that the innovation is the way to grow. Following the policy “do whatever it takes to find the best innovation” (Int3), innovation projects are given the priority over others. Consequently, they invest heavily in R&D and chosen innovation projects are the focus of all company’s resources. “If the company states
that we are only going to pursue innovation for example in cereals, the whole company focuses to develop innovations for only that category. Also, specific brands of the category can be prioritized and the company will concentrate all its efforts on it” (Int4).

**OI-FLEX – Flexibility tools (36)** – The need to be flexible in their processes has risen in the interviews on a part of all interviewees. They emphasized that the structure and the project itself has to be flexible in order to accept various inputs given at any stage of the project; being that because of the nature of OIPs this will most likely be the case. The interviewees from the companies stated that these inputs might also come “from employees from totally different and unrelated areas to innovation” (Int1). Mentions were also made that they “do not have much processes or very strict way of doing things,” (Int4) which is all a part of creating an “environment that makes ideas flow” (Int4). Nexus agency expressed the need to be flexible in order to successfully cooperate with various institutions. Researchers, on the other hand, emphasized how important it is for them to be able to adapt the technology they are working on “to the characteristics necessary to give a proper solution to the company, the idea is to be structured but not so rigid and allow certain degree of flexibility from our side. We want to be able to react accordingly to the necessities of the industry” (Int7).

**4.4.2. Social Mechanisms**

The following are integration mechanisms related to social aspects including informal communication, socialization, horizontal structures, informal leadership and stakeholder involvement.

**OT-INFOCOM – Informal communication (38)** – One of the most frequently mentioned integration mechanisms in the interviews was informal communication amounting to 38 references in total. The company interviewees emphasized the importance of face-to-face contact among the employees which enables not only the hard information exchange, but also a more personal sense of the subject in question and potential development of collegiality and common objectives. This is what they believe helps in ‘connecting the dots’ and bringing the right people together for a certain innovation idea. Further references were given on importance of creating informal connections that can prove to be highly beneficial for business. Nexus agencies made mention that owing to informal communication, they’ve been able to skip certain steps in their usual procedures, get things done much faster and also get in touch with people through informal channels that later on proved to be valuable for the project. Researchers stated that “through informal channels, the companies already know the people who could work for them on innovation project” (Int5). When referring to the expositions and conferences organised with the purpose of presenting certain technology to the companies, one of the researchers mentioned that attendance on these events is usually ensured “through informal channels because the university has already established ties that help connecting this type of projects with the companies” (Int7). Another reference to the importance of informal communication was made during the project. “When there is a complication of any kind, the formality we have goes really low so the tension doesn’t ruin the negotiations or the solution related activities” (Int6).

**OT-SOC – Socialization (45)** – In the interviews socialisation proved to be a rather frequently mentioned mechanism. Most of the references were made of how important the activities that develop and enhance the environment of shared strategic objectives are. “We take courses, trainings, and lessons about how to improve our creative thinking and it is for everybody: for finance, marketing, R&D, for all departments... and we always try to
encourage this in our suppliers and in our clients” (Int4). Additional activities involve design and nutrition fairs, various contests where the best ideas from employees are rewarded, so called ‘new ideas sessions’ where a completely open communication is encouraged, ‘innovation day’ which gathers not only employees but also suppliers as well as customers in a combined effort to form new ideas. Nexus agency expressed similar efforts to involve researchers and make them more interested for certain projects. Researchers who work on an innovation project in a company stated that they usually get into previously formed teams; they get to know the members, bond and develop common objectives. Another type of socialization mentioned was a form of an exchange program called ‘Faculty Summer Program’, where they “spend a summer in a company or in a government facility and get to know and work on some of the projects they are doing” (Int7). ‘Tables of innovation in technology’ also came up as a social activity connecting academia with the industry.

**RD-HOR – Horizontal Structures (18)** – This mechanism seemed to overlap with the cross departmental relations (OT-CROSS) mechanism since it also includes task forces with temporary assignments, as stated by some interviews. However the difference is substantial in two aspects. First, in total it was only mentioned 18 times in 6 interviews. More than 50% of these times it was just mentioned by 2 participants showing its medium-low application. Second, the interviewees described these types of teams as mixed i.e. not only from different organizations but also from different areas. Only one interviewee mentioned this mechanism adds much complexity to the process, but all of them agree the complexity is bearable if allowing proper integration. A combined idea of this mechanism was stated by one of the interviews stating that: “there are a lot of inputs from different areas... we use any kinds of ideas to improve the integration of our process, not only with innovation experts but with people from any place, we are totally open for suggestions” (Int4).

**RD-INFLEAD – Informal leadership (20)** – The findings on informal leadership are related to the individuals that were identified by the interviewees as having a certain influence on decisions made even though they do not officially hold a decision-making position. This may be due to their expertise or dedication to the project. The fact that these companies function on ‘open doors’ policy and virtually anyone can give an idea for an innovation project, reflects on an opportunity for people to think ‘outside the box’, “the idea is if they feel that the company is open for their suggestions, they are encouraged and more likely to take initiative” (Int3). The researchers stated that the “decision-making always has to be made by group consensus. “We are working mainly on engineering projects, and because of its nature we have one responsible person for each area, however at the end, all the stakeholders also participate with their opinions and feedback” (Int6). By delegating certain responsibilities to their students, the researchers feel that “they contribute and feel a part of the project which makes them take ownership of it... One of the main goals we want to obtain is for students to challenge the status quo of the technology in the industry and see how they can improve it. (Int7)”

**OI-STAKE – Stakeholder involvement (46)** – The total number of 46 mentions in the interviews indicates on interviewees’ strong identification of stakeholder involvement as an integration mechanism in OIPs. Many of the references were made on gathering all suppliers and advertising agencies with the purpose of conduction brainstorming sessions. “We involve people from many different areas in these brainstorming sessions. These areas can be internal and external. In the sessions we invite R&D department, all our advertising agencies, our Suppliers, like our Flavours suppliers and package suppliers” (Int1). A strong customer orientation was also very evident by the amount of customer involvement in innovation conceptualisation, mainly during market research and testing of Pilot ideas. In
addition, referring to the activities encouraging creativity, one of the interviewees stated that “we always try to encourage this in our suppliers, in our clients; in every other contact we have in the company” (Int4). As for the researchers, one of them stated that the idea he had for a highly innovative project originated from an “objective of social benefits in the community, based on the society needs” (Int6). The conferences the academia organises are mainly having for a purpose to involve the top management and “get them interested in a certain technology” (Int7). Referring to the importance of stakeholder involvement, one of the researchers stated that “the company should be really involved in the project, it needs to be there. It happens frequently that the people from the companies don’t like to be involved, but we consider it necessary and later on the company also realizes it was necessary in order to achieve good results. Also a main aspect right now is that companies want to practice Corporate Social Responsibility. So we did involve in the project to the managers and the responsible of certain areas in a model we call ‘Enterprise tutors’, in which they give coaching to certain students” (Int6).

4.4.3. Technological Mechanisms

These mechanisms underline the use of technology in the purpose of integration. We identified information technologies, innovation IT infrastructure and compatible technology infrastructure.

RD-INFOTECH – Information Technologies (13) – All of interviewees reflected on the use of Information Technologies in their efforts to organise and coordinate their activities in OIPs. These mainly included mentions of the use of the telephone, fax machine, corresponding through e-mails or communicating through conference calls or net meetings. One of the researchers stated: “We use everything! We use everything, all the available resources to coordinate and integrate the efforts of our team. We have just invested in a brand new telecommunication system. Originally we start using systems of virtual forums on Internet, electronic agendas, emails, mobiles, everything to enhance the communication” (Int5). Though it might be expected that the number of mentions of this integration mechanism would be much higher, its utilization is very often considered as a given, being that the use of information technologies is a part of our everyday lives.

OI-INNOTECH – Innovation IT infrastructure (11) – This integration mechanism includes more sophisticated forms of IT which interviewees indentified to be maintaining databases; the use of a “specialized software available on Intranet, which is used in all the offices of the company throughout the world, to promote sharing of ideas and innovation” (Int1), and creating a worldwide portal in the Intranet where “if an employee has an idea that he thinks should be realised and commercialized to cover a customer need, he can uploaded it” (Int4), this kind of systems have inside orientation, but mentions were also made of a similar type of the system which is oriented towards the outside environment: “we are developing a sort of market place on the Internet, as the ones some companies formed in order to post some of their problems to the public saying ‘We need a solution for this and that, we’d like some ideas’. In this way they generate ideas and choose the ones that are appropriate for their needs, and I think that this kind of model will also be useful for us” (Int2).

NW-TECINFR – Compatible Technology Infrastructure (6) – This integration mechanism emerged when one of the researchers mentioned the necessity of having a compatible technological infrastructure in order for the machines they develop at the university laboratories can be integrated with the technological system already present in the company. “Depending on their existing technological infrastructure, we use an appropriate
approach in the way we work and make some adaptations. We always tend to customize the technology, designs and the solutions in general for each company and here is when the real innovation takes place” (Int6). After indentifying this mechanism, we realised there are similar patterns in events described by company interviewees. When asked about the way they innovate with their suppliers one of the interviewees said that they “give them the ‘white mass’ (like plain yogurt) and supplier mix it with the fruits and the flavours; and they give us their own proposals” (Int4). The ‘white mass’ has a certain balance of lactose and bacteria and the flavours developed for it have to be dosaged in a way that the blend gives an optimum in taste and nutrients. By giving their suppliers a ‘white mass’, they are ensuring that the suppliers are using what was here identified as ‘compatible technology infrastructure’.

4.4.4. Environmental Mechanisms

In this core category we included the mechanisms related to the aspects of internal and external environment. These include nexus agencies, innovation ecosystem, sociable system for knowledge sharing, government incentives, specific trading controls and environmental exchange.

**OI-NEX – Nexus agencies (14) –** The use of nexus agencies was evident in interviewee statements of both industry and academia. The interviewees from the companies referred to the use of specialized agencies in their innovation projects, first in idea conceptualization phase when advertising agencies are used for indentifying market trends: “The agency helps us measure the thermometer of what is going on outside” (Int3); as well as in market research sessions conducted with their consumers: “These sessions are mainly made outside the office, through a third party agency that works as a moderator to conduct the sessions and organize the efforts... The agency was not the one giving the new ideas, but just supporting the process of innovating” (Int4). The interviewees expressed their opinion that they “should do it more often... because they provide certain innovation guidance” (Int2). Academic researchers often referred to a special department or unit within the university which had a role corresponding to this mechanism. “There is a special unit here in the university in charge of linking up universities projects with external actors, as for example enterprises” (Int5). As for using other external agencies specialized in linking researchers with industry on global level the researchers said that “this would be really useful, and it is justifiable in terms of costs which is of secondary importance being that the project can get the monetary resources as long as it attains benefits to the overall project and fulfils a need for the industry. But we would certainly need to see the profitability” (Int6).

**OI-INNOECO – Innovation Ecosystem (11) –** Interviewees from companies made mentions about an existence of a “global unit where they work and develop new ideas for the company, and they evaluate them”, the description given of this unit and its interaction with the industry, numerous suppliers and other actors in innovation process indicates on what we identified earlier as an innovation ecosystem. On the other hand, about working for an industry project in University’s facilities, one of the researchers stated: “I consider the factory-school itself also as an integration instrument. Mainly because it is a dedicated facility just for this project in which the students learn but also implement their knowledge and are in a closer contact with the companies. Therefore the integration results between the university and the companies are really visible in this place. One way of seeing it is that the activities done and concepts developed by students in these installations totally relate with the companies’ necessities and at the same time with the subjects that the students need to learn in school and in practice. And in general, the staff involved in the work in this
factory-school is people like me who coordinates the activities” (Int6). Another researcher also stated that, when invited in an organization to assist on a project, there is usually an innovation ecosystem set in place.

**OI-SOCSYS – Sociable system for knowledge sharing (25)** – Interviewees emphasized the importance of the activities conducted in their organisations in order to enhance creative environment. Some of them are like ‘Innovation Day’ where all the stakeholders (employees, suppliers, clients,) are gathered with the purpose of presenting their ideas. In addition, there are field activities, “we go out of the office to the supermarkets and interact with customers, or in the suppliers facilities to try to cultivate and encourage creativity” (Int4) and also a supported attitude of “sharing of ideas on different levels” (Int3). Collaboration with what could be described as indirect competitors was also referred to, where jointly they developed and launched a product that harmed neither of these two companies’ products but instead simply fulfilled a new customer necessity. Nexus agency interviewee stated that they maintain a “collaborative site for knowledge sharing” (Int2) where company representatives can present their problems and the researchers can search for the ones that best correspond to their expertise and offer solutions for it. As for the researchers, one of them stated that when working on a project there is an undeniable social environment that supports the knowledge sharing, otherwise the project wouldn’t go anywhere or the progress would be extremely slow.

**NW-GOV – Government incentives (6)** – According to three interviewees, the federal and state governments may also play a role in the innovation process and how well it is integrated among different actors. Currently there are some mechanisms that support agreements between the governments, universities and companies, in the way of funds and tax reductions. However, not all of them are very attractive, for example companies may want to invest in other projects rather than in OIP or the researchers may not be remunerated properly. On the other hand, two of the interviewees from public universities affirmed that when private companies are aware of the tax incentives that certain innovation projects can attain, they use more resources on it to integrate it better with the university efforts and of course to the company strategy. They said is a difficult task to initially convince them but once they realize of the benefits they can start new and every time better integrated projects.

**NW-TRACON – Specific trading controls (2)** – Two interviewees referred to the possible control and restrictions that the government or industry can impose over the innovation on some products and services. For example, some raw material may not be exported to the country and thus neither the final product, therefore all the development has to be done locally with the available resources and actors. However both interviewees describe this issue instead of being a negative aspect, as an opportunity to work more together and integrated with other actors in the innovation process, e.g. their suppliers. One interviewee said “If you know you cannot bring all the products from other regions, then you know that you need to be more creative, always thinking in your own market and thus you need to work closely with the people that help you innovate” (Int4). The respondents expressed this mechanism as being out of the control of the organization but as a part of an external structure or a macro-system that if approached correctly can support the integration of several open innovation actors.

**NW-ENVEX – Environmental exchange (3)** – This integration mechanism looks similar to the practice of managers’ exchange belonging to the Socialization mechanism (OT-SOC) however the three participants confirmed some differences. The company interviewee mentioned that the practice of sending managers abroad to lead projects and get training is
not unusual but the breakthrough is the specific reason of sending a manager in a long stay for an open innovation project. I.e. the managers need to be in an external environment where they need to interact and integrate properly with their counterparts in order to achieve an innovation. The same idea was revealed by two interviewees from universities, stating that special programs with long stays e.g. more than two months, within companies or any type of organizations are more integrative activities because the people needs to be focused only on innovating with their teams.

4.4.5. Operational Mechanisms

The mechanisms in this core category refer to more technical aspects of innovation phenomena which are visible in the process of its materialisation. These are: formalization and standardization, planning, output and behaviour control, planning and process specification, learning curve techniques, flexibility tool and formal leadership.

OT-FORSTA – Formalization and standardization (20) – When asked about the innovation process in their respective organisations, the interviewees from the companies made statements like “the process is the same in all product brands” (Int4) while the researchers, reflecting on their experience of working on projects for numerous companies said that “the innovation process is about the same for in company” (Int5). Both types of statement indicate on a presence of formalization and standardization integration mechanism. Though often considered as an inhibitor of creativity the interviewees made some comments why it is necessary, a company interviewee stated: “we do have standardised process and formalities as any other business... just like in all companies, you can’t jump this process because they act as security locks to avoid errors” (Int1); while an academic researcher said “In reality this factory-schools are an extension of the education system of the university, and for this reason the main or basic activities practiced there are really well organized and standardized” (Int6).

OT-PLAN – Planning (12) – Planning came up during the interviews made with the people from the companies in form of feasibility studies when testing whether an idea is possible or not. Further on, mentions were made on more concrete planning for the project itself, “if you don’t do it in a very organized way, then for sure there will be a waste of resources” (Int3). An impressive amount of planning was evident in an interview with the nexus agency. As a mediator between the industry and researchers, the nexus agency took upon itself to develop economical proposal, first “discussing with the researchers and estimating how much effort they will put in, what kind of material they need and so forth... and what is its worth on the market ... if the client is interested in the proposal made by the researcher, we have to make a detailed project plan with schedule and according to that put together all needed documents and administrative statements in order to make a formal contract or collaboration agreement” (Int2). Researchers also referred to planning in form of making a schedule presented to the company they do the project for as well as to an extensive internal planning within the project.

OT-CON – Output and behaviour control (15) – We identified this mechanism in numerous interviewee statements related to the dynamics of reporting and report system they are working in. The setting of the goals and time limits: “we have very clear targets and a defined time frame to achieve them” (Int3). By setting the contract deliverables, nexus agency is also putting in place controls against which the progress of the project is measured. “We also check if the project goes smoothly, which means we check the time, how it is developed and if they are on time or not on time, and organize different meetings,
sometimes we have to make minutes of the meeting and guide them through the process” (Int2). Financial statements also came up as a monitoring tool. In academia, researchers often mentioned that they are keeping the students working on projects under constant supervision “I’m overseeing what the students are doing... they report to me every week or every two weeks” (Int5). Confidentiality agreements are also indentified as a control instrument. Consideration was also given to the time-management even though researchers have a certain amount of freedom “I just have to give deliverables on time” (Int7).

**RD-PLANSPEC – Planning and process specification (18)** – Planning and process specification was also indentified as an integration mechanism by the interviewees. The interviewees from the companies associated it with the need to “write and define really clearly concepts to our customers” (Int1) and when doing the marked research, the company that is in charge of it is provided with “a list of very specific questions we want to ask them” (Int4). The nexus agency interviewee emphasized the importance of having “the problem very well defined” (Int2) and being that, as mediators between the researchers and the industry, they are in charge of drawing the contracts, they are primarily concerned with defining the specifics of “where the project needs to go, what kind of result are expected, what and when needs to be done and who is going to do what” (Int2). The researchers also reflected on need to “discuss the research topic and the deliverables they want to have, what it is specifically that they want you to do, when they want you to report on that, for how long, how many years and how much money they are going to give you” (Int5). Another form of planning and process specification was evident in another researcher’s statement about delegating duties and responsibilities to the students “I assign them a very specific part of the project and tell them ‘In 1 month I want this done’” (Int7).

**NW-LECU – Learning curve techniques (4)** – Three respondents mentioned similar aspects related to using the previous staff experience to help them integrate their processes and do them more efficiently. However we clarify that this mechanism is not associated with the expertise that a new people entering the team could add to the process, but to the knowledge that is transferred informally from one person to the other to share the know-how of specific techniques and procedures that allowed innovation. For example, the interviewee from the nexus agency exemplified saying: “sometimes there are small simple innovation projects that can be done in a faster way than a more complex one, because you already know how to do it” (Int2). The other interviewees also mention that due to the knowledge of some type of OIP, they can have the opportunity to skip some of the steps without losing the integration and control perspective as well as achieving the same results.

**RD-FORLEAD – Formal leadership (33)** – According to the interviews, formal leadership proved to be an important integration mechanism. Company interviewees frequently referred to the formally appointed persons in charge of coordinating innovation activities and bringing people together. Most obvious reference was that “the director in Mexico ensures that all the innovation projects are aligned to the marketing projects, which allows him to have a wider vision of the strategies for getting to our customers” (Int1). They have employees officially in charge of maintaining constant contact between the branches and the transfer of new concepts between them. More concretely, they named a group of ten people located in each major centre of innovation who are responsible for their global distribution and coordination. There are also “specialized teams and people in charge of taking unusable ideas out of the company” (Int3). Researcher stated that when working within the company they usually have a formal authority in a form of a project manager who is in charge of coordination and resource provision. On the other hand, when forking for the companies in University laboratories and facilities, they are usually the ones officially appointed as leaders to guide the team as they see appropriate.
4.5 Summary

Our analysis was made using a combination of different methods and techniques which are not exclusive. The reason for this was in achieving a reliable result, taking into consideration the type of the research and collected data, and at the same time based on formally known and accepted analysis processes. However, we focused on a straightforward coding process with six clear steps of initial reading through the interviews, identifying and labelling specific segments into concepts and categories, categorisation according to theoretical framework and creating a corresponding model.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Integration Mechanisms categories</th>
<th>Code</th>
<th>Core Category</th>
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<td>Informal communication</td>
<td>OT-INFOCOM</td>
<td>Social</td>
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<td>Socialization</td>
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<td>Horizontal Structures</td>
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<td>H</td>
<td>Compatible Technology Infrastructure</td>
<td>NW-TECINF R</td>
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<td>H</td>
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<td>NW-TRACON</td>
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</tr>
<tr>
<td>Int</td>
<td>S</td>
<td>Environmental exchange</td>
<td>NW-ENVEX</td>
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Table 8. Summary of integration mechanisms classified in the five new core categories

The main outcome of the coding process and in general of the whole qualitative data analysis approach undertaken was the identification of new mechanisms and creation of five core categories summarizing them all. This is aligned to Seidel’s (1998) idea that a good coding in a QDA process should yield between three and eight final categories. The distribution of integration mechanisms in the five categories are shown in Table 8. The five core categories, in our perspective, encompassed the most important ideas from the ‘raw data’ and thus provided the foundation to discuss them further given our research objectives. Additionally, the findings confirmed previously identified integration mechanisms, but have also suggested on existence of additional mechanisms. These new mechanisms were characterised as strategic prioritization, government incentives, specific trading controls, environmental exchange and compatible technology infrastructure. The new mechanisms, together with our general findings are further discussed with their relation to the theoretical framework in the next chapter.
In the previous chapter we have proved the reliability of our analysis based on the facts that it has been meticulously done and follows established forms and norms. Most importantly it is receptive to our research question and purpose. However as LeCompte (2000) mentioned, together with a good analysis is expected to be a relevant discussion of the findings that must yield practical results that are significant and understandable to the potential people reading about the research. Thus considering this idea, in this chapter we discuss in a straightforward way the findings of our analysis.

5.1 Hard and Soft integration mechanisms

One of the first points we want to mention is the way in which we categorized the integration mechanisms while analyzing them. This classification is visible since the tables from last chapter (Table 7 and 8) where we labelled each category either as a ‘Hard’ or a ‘Soft’ mechanism (Martinez and Jarillo, 1989). This was a direct result of using our inductive thinking to classify all of the categories found in the interviews. As a result of our Literature Review we built up the supposition that due to the flexible, non restrictive and unobstructed nature of OI it is more probable that the subtle and less formal mechanisms are more common in OI practices and projects. Figure 7 illustrates the percentage of times that the mechanisms were catalogued with this first classification during the data displaying process and analysis. Based on this figures, the assumption was confirmed in our study, as 65% of the integration mechanisms mentioned by our interviewees were labelled as “soft” ones, in comparison to only 35% of “hard” ones.

Figure 7. One possible classification of integration mechanisms in OIP
It is important to state that we do not argue that “hard” mechanisms are not important; on the contrary they are necessary to keep control and formality in the integration efforts. An interviewee well described this situation stating that these types of mechanisms, like procedures, processes and systems, are common in any business because they act as security locks to avoid mistakes. Indeed we agree that “hard” mechanisms are necessary as the completely lack of it would probably cause an ‘integration anarchy’. A neutral stance might be the idea that there should be a balanced mix between the two categories in OIPs, however as we confirm in our study there is a bigger tendency towards using the “soft” ones. To support our findings, we resume a position related to the subject of organizational integration mechanisms and it is the basic idea of incremental selection of integration mechanisms by Martinez and Jarillo (1989). They state that organizations in general use structural and formal mechanisms – Hard mechanisms – to implement simple projects and strategies, but as they start to increase in complexity, then they also use informal and subtle ones – Soft mechanisms – to integrate and manage them. We confirmed this premise focusing more in the specific area of OIPs with the help of our interviewees. They expressed the general perspective that every OIP undertaken in their contexts varied in degree of difficulty, but were always seen as complex projects in general. Therefore the common practice seen is that as organizations know in advance that “hard” mechanisms need to be in place but not necessarily contribute extensively to the integration of complex projects, they only set up the minimum “hard” mechanisms requisites. Then they focus on adding or subtracting “soft” mechanisms to the extent in which they are required with the advantage of decreasing their efforts and costs.

In sum, we partially agree with Martinez and Jarillo (1989) main ideas about integration mechanisms in organizations adapted to our research in OI. On one hand, we concurred that the use of both types of elements i.e. Hard and Soft mechanisms, in different levels and scope is following a pattern of the complexity of the project that needs to be managed. An organization may choose in what extent it will apply “hard” or “soft” mechanisms as long as it is beneficial for its projects and activities. On the other hand, we differed with their idea that the evolution in organizational theory is going in the direction of solely more informality. Although it seems legitimate that organizations are expected to move towards applying more informal and flexible mechanisms to offset the managerial challenge of integrating an augmenting number of independent inter-organizational activities (ibid); the “hard” aspect is still needed. A perfect example of our stance is the situation found with our participants. While we were interviewing people completely related with OIPs i.e. people with a different mindset of how the innovation process has been reinvented, they all mentioned in a not negligible way the use of “hard” mechanisms. It is true, that the subject of achieving the proper mix can be subject of several debates, but the logic not to enter in this kind of issue would be the same followed as in the field of management or strategy (Mintzberg, 1994). And the common sense is that there is no right formula or recipe to establish the exact mix of integration mechanisms that each organization or innovation project needs because they are inherently different by nature and each one of them require specific mechanisms.
5.2 Another type of categorization for the integration mechanisms

After the first possible classification previously explained, we considered designing another significant categorization. When contemplating which characteristics we should attribute to the core categories according to the integration mechanisms identified in this research, the simple categorization into hard and soft mechanisms was not taken into account considering that the terms are too general and would not add to the readers’ perception. Therefore, we started our consideration from broad terms of an External and Internal core category in relation to the environment of the organization orchestrating OI and its criteria of governance and control capability. However, the notion was promptly rejected being that the number of integration mechanisms considered would prove to be too overwhelming for such general core categories. Additionally, it is contradictory to the nature of OIPs described in the literature review, where all the mechanisms that can generally be identified as Internal or External relative to an organisation in traditional context, would by default be mostly Internal in OI context where there is a very delicate line organizations need to cross in order to apply this paradigm (Kirschbaum, 2005; West and Gallagher, 2006).

For this reason we took upon an approach which considers actors in the OIPs as elements of a system, and considered characterization that would enable the reader easy comprehension and understanding of the classification. The most commonly known and used classifications would contribute in that sense. In addition, we also took into account the macro environment of OIPs as the interviews showed and confirmed that OIPs happen within an inter-organizational context level and thus a wider classification may be more effective in enclosing all the mechanisms. By logical line of thinking, we took into account all integration mechanisms we identified in our research and commenced sorting them under core categories according to their general nature and more prominent characteristics. This process has resulted in creation of five core categories to which we bestowed rather generic names of Social, Technological, Organizational, Operational and Environmental integration mechanisms. These summarizing categories conceptually present an image easily understandable for both academics and practitioners.

To further validate our choice, we looked into what Glaser (1978) defined are the main criteria for a core category and question them in the context of the five categories we formed.

The core criteria must be central. The centrality of a core category is seen in its relation to as much as possible other categories and their properties. This is a necessary condition since it indicates that the category accounts for a large part of the variation in a pattern of behaviour. Each of the core categories we selected had this quality adequately summarising all categories indentified in the interviews.

The indicators pointing to the core criteria reoccur frequently in the data. We found that certain categories appeared in that capacity with high frequency of mention, which we established as a stable pattern. Consequently, we increasingly related other categories with them. Each of the core categories had about one hundred mentions in the interviews and around five categories that point to it.

The core category is easily related to other categories. According to the author, it is necessary for these connections not to be forced but to come quickly and richly. Because of this quality, it takes more time to saturate the core categories than the others. In collecting and interpreting data, we reached a point of diminishing findings, adding nothing to what we already knew about a category, its properties and relationship to the core category.
Clear and grabbing implication for general theory. In course of our analysis we have gathered substantial data to begin to conceive the generation of a theory about integration mechanisms in OIPs. However, for this theory to be valid, the research would have to be much more extensive.

We found that the core categories have a considerable carry through, and do not lead to dead ends which were also indentified as important criteria.

Core categories allow building maximum variation to the analysis – being that we carried out the coding of the categories in terms of the properties, dimensions, conditions and strategies, all of them are related to diverse sub patterns of the OI aspect that the core category represents.

Finally, the core category can be any kind of theoretical code, which is mainly referring to the attribute of the category. According to the author (ibid), they may represent a process, a condition, dimensions or a consequence. In this case, the core categories present dimensions and therefore are also justifiable in this aspect. Considering all these criteria we can assure that the core categories proposed were well developed as previously explained and justified. With them we can go a step further in the abstraction stream to suggest a model that represents the patterns between them and other elements. This proposed framework is described and illustrated in a subsequent section of this chapter.

5.3 Patterns between the categories of mechanisms

During the course of our research, we noticed certain patterns among the categories. The choice and the degree of use of the mechanism are dependent not only on the organisational context, but also on the level of implementation and aspect of observation. Service companies might put a lot of effort into Social and Environmental mechanisms, while the companies engaged in technology innovation are more inclined towards the use of Technological and Managerial integration mechanisms, though this rule is not exclusive. Our findings show that if observed from top-bottom approach, mechanisms related to the organisational aspects are more prominent where in bottom-up approach we notice higher degree of more technical and people related mechanisms. Mechanisms of New organisational identity, Strategic prioritization, Centralization and Decentralization, Departmentalization, Formalization and standardization and Output and behavioural control were usually brought in association with Formal leadership; whether they were implemented or directed by it. Interviewees who did not hold any higher managerial positions but shoved a high degree of Informal leadership were more oriented towards integration mechanisms of Lateral or cross-departmental relations, Informal communication, Socialization, Horizontal structures, Innovation technology infrastructure, Innovation ecosystem, Sociable system for knowledge sharing and Environmental exchange. In terms of the aspect of observation, we noticed that the higher concern about Government incentives was expressed by the researchers and nexus agency whose work is more dependent on this kind of support comparing to the companies who have their own source of funding. By the same philosophy, the companies were the ones who expressed concern about Specific trading controls since this mechanism greatly influenced the strategic choices they make as well as the way of doing business. We find it necessary to emphasize that not all the mechanisms within the core categories we labelled them in, necessarily have to be used in whole. The right combination of the integration mechanisms can be made, regardless of the core category we sorted them under, to best compliment the context they are used in.
5.4 New integration mechanisms found in Open Innovation Projects

NW-Gov – Government Incentives

In order to promote investment in industrial and technological development, governments are actively using tax policy instruments. If properly designed and executed, these instruments can have a significant role in stimulating innovation. The influence of government incentives and tax policies has been brought in association with innovation development by numerous authors (Bernstein, 1986; Cantwell and Mudambi, 2000; Kaiser and Prange, 2004; Scotchmer, 2006; Shah, 1995; Tassey, 1996). However, their reasoning is largely made in sense of the most immediate and palpable effects the government policies and tax incentives have on innovation activities in various industries. The authors are in general theoretical and empirical agreements that government instruments increase the commitment to the R&D at the company level as well as that the R&D efforts empowered by fiscal incentives result in an increase of innovation output. We have not found any evidence that the theorists have referred more explicitly to the integrating role of such instruments. Nevertheless, we consider it viable and justifiable as the availability and the right timing of government incentives has an undeniable influence on development in general. For instance, there are certain provisions offered by the governments for technology transfer from foreign countries such as specific tax treatment of licenses and royalties as well as equity participation requirements.

As is insinuated by the findings of our research, when provided with various government incentives, the companies are in a position to reduce or to a certain extent share the risks usually associated with R&D activities, which can in turn encourage them to undertake innovation endeavours. As previously mentioned this type of risk reduction and sharing can come in a form of tax incentives or direct funding, but also in a variety of cooperative research arrangements (one of which can, for instance, be with government laboratories), which strongly indicates on their prospective integration influence in OI context. When talking about risk, however, it is unavoidable to mention that the extent and availability of government incentives usually depend on the policies made according to the recognition of market failure. According to Tassey (1996), in technology-based markets it is usually the best rationale to have a vague allusion to rather excessive risk. As a consequence, the risk and reward rations are often distorted resulting in underinvestment and diminished overall government support for R&D. The reason for this is usually given in a form of budgetary constraints, however, according to the author the real reason lays in the “lack of agreement as to the existence of market failures and the appropriate policy responses for each type of barrier” (ibid, p. 599).

NW-STRAPRIO – Strategic Prioritization

Strategic prioritization is a significant aspect of project portfolio management, which has for a main objective to optimize the utilization of often limited organization resources whether they are human, financial or material. The increasing complexity of technology, evolving business practices as well as market globalization are forcing companies to rely on R&D as a source of sustainability and a long-term growth strategy. Being that most of them usually have a large number of project requests, but not enough resources to work on all of them, the companies often find themselves forced to give priority to certain projects based on their strategic direction. In this respect, numerous authors have presented various models for R&D project portfolio selection (Carlsson, Fuller, Heikkila and Majlender, 2007; Cassimian, Di Guardo and Valentini, 2009; Fang, Chen and Fukushima, 2008; Henderson,
1979; Roussel, Saad and Erickson, 1991; Wheelwright and Clark, 1992). As for the effects of strategic prioritization in OIPs, we were unable to identify any concrete references in theory. There are, however, some indications made by Mikkola (2001) who reflected upon the implications of R&D projects prioritization for innovation management, stating that by pursuing certain strategic direction, the companies are in a position to concentrate their efforts on adequate allocation of available resources. Once the project is in the execution phase, project prioritization provides a mean to resolve any resource contention issues that may arise when the project requires additional resources. When the company does not have the resources necessary for execution of prioritized projects, greater efforts are made in indentifying all available alternatives for them to be acquired through strategic alliances and joint ventures. Though not explicitly related to the sense of integration effect of strategic prioritization, the authors’ stance has a significant merit in the context of OIPs. If so directed by the company’s strategic direction and project prioritization, actions taken in that regard can prove to be highly beneficial in terms of gathering resources and competences from various sources, resulting in cooperation on inter-organizational level.

**NW-TRACON – Specific trading controls**

This integration mechanism has been mentioned solely by the company interviewees. The rationale for this are behind the fact that because of the specific characteristics and influence of these mechanisms, it affects mainly organisations which have to abide by the rules of the market, industry, region or a country they operate in. On the other hand, the researchers are hindered by these limitations to an insignificant extent. The respondents from the industry referred to this mechanism as being out of the control or influence of the organization but as a part of an external structure or a macro-system that if approached to correctly can in fact support the integration of various OI actors. By respecting the same rules and working in rather similar if not the same environments, the actors in OIPs are completely aware of all the conditions and circumstances surrounding them and their partners. This can only positively affect the unity they tend to achieve in order to innovate. They are also in a position to develop a kind of flexibility that supports these specific trading controls to the fullest, but is at the same time able to incorporate constant changes needed to innovate.

**NW-TECINFR – Compatible Technology Infrastructure**

Technology infrastructure is the base foundation of the technological portfolio, which is shared throughout the OI network encompassing all its actors. All companies, regardless if they practice OI or not, need a basic level of IT infrastructure in order have an ability to integrate its processes. The capability of a common technology infrastructure includes both the technical support as well as managerial expertise required to sustain and bring out the innovation from the net of combined efforts of all OI actors. In this sense, it clearly represents an important and we may even go as far as arguing that it is a necessary integration mechanism; at least when it comes to technological innovations. The examples of it are particularly evident in IT industry where every software developer has to build their programs taking all precautions and making them compatible with a specific IT platform they are designing it for (to achieve compatibility with the operation system, but also with the hardware components). While developing their software, IT companies strive to make them compatible with as many platforms as possible. By attaining greater and more universal compatibility, they are enabling the use of their programs in larger scales and thus secure higher profitability. The same philosophy is applicable for other industries. As we stated in our findings, the ‘white mass’ concept in food industry ensures the level of quality
and standard throughout their innovation network. Compatible technology infrastructure, therefore, represents foundation on which innovation can be built upon.

NW-ENVEX – Environmental exchange

Though holding significant similarities with the standard ‘exchange of managers’ practice that fits into the Socialization mechanism (OT-SOC); three interviewees provided us with sufficient arguments and data to identify prolonged exchange of managers as a form of environmental exchange and classify it as a separate integration mechanism. We have already indicated on certain differences in our findings referring to the duration of exchange of managers. Prolonged stay and participation on innovation projects can positively affect the quality and extent of integration achieved. Though the theory is abundant in literature regarding social aspects, effects and issues of exchange of managers in terms of knowledge sharing and developing informal relations; we were not successful in finding distinct references in the literature concerning its duration or the effect of such a prolonged stay on project integration process nor did we find any evidence of this in context of OI. The reason why this mechanism was more prominent in data collected from the researchers comparing to the data received from company interviewees, may lie in the simple fact that they are the ones directly subjected to it and therefore aware of it in greater extent. By their own admission, this mechanism can serve as a powerful tool supporting the efforts of integration in OIPs.

NW-LECU – Learning curve techniques

The significance of Knowledge Management and the usefulness of Lessons Learned are quite well known in the literature. We do not have intention on claiming that there is no adequate reference to it in theory. However, because of the novelty of OI concept we had trouble finding the application of this mechanism in it. Learning curve mechanism was mainly referred to by the researchers and the nexus agency which acts as a connection between the academics and the industry. This division was expected since researchers, as members of academic community, are by nature concerned with the aspects of knowledge and are by default the ones interested in its accumulation and distribution. They have quite readily pulled our attention to the benefits attained owing to accumulated knowledge in terms of acquiring a certain quality of fluidness to the process of integration. Consequently, less time is needed for coordination of activities and, as often implied in the interviews, some mid-steps can even be disregarded. The same fluidity was mentioned by the nexus agency interviewee who stated that relying on experience and earlier acquired knowledge of certain processes; they can be conducted with greater speed. All these qualities clearly indicate on beneficial influence learning has on integration of OIPs.

5.5 Proposed framework: Integration mechanisms in OI Projects

Ending our literature review chapter we stated two essential aspects that had directly guided our research methodology, analysis and thus discussion. First, we mentioned the importance of the matrix of OI applications (Appendix 3) that we built up, for justifying our context selection for data collection. This matrix also helped us to identify the innovators that commonly participate during the OI process and usually undertake these efforts in the form of OIPs. Second, we explained that according to Vanhaverbeke and Cloodts’ (2006) suggestion, in order to better study the phenomena of OI, one of its five levels of analysis need to be selected. We chose the inter-organizational networks level as there are virtually no empiric studies analyzing it and none at all focusing on its integration mechanisms.
Baring these past decisions in mind, we believed it was important to draw and explain some connections between them and the new created categories of integration mechanisms.

In addition, the theoretical framework summarizing the mechanisms we found on the literature also provided a clear vision of its classification limitations and context application. For example, the first set of mechanisms obtained from the research of different organizational theorists (Child, 1972; Galbraith and Edstrom, 1976; Galbraith and Kazanjian, 1986; Lawrence and Lorsch, 1967; March and Simon, 1958; Pugh, et al., 1968; Thompson, 1967) was based on the idea that these mechanisms are applicable solely inside a single organization or company. This is not a flawed or incorrect approach but we believe it is limited. By considering only a single organization environment, it leaves out the interactions of the mechanisms within organizational networks and thus on non-conventional business models e.g. like the innovation process in OI. In a more specific dimension but in the same constraining way, the second set of mechanisms was taken from the setting of R&D department and specific innovation projects. Although the authors (Sicotte and Langley, 2000) describing these mechanisms were focusing in only one area, they thought about the relationships that could exist with other areas within the organization. However they did not consider the notion of innovating out of its boundaries, leaving out again the possibility to extent the mechanisms exploitation in other contexts and practices.

Therefore it is a necessity to create a more specific mechanisms categorization (in the field of OI) but at the same time, a multi organizational framework with wider applicability (in the context of inter-organizational networks). By doing this we attempted to provide a structure that can support the application of the new mechanisms classification we identified in university/industry associations to a more advanced range of actors. Although our classification of integration mechanisms is centred on environments of private companies and academic institutions, it represents a solid framework of reference when looking into integration of OIPs with other types of innovators. Since only one integration mechanism (Government Incentives) showed a slight tendency to be more prominent in university setting, we believe that all of them have a generic quality when it comes to their application in other contexts involving all of the remaining actors in OI networks.

Therefore, we propose a framework shown in Figure 8 which basically illustrates how the categories of integration mechanisms could harmonize and be used with other OI actors as long as the projects or activities conducted between them enter on the characteristics of the OI Model. The actors were taken from the potential innovators that can be integrated in OI identified by us and illustrated in the Matrix of Open Innovation applications (Appendix 3). As previously stated these actors were established based on the different types of collaboration (Tidd et al., 2005, cited in Viskari, et al., 2007), the 3rd category of innovators i.e. outside innovators (Neyer, et al., 2009) and several examples from practitioners’ views. All the actors have the same green colour as in the framework we do not want to emphasize this thesis study context (private companies and universities) but rather attempt to generalize the findings. The arrows in the right side of the figure represent the organizations and individuals’ association capability as well as the interchangeability of networks involved. The five inner boxes represent the new categories of mechanisms, each one has a different colour as we have grouped each integration mechanism to solely one core category i.e. there is no redundancy or overlapping between the main categories. In spite of not being all together in direct contact, the main categories are linked through the upper blue lines to clarify its relationships and possible self-applicability. In this way, the mechanisms can be used all at the same time or independently i.e. the advantage shown with this figure is the inherent flexibility and easiness to accommodate them for various
potential innovators. This is reinforced by the large semi-transparent boxes of each potential actor which are displayed along the five categories to show their wide applicability and not exclusivity. The big boxes with a dotted frame and from different colours located behind the central figure represent other types of mechanisms classification that could overlap in organizations. I.e. the idea of not restrictedness of the integration mechanisms with other types of mechanisms is present in the model due to the supposition that they will probably overlap with other organizational mechanisms (Ouchi, 1978). However this interaction with other mechanisms and tools is better explained in the subsequent section of this framework.

This framework does not represent the process of how the mechanisms are supposed to be used in a systematic way but rather it is a conceptualization of integration mechanisms as a common grid and support for OIPs between different innovators. As we have explained before our initial research question was answered with the identification of the integration mechanisms and later abstracted more with the main categories. In this sense, the answer to our research question is used as a trigger for creation of this framework applicable to a greater range of OI actors. Other OI analysis levels (Vanhaverbeke and Cloodt, 2006) were considered in attempt to bring the importance of the role the IMs categories have in integration of external sources used in OIPs, which as Gassmann (2006) mentions are generally unexpected. In addition, the framework is supporting the notion that integration mechanisms used in OI have to enable inter-changeability of networks involved and flexible integration infrastructure which is easily accommodating various potential participants (Fowles and Clark, 2005). Figure 8 underlies not only our validated empirical data, but also all the integration mechanisms obtained from several theorists as well as best practices views, together with notions of OI, networks and even other organizational mechanisms views.
This model attempts to go a step further in mechanism abstraction by proposing a new configuration of integration mechanisms among the OI actors. The essence of this proposal is to create a leap from the empirical perspective resulted from our data analysis to a completely theoretical one. The general reasons are to enable a simple way, with a basic diagram, to depict how integration could be achieved but at the same time properly base it on the outputs of our abstract thinking. When showing a framework more theoretically than empirically based as in Figure 8, there is the possibility of stating a general model that may not be applicable for all the settings. Indeed we assumed that this model is not universal but it guides and enables a straightforward and unambiguous understanding on how the integration mechanisms work in OIPs. Conversely, the emphasis should be in the latent possibility to generalize our proposal in other contexts, if not as a general theory at least as a specific support and foundation in this field. In general, although this framework needs to be confirmed with more empirical studies, it is valid and useful as a “map” and a guide towards understanding the means that make integration possible in OIPs and activities in inter-organizational networks.

5.6 Rationalization and justification of the framework proposed

The framework presented in the above section is not the re-cataloguing of the components or the entire adaptation from another’s author model. Its full conceptualization was though by us and hence we can assert that it is a completely new way of perceiving the integration in OIPs. As a matter of fact if we consider the importance and weight, as stated in our literature review, about integration in this type of innovation model, then we could also argue that our framework provides a new perspective to OI. Although this statement may sound pretentious, we firmly believe it is true as we were not able to find any similar structure, agenda or framework analogous to the idea we wanted to represent. Criticisms may arise regarding the solely proposal of framework without other related elements useful for its development e.g. a metric system for the mechanisms or a procedure of how to implement them. However this being an exploratory study, and probably one of the first investigating OI integration mechanisms, it accomplishes its objective of presenting a diagram that shows a clear idea of how the integration of OI activities occurs as well as linkages between different types of innovators.

In addition for its justification, our framework shares the integration notion in generic innovation projects as described by Putzger (1998) in the sense that it attempts to elevate the linkages between each OIP stakeholder to promote a valuable interaction among them. In the same way, the model implies a suggestion that one of the main drivers of integration in the innovation process is the emergence of new types of inter-organizational relationships (Handfield and Nichols, 1999) as existent in OI. One of the underlying messages of this model is that in OI it is not sufficient to manage the integration of innovation process like an individual function but it needs to be done as an integrated chain of processes supported by specific mechanisms. Along with these reflections we thought about other aspects related with the represented relationships of the model elements and their background. Therefore below we present other three crucial considerations that help in explaining and supporting the new proposed framework and hence its originality and real theoretical value is justified.
5.6.1 Foundation on accepted theories and authors

As we have stated in the framework description and justification, the absence of an explicit model explaining the integration apparatus in OI drove the search for its creation. Although it uses the new categorization conceptualized on our personal abstract thinking, it is rooted in established and accepted theories and ideas from several authors. This aspect provides a satisfactory foundation degree and ensures the alignment with organizational integration mechanisms in case the model is further developed. One may argue that this model is also based on study cases from companies implementing OI adding a sense of uncertainty as there are still no widely accepted theories about the mechanisms in this innovation field. However, we needed to consider this option as we believe it would not be objective to create a framework for OI projects without considering some of the already researched cases on them. Thus bearing in mind the evaluation of these fairly recent articles with known firm practices was a key addition in creating new categories and thus assembling a more complete model.

As depicted in Figure 8, our framework of the integration mechanisms across different open innovators, resemble the suggestions of Sicotte and Langley (2000) in the sense that they also classified five possible types of integration mechanisms suitable for R&D projects. However our categories beside having a different logic for being classified, they also encompass a macro context applicability as already explained before. The important point here is that the similarity, at least in the model groups’ configuration, suggests that our findings are associated with other types of formal theories. Therefore our framework can be legitimately claimed to fulfil its basis on formal studies from different types and hence we are satisfied with its final arrangement as it helped us to achieve part of our research objectives i.e. to understand integration in OI.

5.6.2 Integration Mechanisms stance within inter-organizational networks

In our literature review chapter we made clear the need for integration in OIPs and activities. Therefore it would be useful to establish a relationship between this integration, the means to achieve it and its effects on other entities within the model. Ritter and Gemünden (2003) argued that in inter-organizational R&D projects, the ability to integrate activities becomes a key factor of success, thus by deduction, the mechanisms themselves act as a determinant to enhance the interaction between networks. Our framework clearly shows that the mechanisms can be harmonised in multiple combinations with different types of innovators to allow flexibility and avoid for an innovation process to be tightly managed. These ideas are also backed up by Neyer, et al. (2009) suggesting that inter-organizational innovation processes should evolve from being managed as tightly joined processes to be flexible but still connected e.g. networks. These kinds of networks, illustrated in Figure 2 are the ones also outlined in our framework. The only difference being that in our framework the interaction with the integration mechanisms is visible and more flexible i.e. the relationships of each category are all interconnected with the networks’ actors but at the same time these connections are more bendable and can occur more freely.
5.6.3 Interaction with other mechanisms and tools

One of the most common means to manage complexity in the structures and processes found in any kind of organization is with the support of different types of methods, tools, and mechanisms (Galbraith and Kazanjian, 1986). As an organization can have virtually an infinite range of possible issues to cope with, there are also different instruments, some very general and others more specific, to solve them. Based on this idea, we understand that the suggestion of a model to render the incorporation of innovation efforts in different contexts cannot be entirely stringent with the types of mechanisms included on it. Although the new framework proposed in Figure 8 shows only the integration mechanisms it does not mean it neglects the existence of other variety of organizational mechanisms. In fact this notion is visually represented in the model with two elements. First, the larger and central box containing the main categories has a dotted line style symbolizing the aperture of the mechanisms categorization to be present in other types of classifications. Second, these other types of models or mechanisms frameworks are represented as additional large boxes behind the principal one to show the overlapping likelihood.

We cannot claim with certainty what other exact types of frameworks or structures could be applicable to this mechanism recurrence or multi-presence. This question on itself could be another research theme. However we can clarify the point of the associations of the integration mechanisms operating similarly or overlapping with other models by mentioning an example on organizational control mechanisms. Nieminen and Lehtonen (2008) created a framework of three control mechanisms: self-control, clan control and bureaucratic control. Within these groups of control mechanisms we can also find many of our integration mechanisms from theoretical framework e.g. formal and informal meetings, training, project planning, reporting, and incentives among many others. Thus, the idea that these different mechanisms models are complementary or alternative from each other rather than strictly substitutes is valid. In the same way, Leifer and Mills (1996) mentioned that control tools and mechanisms in general, are neither dependent nor separated but they need to be applied together to support each other. This logic supports the balancing relation existing between models i.e. a high degree of control mechanisms utilization does not mean a low degree of integration mechanisms and opposite. In sum, the valuable interaction advantage of our model could be fitted with Ouchi’s (1978) idea who affirmed that different types of organizational mechanisms tend to overlap in organizations and possibly will appear in a variety of combinations.
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Highlights of the research

As we have seen in the literature, because of its potential to provide great benefits, in the coming years we will see an increasing number of companies trying to implement the concept of OI. In the same way, academia will not be far behind expanding its interests in OI phenomena as further study will provide better comprehension of it. It is expected as with most “disruptive status quo” models, like OI, there will be certain difficulties considering the novelty of the concept. In this regard it is essential to understand it and develop an appropriate way of implementing it. Integration mechanisms, in our opinion, have a crucial role in these efforts. Unfortunately there are still not enough clear and focused studies, either from practitioners or scholars’ point of view, which provide specific integration tools and mechanisms for this field. With this idea in mind, we have embarked to investigate and indentify integration mechanisms in OINs in an attempt to accomplish the study purpose and answer our research question.

Since the beginning of the research, we focused on trying to respond to the question, how integration is achieved in Open Innovation Projects between inter-organizational networks of innovators, specifically in projects between private companies and universities. The part of concentrating on IoNs of “outside innovators”, like universities interacting with private firms, was in our opinion the added value of this study. We are not claiming that studies have not been done among private firms and academic institutions. However it is a reality that understanding the integration mechanisms in the innovation process between them has always been neglected until now. Actually the enquiry itself guided us while investigating the phenomena, thus it is a fact that our research question was answered with our study analysis and discussion.

In the same way, we strongly believe that the purpose was achieved through all the stages of our study. First because we conducted an extensive literature review on OI field and the IM associated with it. Second, the study was conducted within three different but interrelated OI scenarios, in particular with participants from two MNEs, two academic institutions and a nexus agency i.e. a third party frequently involved between the two first types of OI actors. Third, the interviewees from these organizations were interviewed in a more open way to allow them to express freely their viewpoints and perspectives. And finally, with the data collected we were able to analyse it and conceptualize in the form of a new framework or preliminary theory. For these reasons we firmly claim that we achieved our purpose on reflecting academically and practically on various integration approaches that appear in the innovation process among different innovation sources. But at the same time, we analyzed the applicability of these integration mechanisms in the context of OIPs at an inter-organizational network level i.e. the three described OI scenarios.

In sum, we achieved the purpose and objectives of our thesis by going a step further in the abstraction of the findings and proposing a new framework. Consequently, this study has met the expectations for the search of new knowledge and we hope that all the proposals and conclusions here suggested will be taken into consideration as a valuable reference in the future.
6.2 Academic and Practical Contributions

As Bryman and Bell (2007) mention, the desire outcome for a relevant business research would be the creation of a theory. We knew in advance because of the limitations of the study, the result of our research would be the creation of a substantive theory rather than a formal one. However this substantive theory is also valid and valuable to increase knowledge about OI phenomena (ibid). In our context a theory was seen as proposing a logic approach where our five well developed core categories are systematically connected through relationships to form a theoretical framework that contributes in explaining how the integration mechanisms influence open innovation projects. However this was explained in more detail in the discussion part in the section of the rationalization and justification of our proposed framework. The main findings and results from the research are presented in a sequential way in Figure 9.

Concretely, there are three contributions provided by this study. A confirmed and extensive list of integration mechanisms applied in OI projects, including six new mechanisms not found before in the organizational integration theory. A set of five categories of integration mechanisms created on similarities and patterns of the mechanisms and finally the already mentioned framework. Any of these contributions can be seen as providing theoretical and managerial implications.

In the academic context, the results provided a tentative theory to understand the scope that the integration mechanisms can have in OIPs. We also presented a reflection upon the mechanisms seen as Organisational, Social, Technological, Environmental and Managerial key aspects to achieve integration in the context of OI in Inter-organizational networks. Nevertheless we believe that the most important academic contribution of our study is in being the first attempt made to study and map the integration mechanisms in OI with the support of empirical data, which in turned gave a significant addition to the formal literature about the integration in OI phenomena so much disregarded although its value.

In a practical context, we believe the results will be more helpful for managers as a generic guide or a standard model to understand how integration can be done in OI and in case it is already in action, what else could be added to support it. As we mentioned before within management and innovation fields, it would be really difficult, almost impossible, to propose a model that fits exactly to each organization implementing OI. Therefore we encourage that depending on the context, each practitioner can identify which kind of
mechanisms are the most suitable to integrate their open innovation processes. They might have already been using some of them; however it is probable that they are not completely aware of all the mechanisms identified in this research. It is our great ambition, adding to the perception on integration of OIPs, for our proposed framework to contribute in providing the practitioners with tools and means of improving and enhancing the integration of their innovation processes and thus probably growing as organizations.

6.3 Strengths and limitations of the research

This thesis is a first exploratory study of the integration mechanisms in OI and consequently we accept it has some limitations as well as strengths. We understood since the beginning of our research that due to the restrictions on time and resources, our study could have some weaknesses which would enable criticism. We are not trying to justify these faults, but we took actions to undermine them. However, we will mention the most important limitations so the reader can know what could have been done differently.

In one hand, as for the research limitations, we accept that our study yielded a substantive theory rather than a formal one (Hair, et al., 2007). The results of our study relate the theory to a certain empirical position or specific context or area e.g. OIPs within inter-organizational innovators. However with more time and resources, it would have been interesting to pursue the creation of a theory with higher level of abstraction which could be more applicable to a wider range of contexts e.g. integration mechanisms in any level of analysis of OI practices. However to achieve a theory of this level, it would have been necessary to collect data in contrasting settings and areas (Bryman and Bell, 2007). We did not aim for a larger scope e.g. interviews with greater number of people from many organizations, which may be seen as a possible weakness. In the same way, by interviewing people from only two countries, the critique whether the innovation culture of a region or country may bias in great extent this research may arise. However we prefer to believe that in an exploratory study it is better to begin the search for information in a more focused research context.

On the other hand, regarding the strengths of our research, we identify several strong points which mostly relate to decisions taken but also to the outcomes obtained. The first set of advantages relates to the sources of our data and their contexts, which is important as we were sure that the quality of the interviewees chosen was going to influence the quality of our results. We noticed that previous studies on OI had focused more on broad samples of firms to extract the most possible information from them e.g. just practices in general. However we avoided a broad measurement and we focused on narrowing the research contexts definition, which allowed us to obtain more precise, detailed and accurate perspectives for our purpose. The participants themselves were another strong element for our data collection as all of them provided reliable information being that: a) they belong to organizations practicing OI at an inter-organizational level and b) they have specific positions directly related with OI. In addition, we were able to interview a person belonging to each one of the innovator groups in OI networks i.e. people from private companies, academic institutions and nexus agencies. This assured that we had a more complete spectrum of answers related to our specific research context.

The second set of advantages includes aspects related to the integration mechanisms. After an extensive literature review we were able to extract and summarize a comprehensive list of integration mechanisms based on theorists and practitioners views. We cannot claim that our theoretical framework contained a full inventory of all the integration mechanisms.
available in reality, but it was a very good approximation based on formal literature. In the same way, the new categories proposed by us are probably missing some mechanisms however it is a fairly complete listing. More important is that the input of this type of mechanism categorization contributed to practical and academic context. The proposed framework is in fact usable in academia and also in different types of organizations.

The third and last set of advantages involves the concordant and connected aspect of innovating in the OI domain. Although it may sound pretentious, we believe that one of the strong points of our research is the fact that we were able to focus on an unattended area of OI and make some novel discoveries. The new integration mechanisms found, the new core categories and the comprising framework proposed, all of them are original results of our deductive and analytical thinking. Beside these novelties, we were also able to uncover several potential topics to expand in the specific area of integration mechanisms and consequently to improve the understanding of OI. These opportunities to continue the exploration of the phenomena is a clear proof that the undertaken research produced valuable results.

In sum, due to the time limitation for our study we did not undertake an endeavour of a higher magnitude which gives some limitations to our research. Nevertheless, our study has several strengths that enhance its validity and reliability and could be used as a replication outline for studies with related purpose and research questions. We encourage researchers to continue studying the phenomena of OI. In specific we advocate the need to carry on the comprehension of the integration mechanisms and a creation of a formal theory based on empirical data. As previously said, one particular strength of our research is the exposure it gives for future research. However we believe these suggestions deserve to be better described and explained and thus we elaborate them in the next section.

6.4 Further Research: reflecting on integration mechanisms in OI

As we stated in the first two chapters of our thesis, several authors as Enkel, et al. (2009), Neyer, et al. (2009) and Vanhaverbeke and Cloodt (2006) just to mention a few, suggest that the field of Open Innovation could be still seen as an emergent subject of study even though it was created six years ago. Therefore there is still much potential to continue researching on it. In specific, as we made clear in our thesis, there is an opportunity for significant research on the integration mechanisms involved on OI (DeFillippi, 2002); with a special emphasis in empirical research which is just starting formally (Brem, 2009; Fredberg, et al., 2008). Certainly, as any research well planned, ours had a certain scope that inherently left other aspects of study out of the boundaries of our purpose and research questions. However there were some specific subjects that attracted more our attention through the analysis and discussion. We reflected on them in relation with the integration mechanisms in Open Innovation and thus we suggest below some relevant topics for future research that may enhance the understanding on this field.

A) Study cases of companies or networks struggling with OI integration to assess integration mechanisms efficiency.

From the common literature that we found about Open Innovation in general we noticed that all the authors, without exception, based their research and hence suggestions and conclusions on organizations seen as successfully implementing and integrating OI. This is not an incorrect approach as an organization with good performance for sure will contribute to the findings on any area even if it is complicated to evaluate. For example, regarding a
difficult topic to assess as success within open innovation networks, Fowles and Clark (2005) based on their study, suggested that a good indicator is the number of ideas generated from outside sources in a company technology area. Their conclusion is valid and reputable but what if their study had been focused instead of the success indicators rather on the indicators of failure, they would probably have found also interesting results. The point is that the understanding on the field of open innovation, as many others, may also be enhanced researching on problematic study cases.

For this reason we strongly suggest that additional research regarding integration mechanisms in Open Innovation Projects should be done in companies or networks of organizations having integration issues. We suggest two valid reasons; the first one is that researchers will have the opportunity to understand if the failure of an OIP done in a single organization, or among a network, depends on the lack of integration mechanisms or even if they exist in what degree the correct utilization of them can influence the project outcome. The second, and probably most important, is that a study of this kind could give the opportunity to evaluate how effective and efficient is each one of the integration mechanisms, perhaps by using quantitative research methods. We believe that expanding the research in this direction will very probably add important discoveries to the OI field and its specific study elements.

B) Confirming OI integration mechanisms within other actors, industries and countries.

We reinstate that due to the resource and time limitations, we did not conduct a wider research encompassing other types of settings and innovation actors. However our exploratory study provides a possible foundation for scholars which may want to study integration mechanisms at the other levels of analysis of OI, proposed by Vanhaverbeke and Cloodt (2006). As well, there is the opportunity to test and confirm our integration mechanisms framework in several and contrasting situations. As our study was completed using data obtained from the contexts of academic institutions and food industry firms, there is the possibility to assess the model in another industry or sector. In the same way, as our interviewees are based in North America (Mexico and U.S.A), there is a prospect to research the mechanisms in other countries and regions to evaluate in what degree the integration mechanisms may vary. The fact that more than half of our interviewees expressed that there are other regions like Europe or East Asia that are more active in OI than North America, is an additional reason why this type of studies should be continued. Therefore there is a latent opportunity to research in these other enriching environments. In sum, we encourage academics to continue extending OI research scope by studying in broader, different and even contrasting samples and settings.

C) Open Innovation integration mechanisms in SMEs.

During the initial process of understanding OI and developing our literature review, we noticed that OI research has in general been focused mainly on large organizations and multinational enterprises (MNEs). This research pattern leaves small and medium enterprises (SMEs) out of the scope of OI investigation. However in the last year, some authors had taken the endeavour of closing this research gap and have done studies focusing on some OI subjects in SMEs. For example Zeng, et al. (2009) explored the relationships between cooperation networks and innovation performance of SMEs. Although they found significant positive relationships between inter-firm cooperation, the study is based only in Chinese SMEs, which relates to the limited issue expressed in point “B)”. A more complete view of the dynamics of SMEs in OI is presented by van de Vrande,
et al. (2009) who found that medium-sized firms adopt OI more often than small enterprises because they have better resources to manage a broader range of innovation practices. Indeed, their findings are important regarding the trends and challenges in this field, however this is only an exploratory study.

Therefore, we firmly believe that additional research is needed for SME context, especially in the integration mechanisms that exist in this type of organizations. As van de Vrande, et al. (2009) concluded, one of the important challenges for SMEs, is the organizational and cultural issues that can appear due to the increasing interaction with external innovators. Thus it would be practical to understand if the same integration mechanisms that exist in large organizations also apply in medium and small ones. Based on this study (ibid) we now know that OI happens in a similar way but not in the same degree as in MNEs. It may be possible that the scale of integration efforts is reduced in context of SMEs but the complexity to integrate them is still present. The question that remains is if the size of an organization affects the complexity of integrating efforts needed and therefore the mechanisms used to deal with them.

D) Relation of certain integration mechanisms with project life cycle stages.

When analyzing data acquired through interviews, we noticed a certain pattern in frequency of mentions the interviewees made of integration mechanisms depending on the project phase they were referring to at that time. Though all of the mechanisms seemed to be present throughout all project phases, their importance and degree of presence seemed to vary.

Most commonly referred to mechanisms in project conception phase are defining of the organizational identity, stakeholder involvement, informal communication, socialization, informal leadership, visibility tools and nexus agencies. According to the defined organisational identity and strategy, corresponding inquiries are made with the stakeholders through informal communication and socialization. This is what greatly contributes towards achieving visibility across the organization as well as the market. This is where informal leaders come forth propagating new ideas and concepts. Nexus agencies have a great responsibility of getting in touch with researchers who can offer a solution for a problem from industry or gather new concepts from users.

In initiation phase the most visible were Strategic prioritization, Departmentalization, Cross-departmental relations, Sociable system for knowledge-sharing, Government incentives and stakeholder involvement. In this stage the level of project prioritization is determined which in turn dictates the engagement of organizational departments. Cross-departmental relations are formed as well as sociable system for knowledge sharing. Government incentives play an important role in providing support for the project. During this phase, a close watch is kept on stakeholder opinions and expectations.

In planning phase, the interviewees have mostly referred to the mechanisms of Innovation technology infrastructure, Planning and process specification, Formal leadership and Learning curve techniques. Considering the existing technology infrastructure, all necessary planning and process specification is made using the experience and knowledge from previous projects to shorten or dismiss certain steps. A formal leader who is appointed to the project has a responsibility of coordinating the project.

Execution phase was mainly characterised with Innovation ecosystem and Formal leadership mechanisms where a formal leader still maintains his coordinating role.
Depending on the type of the project, the development is usually conducted within an innovation ecosystem in form of the laboratories, production sites or research centres.

Controlling and monitoring phase in addition of Formal leadership was also contributed by Output and behaviour control mechanism. The formal leaders’ responsibility is also to supervise the activities and monitor the progress of the project. With output and behavioural control mechanism, various reports are created.

In Closing phase increased stakeholder involvement is noted together with output and behavioural control which is seen in all administrative activities followed by project closure. The mechanism of Informal communication is reflected upon the inter-organizational connections created for future references.

If considered in terms of hard and soft mechanism classification, soft integration mechanisms were mostly present in conception, initiating and closing phase, while hard integration mechanisms proved to be more frequent in planning, executing as well as control and monitoring phase. Our findings led us to conclude that there is a connection and dependence between the project phases and the degree of presence certain integration mechanisms have in them. We are not in a position to claim this with definitive certainty, being that we did not set out to inquire into or investigate the presence of integration mechanisms depending on project phases. However, the findings presented in this research prove this is an open area for future research.
6.4 Summary

Through our research, we confirmed the existence of 27 subcategories of integration mechanisms in the context of academic institutions and private companies applying OI. Most of these subcategories were taken from different organizational and innovation theorists together with mechanisms extracted from relevant study cases. Additional subcategories were found while analysing the empirical data. In the same way, we introduced the term of Hard and Soft integration mechanisms to indicate on the most used ones in OIPs. We further reclassified all these subcategories into five core categories encompassing their common notion to be able to suggest a degree of generalization. By doing so, we were able to go a step further to create an abstract framework to identify the relationships between the potential mechanisms and different OI actors. This framework is valuable to consider the applicability of the proposed integration mechanisms categories in different OI settings and support the understanding of how the harmonization of OI efforts occurs with different types of innovators.

Although our thesis has some limitations, we strongly believe that our findings are adding important results to the literature on OI. Specifically in understanding how the integration can be done between the external innovators, in context of inter-organizational networks proposed by OI model. Our findings should encourage other researchers and scholars to study and analyze in greater extent and depth the integration dynamics in the OI field. Our rationale for this is based primarily on the interviewees’ perspectives stating that the use of the correct integration mechanisms can be of significant influence to the success of OIPs. We cannot refer to any author to support this assumption as we did not find any studies on this topic. This is, however, an interesting opportunity for future research, along with many others, which can increase the knowledge not only about advantages and benefits of OI, but also on its optimal implementation.

We firmly believe that Open Innovation is a good business model for innovating in a different and non conventional way, providing a competitive advantage. With this gained superiority it is more probable that organizations can continue growing and developing. However based on our research we conclude that it is not sufficient to employ OI as just another innovation model. It is essential that organizations understand not only how to take advantage of OI, but also how to implement it effectively i.e. achieving the proper integration of all the resources, actors and efforts involved in an OIP. We hope that with our findings and suggestions, scholars and practitioners can benefit in a significant degree, either as taking this work as a foundation for future research or by selecting the ideas and aspects relevant for them.
References


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## Appendix 1. Lists of known Open Innovation examples

Detailed list of “Open innovation: Success stories” (del Moral, 2008).

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lego</td>
<td><em>Lego is probably the best known because it was one of the first companies to allow their customers to suggest new products that could then be materialized through its initiative, Lego Mindstorms.</em></td>
</tr>
<tr>
<td>Threadless</td>
<td><em>Threadless is a T-shirt shop that started as a student project. Now it allows its customers to suggest new designs and vote for the ones from other users that have been proposed.</em></td>
</tr>
<tr>
<td>Dell</td>
<td><em>Dell is a company that first saw the biggest downside of Web 2.0 (forums and blogs against it), reacted and has become one of the pioneers in implementing open innovation through IdeaStorm, a site that allows suggesting improvement ideas and vote for others that customers have proposed.</em></td>
</tr>
<tr>
<td>Starbucks</td>
<td><em>Starbucks is more likely the company that is betting for the Web 2.0. It has launched a blog and suggestion ideas system similar to Dell and also promotes a social network in which employees and customers can interact through social projects of their own choice.</em></td>
</tr>
<tr>
<td>IBM</td>
<td><em>IBM it can test its platforms with their own employees before proposing their use to customers. Moreover, open innovation is closely related to the use of free software, so that the communities of programmers who develop the products side by side with their own employees.</em></td>
</tr>
<tr>
<td>Facebook</td>
<td><em>Facebook allows all the world the development of computer products (applications or apps) that work perfectly within their social network. In this way, everyone wins: the developers access to millions of users with which to make money and Facebook continues to grow and offer more services.</em></td>
</tr>
<tr>
<td>Misha</td>
<td><em>Misha is a Korean cosmetics brand that has been released through a social network for women that come from the ideas and proposals of all kinds. The company has managed to capture 40% market share of beauty products in its country.</em></td>
</tr>
<tr>
<td>P &amp; G</td>
<td><em>In 2000 a new CEO completely changed its innovation systems and knowledge management, in order to catch more ideas from outside. Today, the innovation productivity has increased by 60% and takes 50 new products to market each year. It has 7,000 virtual researchers to develop products from outside.</em></td>
</tr>
<tr>
<td>Eli Lilly</td>
<td><em>Is known for having launched InnovCeutic, probably the best known innovation network. Basically, this is a system that allows scientists around the world access to business needs and, where appropriate propose their solution. The winners will carry a prize that, in some cases, has reached $ 25,000.</em></td>
</tr>
<tr>
<td>Peugeot</td>
<td><em>Peugeot invited one day to customers submit designs for cars. Got a record 24 hours in traffic on its website, although it is unclear how also got a great know-how. In this case and in the following companies, there is more marketing than innovation.</em></td>
</tr>
<tr>
<td>Coca-Cola</td>
<td><em>Coca-Cola is one of the most closed companies in the world (its recipe remains a big secret), however it has dared to allow their customers to design a bottle through the “Design the World a Coke”.</em></td>
</tr>
<tr>
<td>Nike</td>
<td><em>Nike had done the same as Coca-Cola coming some time ago but even further, allowing customers to customize their sneakers that they would like to have with the commitment that after they will be manufactured.</em></td>
</tr>
</tbody>
</table>
Appendix 2. The basics of Open Innovation


<table>
<thead>
<tr>
<th><strong>Closed Innovation Principles</strong></th>
<th><strong>Open Innovation Principles</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The smart people in the field work for us.</td>
<td>Not all the smart people in the field work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company.</td>
</tr>
<tr>
<td>To profit from R&amp;D, we must discover it, develop it, and ship it ourselves.</td>
<td>External R&amp;D can create significant value: internal R&amp;D is needed to claim some portion of that value.</td>
</tr>
<tr>
<td>If we discover it ourselves, we will get it to the market first.</td>
<td>We don’t have to originate the research to profit from it.</td>
</tr>
<tr>
<td>The company that gets an innovation to the market first will win.</td>
<td>Building a better business model is better than getting to market first.</td>
</tr>
<tr>
<td>If we create the most and best ideas in the industry, we will win</td>
<td>If we make the best use of internal <em>and</em> external ideas, we will win.</td>
</tr>
<tr>
<td>We should control our intellectual property (IP) so that our competitors don’t profit from our ideas.</td>
<td>We should profit from others’ use of our IP, and we should buy others’ IP whenever it advances our own business models.</td>
</tr>
</tbody>
</table>

Appendix 2.2 – Some Mechanisms of Open Innovation listed by (van der Meer, 2007)

<table>
<thead>
<tr>
<th><strong>Stage</strong></th>
<th><strong>Importing</strong></th>
<th><strong>Exporting</strong></th>
</tr>
</thead>
</table>
| Concept   | • Creative sessions networking with universities and scientific institutes  
• Knowledge clusters ‘Open Day’  
• Conferences  
• Fairs  
• Suppliers and end-users  
• Licensing in | • Cluster projects  
• Industry groups  
• Public–private co-operation  
• Licensing out |
| Development | • Patent search  
• Partnering  
• Spinning in | • Patent brokers  
• Spinning out |
| Business   | • Venturing in | • Venturing out |
### Appendix 3. Matrix of Open Innovation applications.

Open innovation application Matrix (with examples):

<table>
<thead>
<tr>
<th>Principal Actors in Open Innovation</th>
<th>Products</th>
<th>Services</th>
<th>Technology</th>
<th>Knowledge / Processes</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers / Subcontractors</td>
<td>P&amp;G Pringles Chips Apple iPod - originally by external catalyst</td>
<td>P&amp;G CreateInnovate - Design of new packages</td>
<td>Nokia Innovenet</td>
<td>Calgene biotechnology Boeing Dreamline Supply Chain - FAILED 2</td>
<td>Kelloggs sustainability projects</td>
</tr>
<tr>
<td>Customers / Clients / Users</td>
<td>Dell IdeaStorm Danone new flavours Lego Mindstorms</td>
<td>Facebook open &quot;apps&quot; International Flavors and Fragrances design</td>
<td>Google Android apps Linux opensource policy</td>
<td>Yahoo Answers</td>
<td>Peugeot new designs competition</td>
</tr>
<tr>
<td>Competitors / Strategic Partners</td>
<td>Nissan - Peugeot Dell involvement with suppliers</td>
<td>Sky Team / One World T-mobile communication network</td>
<td>Netflix - LG Electronics Cisco alliances and tech incubator</td>
<td>Internet Home Alliance IBM - “Ventures in Collaboration”</td>
<td>Dossia - Employees with portable electronic medical records</td>
</tr>
<tr>
<td>Employees / entrepreneurs / users</td>
<td>3M innovation culture P&amp;G innovation system</td>
<td>IBM trials demos DuPont technology bank</td>
<td>TopCoder - programming competitions DuPont technology bank</td>
<td>P&amp;G InnovationNet IBM open improvement</td>
<td>Starbucks Social Network <a href="mailto:proposal@intel.com">proposal@intel.com</a></td>
</tr>
<tr>
<td>Specialized Community (e.g. researchers)</td>
<td>P&amp;G Connect and Develop Eli Lilly - Innocentive</td>
<td>IBM open source and free software policy.</td>
<td>Sun Microsystems Philips High Tech campus and MiPlaza</td>
<td>Eli Lilly - Innocentive Eureke medical DuPont technology bank</td>
<td>Artistshare - Fans funding new artists</td>
</tr>
<tr>
<td>Academic Institutions</td>
<td>Electrolux Design Lab Novartis Nokia Beta Labs</td>
<td>Science Commons - generic license agreements</td>
<td>Nokia Research Centre Intel Labs Europe</td>
<td>iBridge Network - platform for university innovation</td>
<td>ITESM Enterprise Incubator</td>
</tr>
<tr>
<td>Government / Agencies</td>
<td>NASA open innovation culture (ongoing)</td>
<td>E-Government British Citizen Engagement</td>
<td>Vinnova.se Intel Labs Europe</td>
<td>New Zealand Police Department</td>
<td>Vinnova.se Calgene biotechnology</td>
</tr>
<tr>
<td>Community in General</td>
<td>Threadless T-shirts Danone New products Nike / Converse</td>
<td>Idea4all.com Coca Cola - Bottle design</td>
<td>Ninesigma - technology problem solving</td>
<td>IdeaConnection Yet2.com Ideawicket</td>
<td>Misha Cosmetics The Crowdfund Company</td>
</tr>
</tbody>
</table>

**Notes:**
1. Most of the examples were taken from the Open Innovation examples list available in the Appendix.
2. Refers to Boeing failed attempt to implement Open Innovation in its Supply Chain.
3. Open Innovation units of analysis proposed by Chesbrough et al (2006) to be consider when investigating the model.