The Open Innovation Journey: How firms dynamically implement the emerging innovation management paradigm

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ABSTRACT

Open Innovation is currently one of the most debated topics in management literature. Nevertheless, there are still many unanswered questions in Open Innovation research. Especially two issues require further investigation: (i) understanding the relevance of Open Innovation beyond high-tech industries and (ii) studying how firms implement Open Innovation in practice. The paper addresses these topics by studying, through an in-depth case study, the journey that the Italian leading cement manufacturer, has undergone to move from a Closed to an Open Innovation paradigm.

The paper shows that the Open Innovation paradigm is implemented along a three-phase process that comprises the stages of unfreezing, moving and institutionalising. Moreover, it emerges that the changes through which Open Innovation has been implemented involve four major dimensions, i.e. networks, organisational structures, evaluation processes and knowledge management systems. They should be therefore conceived as the managerial and organisational levers an innovating firm can act upon to streamline its journey toward Open Innovation. Theoretical and managerial implications of using these levers for implementing Open Innovation are discussed at length.

1. Introduction

Open Innovation is the purposive use of inflows and outflows of knowledge to, respectively, accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, 2003). As an emerging paradigm for managing and understanding innovation processes, Open Innovation has been among the most debated topics by management scholars in the last years (Christensen et al., 2005; Dodgson et al., 2006; Gassmann, 2006; Vanhaverbeke, 2006; West and Gallagher, 2006). However, despite the huge interest the concept has raised among scholars and practitioners, there are still many unanswered questions in Open Innovation research and many areas where further investigation is needed (Chesbrough et al., 2006). In particular, two issues are widely acknowledged as being “open” challenges for researchers in Open Innovation (Gassmann, 2006): (i) to investigate the relevance of Open Innovation as a new paradigm for industrial innovation management beyond high-tech industries, where it has been primarily applied and studied; (ii) to investigate how firms can implement Open Innovation in practice.

As far as the first topic is concerned, only very recently a few attempts have been carried out to study Open Innovation outside high-tech industries. Chesbrough and Crowther (2006) survey 12 firms, identified as “early adopters” of Open Innovation, in mature and asset-intensive industries like aerospace and chemicals, whereas Vanhaverbeke (2006) and van de Meer (2007) investigate the adoption of Open Innovation in Dutch innovative firms operating in several heterogeneous sectors (e.g., food and beverage, chemicals, machinery and equipments). Similarly, scant attention has been dedicated so far to the process through which firms implement Open Innovation. Only scattered anecdotic evidence is available on this topic. For instance, Huston and Sakkab (2006) describe the different types of networks and the strategic planning process at the heart of Procter & Gamble’s open innovation approach, which is called “Connect and Develop”; Haour (2004) documents the way Generics creates and manages networks for sustaining its “distributed innovation” system; Kirschbaum (2005) explains how the multinational company DSM has built a teamwork and an entrepreneurial culture for opening up its innovation process. More recently, Gassmann and Enkel (forthcoming) collect evidence from more than 120 firms with the aim to discuss how Open Innovation is implemented in practice.

The paper addresses the above mentioned limitations of extant research on Open Innovation, studying the process through which a firm operating in a mature industry has adapted its organisational and managerial systems to the Open Innovation paradigm. Specifically, the paper reports the case of Italcementi, the leading Italian cement manufacturer, discussing the phases the firm went
through in the last 18 years to evolve from being a Closed to become an Open Innovator. This rich empirical basis allows us to comment on the managerial and organisational levers the firm has acted upon in this transformation process, with interesting implications for both theory and practice.

The paper is structured as follows. Section 2 develops the theoretical framework used for gathering and interpreting data about the Open Innovation journey of Italcementi. Section 3 motivates the research design and describes how the case study has been conducted. Section 4 presents the case of Italcementi, whereas Section 5 comments on the results of the empirical investigation and discusses the key features of the journey towards Open Innovation. Finally, conclusions and future avenues for research are discussed in Section 6.

2. Theoretical framework

For the purpose of the paper, we developed a theoretical framework combining and integrating research from different fields. First of all, the Open Innovation concept is further divided into its two basic dimensions, namely outside-in and inside-out Open Innovation. Then, the process of transition from Closed to Open Innovation is interpreted as an organisational change process, this allowing us to identify the different steps through which a firm conforms itself to the new innovation paradigm. Finally, the main levers on which managers intervene to realize the transition from a Closed to an Open Innovation model are introduced and discussed.

2.1. Dimensions of Open Innovation

As far as the first topic is concerned, Chesbrough et al. (2006) realize that it is possible to distinguish two conceptually separate dimensions of Open Innovation: (i) inbound or outside-in Open Innovation, which is “the practice of leveraging the discoveries of others” and entails the opening up to, and establishment of relationships with, external organisations with the purpose to access their technical and scientific competences for improving the firm’s innovation performance; (ii) outbound or inside-out open innovation, which suggests that “rather than relying entirely on internal paths to market, companies can look for external organisations with business models that are better suited to commercialize a given technology”. In other words, it is the practice of establishing relationships with external organisations with the purpose to commercially exploit innovation opportunities.

We advance that, in the journey from Closed to Open Innovation, a firm might separately introduce these two dimensions. This is consistent with the empirical evidence available in the literature. For instance, Chesbrough and Crowther (2006) show that in mature and asset-intensive firms, outside-in Open Innovation is clearly the prevailing dimension. Similarly, Gassmann and Enkel (forthcoming) find that firms integrate outside-in and inside-out Open Innovation in a very limited number of cases, whereas the two dimensions are often separately introduced. In particular, the authors show that firms where the outside-in dimension prevails generally belong to low-tech industries, whereas inside-out Open Innovation is far more diffused among high-tech companies. Therefore, in order to investigate the characteristics of the journey from Closed to Open Innovation, these two dimensions should be kept theoretically and empirically separate.

2.2. Process of implementation of Open Innovation

Adopting each or both of the above dimensions of Open Innovation implies a deep organisational change within the innovating firm. Open Innovation requires transforming the firm’s closed boundaries into a semi-permeable membrane enabling innovation to move easily between the external environment and the firm’s internal innovation process. Dodgson et al. (2006), in their study of the Connect & Develop innovation model at Procter & Gamble, report the feeling of many influential managers and highlight the “significant cultural and organisational change” required to adopt Open Innovation. Despite its undisputed importance, this facet of Open Innovation has been rather neglected by scholars so far and, to our best knowledge, there are no contributions adopting an organisational change perspective to shed light on the adoption of Open Innovation.

Because Open Innovation entails a significant organisational change in the firm that is willing to adhere to its principles, we advance that the implementation of Open Innovation should be better conceived as, and takes place in practice in the form of, a multi-phase organisational change process. Research adopting a process view to study organisational change has its roots in the early work of Lewin (1947), who described organisational change as a process made of three phases called unfreezing, moving and institutionalising. The first phase implies the establishment of a sense of urgency for change, the creation of a “guiding coalition” (Kotter, 2007) for championing change, and the creation and communication of the new vision to both internal and external stakeholders (e.g., personnel, senior management, suppliers, customers). The second phase concerns the actual implementation of change through the establishment of new procedures and patterns of behaviour consistent with the new vision, eventually acting on budget constraints, targets, schedules and reward systems. This stage is typically characterised by an experimental “trial and error” approach, which allows identifying the solution which better fits with the firm’s internal and external context. Finally, the third phase involves the institutionalisation of the new order, through consolidating the improvements achieved in the previous stage and preventing a slip back to the antecedent status quo. Building on the early work of Lewin (1947), several authors (Judson, 1991; Kotter, 1995, 2007; Galpin, 1996; Clark et al., 1997) have developed different multi-phase models of the change process, comprising seven to twelve phases. In this paper, consistently with the work of Armenakis and Bedeian (1999), who review organisational change literature and bring back the aforementioned contributions to the original three-phase model proposed by Lewin, we suggest that Open Innovation as an organisational change process occurs through an unfreezing–moving–institutionalising sequence.

2.3. Managerial levers for Open Innovation

Implementing Open Innovation requires the innovating firm to act upon on a number of managerial levers, along which the change process unravels. Studying extant literature in the field it is possible to identify four key levers where the implementation of Open Innovation has an impact.

2.3.1. Networks

Open Innovation implies an extensive use of inter-organisational relationships to in-source external ideas from a variety of innovation sources and to market internal ideas that fall outside the firm’s current business model, using a range of external market channels. This requires the innovating firm to establish relationships with a variety of partners, in particular universities
and research institutions (Perkmann and Walsh, 2007), suppliers (EmdenGrand et al., 2006), and users (von Hippel, 2005; Simard and West, 2006; West and Lakhani, 2008). As noted by Dittrich and Duyster (2007) in their analysis of the innovation network of Nokia, inter-organisational relationships might be established with an explorative or exploitative intent (March, 1991), the former enabling the inflow of external knowledge (outside-in dimension of Open Innovation), the latter allowing for the external exploitation of technological opportunities (inside-out Open Innovation). This suggests that in implementing Open Innovation firms should be able to manage different networks for different purposes. Laursen and Salter (2006) go further by identifying, as a key factor in the shift towards Open Innovation, a change in the way through which firms search for new ideas and technologies. The authors suggest that Open Innovation firms increase both the search breath (the number of external sources they rely upon in their innovative activities) and the search depth (the extent to which firms draw deeply from the different external sources) of their innovation networks.

2.3.2. Organisational structures

Successfully managing externally acquired knowledge requires the development of complementary internal networks (Hansen and Nohria, 2004), i.e. organisational structures devoted to accessing and integrating the acquired knowledge into the firm’s innovation process. The same internal re-organisation is needed to follow external paths to market for internally developed ideas. Evidence shows that these organisational structures strongly vary from independent “Open Innovation” business units (Kirschbaum, 2005), to task forces and dedicated cross-functional teams (Sakkab, 2002). Furthermore, in the concept of organisational structures it is necessary to include also: (i) the establishment of organisational roles supporting the implementation of Open Innovation, e.g., champions who lead the process of adoption of Open Innovation (Chesbrough and Crowther, 2006) or gatekeepers for managing the firm’s interface with the external environment (Allen, 1970; Tushman, 1977); (ii) the use of rewarding systems purposefully introduced to support the new paradigm (Chesbrough, 2003).

Specific interventions along all these dimensions are needed to favour outside-in and inside-out Open Innovation. For instance, creating an independent business unit which manages collaborative relationships and research contracts with Universities is a necessary change to streamline the inflow of knowledge from these important external actors (Santoro and Chakrabarti, 2002). On the other hand, establishing a business development unit with dedicated resources and adequate skills is often a pre-requisite for an effective external exploitation of proprietary technologies (Lichtenthaler and Ernst, 2007).

2.3.3. Evaluation processes

Another key lever upon which managers might act to implement Open Innovation is the process by which innovation projects are evaluated. The openness of the innovation system increases the difficulties determined by the evaluation of innovation projects, which often involve significant technical and market uncertainty. In such circumstances, firms need to play “poker” rather than “chess” (Chesbrough, 2003), i.e. they need new metrics of evaluation to focus more upon external sources and/or exploitation paths of innovation. In this respect, procedures to systematically scan and continuously monitor the range of technologies available in the external environment (van de Vrande et al., 2006), as well as new forms for the involvement of external sources of innovation through the strategic use of corporate venturing (Keil, 2002), appear to have an increasing importance for the outside-in dimension of Open Innovation. Similarly, introducing inside-out Open Innovation has deep implications on the evaluation process. In particular, it requires that external exploitation alternatives (like spin-outs and out-licensing) are considered since the beginning of the evaluation process as they might have a relevant impact on the potential profits resulting from innovation (Lichtenthaler, 2004).

2.3.4. Knowledge management systems

Finally, managers might be required to intervene on knowledge management systems to favour the introduction of the new innovation management paradigm. Open Innovation is indeed all about leveraging and exploiting knowledge generated inside and outside the firm to develop and exploit innovation. Implementing Open Innovation means, therefore, to adopt knowledge management systems able to foster the diffusion, sharing and transfer of knowledge within the firm, and between the firm and external

**Fig. 1.** Theoretical framework.
3. Research design

The theoretical framework described in the previous section allows us to answer the main research question of the paper:

- How does a firm in a mature industry use the different managerial levers along the three phases of the organisational change process to implement each of the two dimensions of Open Innovation?

Because the area of investigation is relatively novel, we focus on the collection of rich qualitative data through case study research (Yin, 2003). The purpose here, consistent with Siggelkow (2007), is to provide a rich illustration of the phenomenon under analysis. Furthermore, case study design is particularly useful when the researcher tries to unravel a process that plays out over time. Finally, as our purpose is to advance theory, after the initial definition of the research question with references to extant literature, we refused to make hypotheses about specific relationships between levers, phases of the process and dimensions of Open Innovation, observing the empirical evidence and using it in an inductive fashion (Eisenhardt, 1989).

We started by identifying early adopters of Open Innovation in mature industries in Italy. To this aim, following the methodology adopted in Chesbrough and Crowther (2006), we used the professional Lexis-Nexis newspapers database (www.lexisnexis.com) and carried out different rounds of searching using keywords related to Open Innovation. Ten Italian firms (Barilla, Beghelli, Brembo, Ducati, Eni, Luxottica, Indesit, Italcementi, Mapei, Tenaris) resulted as “early adopters” of Open Innovation in mature industries.

The top managers of the identified firms have been invited to participate, together with the authors, to two Open Innovation workshops, during which issues related to the implementation of Open Innovation were discussed. Finally, we selected the case of Italcementi, the leading Italian cement manufacturer, for being studied more in depth. In this choice, we mainly considered the efficacy of research, in the meaning of Yin (2003), i.e. the chance of having a good collaboration with a counterpart very interested in the research and of studying the phenomenon in a “transparent” way through accurate and careful data and information collection. Moreover, Italcementi allowed us to provide an example of application of Open Innovation in an industry where, to our best knowledge, similar analyses are lacking.

We gathered information mainly through direct interviews. Specifically, we went through the following steps. First, we briefly described the research project through a written summary and a telephone call to the managers previously involved in the workshops, asking them to introduce us to the head of the R&D function and/or to other managers responsible for the research and innovation management activities. Then, we personally interviewed the selected R&D and innovation managers. We undertook four semi-structured interviews (each interview lasted on average 2 hours) in order to gather the required information. The interviewed people were: (i) the former head of R&D during the years 1991–2006, (ii) the head of the Intellectual Property Office who joined Italcementi in 1993, (iii) the current head of R&D and (iv) the current head of the Innovation Directorate. All interviews were tape-recorded and fully transcribed. Secondary information was collected in the form of documentation (newspaper articles, website news and balance sheets) and archival records (organisational charts, list of partners, service records). This further informed the researchers with background information about Italcementi, its innovation processes and outcomes. Moreover, these secondary information sources have been triangulated with data drawn for direct interviews (Yin, 2003). Finally, telephone follow ups with respondents were conducted in order to gather some important missing data. The gathered data and information allowed us to identify and analyze the phases Italcementi went through in the last 18 years to evolve from a Closed to an Open Innovator. As a whole, the case study lasted five months, from January to May 2008.

4. The Open Innovation Journey of Italcementi

In this section of the paper, we present and describe the journey of Italcementi, the leading Italian cement manufacturer, through which it evolved from being a Closed to become an Open Innovator. The journey, according to the interviewed managers, started indeed in the early 1990s.

Table 1 summarises some relevant information about the firm in the period of the analysis and provides a brief history of Italcementi since its foundation in 1864.

4.1. The early 1990s and the closed innovation model

During the early 1990s, Italcementi was very different from how it is today. First, it was very much focused on the Italian cement market, where it operated with an undisputable leadership. Besides Italcementi, the Italian market was populated by a few small companies working on a very local basis. As a consequence of the relatively low level of direct competition, innovation activities in Italcementi were mainly focused on improving internal production processes and increasing products’ reliability (i.e. their chemical composition) for general construction uses. Although there was not a formal R&D unit within Italcementi, innovation activities were carried out in the firm’s technical support centre, employing nearly 100 people, whose main task was to address the technical problems identified by customers (craftsmen and small and medium bricklayer firms). Italcementi held no patents in the early 1990s, even if the firm was active also in basic (academic) research. The head of the technical support centre was indeed a University professor who, together with the other 3 graduates of the centre, published a number of papers in academic journals and conference proceedings. This activity was strongly supported by the top management as it contributed to strengthen the position of Italcementi as representative of the interest of the Italian cement industry at European level.

4.2. 1991–1994. The first steps towards Open Innovation

The wave of globalisation hit the cement industry at the beginning of 1991, when also changes in the EU laws had lowered entry barriers to national markets. The top management of Italcementi was aware...
that, in order to maintain competitiveness, the firm would have needed to significantly increase its scale and presence in other markets. In order to speed up the achievement of these goals, Italcementi decided to acquire Ciments Francais, the leading French cement firm. Ciments Francais had at that time about three times the size of Italcementi. In the late 1990s and in the first 2000s the process of internationalization shifts towards emerging countries with relevant acquisitions in Morocco, Bulgaria, Kazakhstan, Thailand and equity investments and joint ventures in India and Egypt. Later in 2006, the company acquires full control of the India joint venture and signs a collaboration deal with Arabian Cement Company. In 2007, with a productive capacity of more than 70 million tons per year, Italcementi is the leading Italian cement player and it is ranked fifth at worldwide level. Italcementi is among the top ten Italian industrial firms by market capitalisation and operates in 22 countries.

Table 1
Key data and brief history of Italcementi.

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<td>Revenues (€b)</td>
<td>0.84b</td>
<td>2.65b</td>
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<td>Domestic (%)</td>
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<td>50%</td>
<td>30%</td>
<td>28%</td>
<td>26%</td>
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<tr>
<td>International (%)</td>
<td>1%</td>
<td>50%</td>
<td>70%</td>
<td>72%</td>
<td>74%</td>
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<tr>
<td>Employees</td>
<td>6,288</td>
<td>12,450</td>
<td>18,137</td>
<td>22,857</td>
<td>23,700</td>
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<td>R&amp;D expenses (%)</td>
<td>n.a.</td>
<td>0.2%</td>
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4.3. 1995–2005. The TX Active project: testing the new innovation approach

Competitive pressure in the industry increased also due to a wave of M&As among the major competitors of Italcementi. The top management wanted to demonstrate that the acquisition of Ciments Francais created not only a larger firm but also increased its innovation potential. The TX Active project emerged as a good chance to provide this evidence. The project started from the idea of applying cement to reduce pollution by mixing traditional cement components with photo-catalytic elements able to capture and neutralise carbon oxide from the external environment. Potential applications were manifold (e.g., arcades, bridges, concrete constructions) and large cities, at that time strongly committed to fight carbon oxide pollution, represented a very attractive market.

Despite the idea was generated within Italcementi, the firm clearly lacked knowledge about photo-catalysis, a chemical process very far from those commonly adopted in the cement industry. Leveraging the social network of the head of R&D, Italcementi started to establish formal relationships with a number of Italian Universities and research centres (among the others, Politecnico di Torino, Politecnico di Milano, CNR). The power and skills of the internal project managers grew significantly as well as the number of R&D personnel with a technical or scientific degree: the normal turnover of retirees was used to hire more skilled people, maintaining the overall number of R&D workers close to 100. Meetings were held on a monthly basis with the head of R&D and the Intellectual Property Office.

Managing basic research projects, and particularly those on photo-catalysis, requires however a larger amount of financial resources that Italcementi was not able to devote to R&D activities at that time. The head of R&D decided then to open a small research centre (only 10 people) in Brindisi. The aim of the centre was to promote research projects to be funded by the European Commission under the Framework Programmes. The fact that Brindisi was in an Objective 2 region (i.e. a region of the European Union with a priority in the grant of funds) made it easier for Italcementi to access public funding (e.g., a project was launched with the acronym PICADA in 2002 to further develop photo-catalytic elements for the TX Active).

At the same time, however, accessing EU funds required: (i) to enter into a European network of Universities, this enlarging the original relationships with Italian academic professors and creating a formal system for managing collaborations; (ii) to strengthen the intellectual property protection systems by hiring new personnel for the Intellectual Property Office. Italcementi became able to file nearly 4 patents per year.

In the period 1995–2005, the number of innovation projects implemented every year more than doubled, from nearly 7–8 in 1995 to more than 20 in 2004 and 2005. The increase in the number of projects also forced the adoption of ICT systems to more effectively manage cross-functional teams across different countries (e.g., videoconference devices) and for searching in database of scientific publications and patents. The project management culture was well diffused in the firm and also the personnel in R&D started to be evaluated, even if still informally,
on project performance. In particular, the ability to establish a network of contacts outside the firm was regarded as critical for the appointment and subsequent evaluation of project managers.

### 4.4. 2006-onward. Italcementi as Open Innovation firm

In the last 2 years, also as a consequence of the success of the TX Active project, Italcementi further increased its efforts in innovation. In 2006, a new head of R&D (also with past experiences in the R&D of Eni) was hired.

A new small research centre was established in a scientific park named Kilometro Rosso near Bergamo, with the aim to exploit cross-fertilisation of research activities taking advantage of the presence of research labs of firms operating in different industries (e.g., automotive, aerospace, biotechnology). The R&D unit within Italcementi was also restructured through the establishment of the so-called sector heads. Seven sector heads, chosen among the most experienced project managers, were appointed for coordinating innovation projects belonging to certain key areas (e.g., cement, additive, concrete), for identifying the right project manager to be entitled with the responsibility of each project, for supporting the head of R&D in the evaluation process of innovative projects, for managing relationships between the different functions within the firm (ensuring also the involvement of commercial units), and finally for nurturing and expanding the innovation network of Italcementi.

In 2007, to further support the work of the sector heads, a new organisational unit called Competitors Group was established with 2 people under the supervision of the Intellectual Property Office. The Competitors Group constantly monitors the activities of competitors about the introduction of new products and scouts the most promising technological advances in Universities.

The relevance of innovation for Italcementi has been formalised through the development of an ad hoc indicator, called “innovation rate”, measuring the contribution of innovative products to the overall revenues. A target value of 5% was set for the year 2013 and additional measures and targets have been derived for project managers and R&D personnel.

In the meantime, since 2006 Italcementi has increased the involvement of customers in its innovation activities. The first customers involved by Italcementi have been “internal” ones, i.e. the different commercial branches of the firm. A new organisational unit, independent from R&D and employing 10 people, has been established under the name Innovation Directorate. The aim of the Innovation Directorate is to evaluate, together with R&D, the potential for the commercial exploitation of the results of innovation projects. More recently, the Directorate started to involve external customers. The first attempts have been made using the TX Active as a testing field. A network, called TX Active club, has been established involving the main customers of the new product with the aim to receive quick feedback on its practical use and to eventually co-develop ad hoc solutions (e.g., a project has been launched to develop a formulation of the TX Active cement which is compatible with the use in plasters for external painting). The Directorate is however far from focusing on project performance. In particular, the ability to establish a network of contacts outside the firm was regarded as critical for the appointment and subsequent evaluation of project managers.

### 5. Discussion and managerial implications

The journey of Italcementi towards Open Innovation is very appropriate to achieve the aim of the paper. First, it starts from an era when the firm’s innovation attitude clearly conforms to a Closed Innovation approach. This allowed us to observe the whole journey it has undergone to adopt Open Innovation.

Second, Italcementi is, at the beginning of its journey, a typical example of a company operating in an asset-intensive, relatively low-tech and mature industry:

- it has strong but rather narrow scientific and technical competences in its own area of interest;
- In the early ’90s old technicians at Italcementi were able to recognise the components of a cement mixture only by looking at it ... but they were not aware of anything else happening outside the industry

**Former Head of R&D**

- R&D activities are not even formalised within the firm and are carried out, with a rather marginal effort, by the technical support centre;
- the firm focuses on a relatively narrow (domestic) market where customers are on average low demanding in terms of product innovation and where competition is rather weak;
- the firm pays a lot of attention to technical assistance and the reliability of their products, believing that too much innovation may confuse customers.

Our market requires reliability, reliability and reliability. We tried to develop at the end of the ‘80s a pre-add cement, i.e. a cement which did not require the user to mix it with additives, but most of our customers were not interested in it. They preferred to use their traditional additives with their own recipes.

**Former Head of R&D**

It immediately follows that implementing Open Innovation in such an environment represented a significant challenge and clearly required a remarkable change in the organisation and management systems of Italcementi.

As far as the two dimensions of Open Innovation – which represent the first axis of analysis of our framework – are concerned, there is clear evidence in the case study that Italcementi first introduced outside-in Open Innovation, focusing on accessing external sources of knowledge and innovation (particularly for the development of the TX Active), whereas only in more recent years they have started to implement the inside-out dimension. The process of implementation of Open Innovation in Italcementi is therefore consistent with the evidence collected by scholars studying the implementation of Open Innovation in low-tech and mature industries (Gassmann and Enkel, forthcoming; Chesbrough and Crowther, 2006).

In order to discuss the journey of Italcementi in more details, we separate (according to our theoretical framework) the analysis of the two dimensions of Open Innovation. For each of them we briefly reorganize the process in the three phases of unfreezing, moving and institutionalising, focusing our discussion on the key managerial levers along which change has occurred. **Table 2** summarises the main findings of the case study analysis.
5.1. Outside-in dimension

5.1.1. Unfreezing

The journey of Italcementi towards Open Innovation undoubtedly starts when the firm’s top management makes clear its commitment to innovation.

The interviewed managers reported that the CEO of Italcementi, who was also a member of the family which founded the company in the 19th century, was used to say in internal meetings:

Italcementi has been so far the leader on the Italian market leveraging the undoubted reliability of its products, but in order to be a leader in the future globalised market we need to find a new way to nurture our innovation, looking more and more outside the boundaries of our company.

The enabling role of top management is well established in the literature on radical organisational change (see, e.g., Goodman and Dean, 1982) and we found it to be a key pre-requisite for the implementation of Open Innovation in Italcementi. However, in order to trigger the change and overcome the firm’s organisational inertia (particularly relevant in mature industries), the firm had to adopt a jump-in approach (Clark et al., 1997; Kotter, 2007) hiring a new head for R&D unit from outside. This helped creating a new culture of innovation. It is in this new and more outside the boundaries of our company.

In my first months in Italcementi, the new head of R&D set almost every day internal meetings, talking with the first project managers, discussing with them about potential new projects and collaborations, and I was also often involved ... at the very beginning it seemed like a waste of time but shortly we started feeling that people were more aware that innovation was not only a slogan but a business target to achieve.

In a firm where people in the technical support centre were expected only to meet technical requirements, the new “cultivation” style of management (Orlikowski and Hofman, 1997) clearly helped creating a new culture of innovation. It is in this new and more favourable environment that the new head of R&D started to act upon the managerial levers on which the implementation of Open Innovation is based. Very interestingly, the first action undertaken to introduce the new approach to innovation is the creation of a new organisational unit: an Intellectual Property Office dedicated to manage the existing and new knowledge base of the firm. If we recall that the R&D unit had been created no more than 1 year earlier, we can identify two significant implications of these modifications: (i) they make the change immediately visible to every one within the firm, i.e. they are strong signs that the status quo has been unfrozen to enable change; (ii) they do not interfere with the basic processes and routines of the firm. If we recall that the R&D unit had been created no more than 1 year earlier, we can identify two significant implications of these modifications: (i) they make the change immediately visible to every one within the firm, i.e. they are strong signs that the status quo has been unfrozen to enable change; (ii) they do not interfere with the basic processes and routines of the firm, i.e. they do not conflict directly with the status quo. At the same time, and with similar purposes, an external scientific committee is established to evaluate projects: the committee is visible enough (and also involves highly respected professors) and not conflicting with internal routines (as they meet only twice a year).

The first patents filed in the years 1992–1994 represent the early wins (Kotter, 2007) needed to signal that implementing change can lead to tangible results.

It deserves a special attention the fact that, at least in the unfreezing phase, the role played by the firm’s network is rather marginal if not completely irrelevant. This is rather new in Open Innovation literature which, on the contrary, has almost always stressed the role of the network as a key enabler of the adoption of the new paradigm. In the case of Italcementi, the only network that seems to play a role since the beginning is not the one at the firm-level, but the social network of the new head of R&D. Considering the work of Perkmann and Walsh, (2007) on
university–industry relationships, we could argue that these inter-personal relationships acted as antecedents to the firm-level relationships. In this respect, individual social networks could be as relevant as firm-level networks to understand the implementation process of Open Innovation.

5.1.2. Moving

Once the firm is made aware of the need for a new approach to innovation, the implementation of change (i.e., the moving phase of the process) requires an experimental field where the solutions better fitting with the characteristics of the firm are identified (Lewin, 1947). In the case of Italcementi, the experimental field is represented by the TX Active project. As discussed earlier, the project had the characteristics (in terms of degree of innovativeness and need for accessing external sources of competence) for being the ideal setting to implement the outside-in dimension of Open Innovation.

The first challenge Italcementi was confronted with was related to the network lever. The firm had in fact to switch the social network of the new head of R&D into a firm-level network.

For long time the firm competed with universities in publishing works in journals and conferences ... so we were not used to cooperate with external organisations. Moreover, we needed to protect our knowledge from potential spillovers in order to start relationships and to manage contractual stuff ... at the end project managers fully understood the role of the IP Office and began to work more closely with it

*Head of Innovation Directorate*

The network had an exploration nature in the words of March (1991), as the firm needed to explore new areas of knowledge different from those it traditionally mastered. Interestingly, the depth of the network (Laursen and Salter, 2006) clearly prevailed on its breadth. Italcementi, indeed, established a number of long-term relationships almost exclusively with Italian Universities, at least in a first phase. The reason behind this decision appears to be twofold: (i) Universities represent the only partner able to satisfy the need for basic knowledge expressed by the firm; (ii) relationships with Universities are less risky in terms of potential spillovers than those involving suppliers, customers or even competitors. Focusing on Universities as privileged external sources of technical knowledge is consistent with the attitude towards IP protection of the firm.

Besides the network, all the four managerial levers that we identified in our framework are “moved” at this stage. ICT systems are strengthened and their use increased significantly the collaborations of people in cross-functional teams. IP protection systems were also more widely employed. They allowed the firm to enlarge its network of relationships with Universities beyond the Italian boundaries, including other European Universities member of the EU project consortia lead by Italcementi. Evaluation processes became more formalised, and particularly the need for accessing external knowledge was systematically assessed during project meetings.

We created this office in Brindisi for the EU projects and, since then, in every project meeting at least there is someone asking if we considered the chance to establish a consortium of partners for pursuing the project development.

*Head of Intellectual Property Office*

The establishment of the office in Brindisi is the example of another action taken at the level of the organisational structures which goes beyond the TX Active project. Interestingly, also the performance management system was adapted – even if still informally in this phase – to the new Open Innovation perspective, with project managers being evaluated also on the basis of their ability to establish social and inter-personal networks.

We started evaluating our researchers also on the number of contacts they established by joining conferences and international business meetings. It was like creating an incentive for them to stay at the conference venue talking with other people instead of going around in the city.

*Former Head of R&D*

5.1.3. Institutionalising

Finally, the results achieved in the implementation of the outside-in dimension of Open Innovation are consolidated and institutionalised in the last 2 years. As it happened in the unfreezing phase, the focus is here on organisational structures.

In particular, the role of the innovation champion, who, at the beginning of the Open Innovation journey, was performed only by the head of R&D, becomes distributed among the seven sector heads. Moreover, the sector heads represent permanent organisational roles within the firm. The firm also formalised a gatekeeping role through the establishment of the Competitors Group, this also improving the resources devoted to scouting for external sources of innovation. This allows to spread the adoption of the Open Innovation approach beyond the testing project and to make it part of the firms’ organisational routines and procedures.

Ciments Francais, at the time of the acquisition, had its own Competitors Group. Once acquired, however, it was decided to close the unit as its role was not so clear ... after nearly 15 years finally we decided to reintroduce it, as now we have a clear vision on how to use it

*Head of R&D*

The innovation rate, together with a number of other measures derived from it, has also been introduced in this phase. A target objective for this metric has been also identified and formally included in the firm’s business plan for the next years. Early cases of firms implementing Open Innovation outside high-tech industries (Chesbrough and Crowther, 2006) show that “companies using Open Innovation to extend their enterprise do not create new processes and metrics; Open Innovation perspective onto existing processes”. On the contrary, and therefore more interestingly, the case of Italcementi suggests that also firms in mature industries may adopt Open Innovation through a deep change of their processes and evaluation metrics.

5.2. Inside-out dimension

The inside-out dimension of Open Innovation has not been completely implemented by Italcementi so far. The firm started only recently indeed, in the last 2 years, to look explicitly for the external exploitation of innovations developed within the firm.

Now we are ready to discuss with partners for potential out-licensing agreements ... this was not even thinkable for Italcementi at the beginning of the new century

*Head of Intellectual Property Office*

Only after improving competences and developing relevant experience in knowledge management and IP protection systems, a firm is able to start proactively using its knowledge (Chesbrough et al., 2007). Therefore, it is possible to argue that, as already discussed in the paper, it is rather difficult to contemporarily develop the two dimensions of Open Innovation, and that firms may therefore decide to start by focusing only on one of them. Differently put, it is possible to say that each dimension requires
Innovation occurred. The process of implementation of the inside-out dimension was capabilities perspective (Teece, 2007). In the case of Italcementi, these capabilities have been recently interpreted under a dynamic connected to the inside-out dimension of Open Innovation. Both by external exploitation (multiplicative capability) is strongly outside-in process, whereas the capability to multiply innovation different capabilities (Gassmann and Enkel, forthcoming). Ab-

42

Innovation. On the one hand, it provides support to a number of paper strongly contributes to the ongoing debate on Open Innovation approach and will hopefully inform future research investigate the process through which a firm conform to the Open Innovation paradigm. This framework allows to systematically a theoretical framework integrating contributions from different streams of research. To this aim, the paper firstly develops has adapted its organisational and managerial systems to the extant research on Open Innovation, studying the journey through innovation projects represents a strong signal that the status quo has been unfrozen, but without interfering with the firms’ basic processes and routines; (ii) the marginal (if not irrelevant) role played, at least in the first phase of the process, by the firms’ network of customers and suppliers. This is somehow a new finding in the Open Innovation literature, which has very much stressed so far the relevance of the firm’s network as a key enabler of the adoption of the new paradigm; (iii) the pivotal role of the individual social network of the Open Innovation champion, which appears to act as an antecedent to firm-level relationships; (iv) the fact that, differently from the available evidence on Open Innovation in mature industries, according to which “companies using Open Innovation to extend their enterprise do not create new processes and metrics; instead they layer an Open Innovation perspective onto existing processes” (Chesbrough and Crowther, 2006), our case highlights a deep change also in the processes and evaluation metrics. Finally, the paper contributes also to organisational change research, as it is to our best knowledge the first attempt to apply the established Lewin’s model to study the process of adoption of the new Open Innovation paradigm.

As far as practical implications are concerned, we believe the paper provides managers working in mature, asset-intensive industries with a number of insights which stimulate their own remarks about how to organise and carry out the process of adoption of Open Innovation and how to improve the odds that it is successfully completed.

The research we conducted is explorative in nature and has obviously a number of limitations. First of all, it is based on a single case study and therefore any generalisation of the results needs to be carefully considered. In particular we were not able to control for the impact of several contextual factors which might have an important influence on the process of implementation of Open Innovation, e.g., the nationality of the firm (country-specific factors), the industry in which it operates (industry-specific factors), the fact that it is a family-owned business (firm-specific factors). We believe, however, that the richness of the details provided by our single case study makes the paper a valuable basis for future research into the anatomy of the journey of Open Innovation.

5.2.1. Unfreezing

Once we came out from R&D with a new product we encountered a lot of problems in diffusing it even in some of our subsidiaries ... it was as if we lacked a connection with our internal customers
Head of Innovation Directorate

These words describe the organisational environment of Italcementi in early 2006, when the firm started its process of implementation of the inside-out dimension of Open Innovation. It is interesting to note that, as it happened for the outside-in dimension, the organisational change undertaken for adopting the inside-out Open Innovation is lead by a champion. Furthermore, the sense of urgency for change is also established through a jump-in of an external manager with past business experience.

The Innovation Directorate is the organisational structure which makes this change visible. The Directorate initially ensures the connection between R&D, the other functional units and the subsidiaries of the firm. At the same time, it has the role of evaluating and planning the best solutions for the exploitation of innovation results.

5.2.2. Moving

The TX Active project appears to be the testing field also for the implementation of the inside-out dimension of Open Innovation. The first attempt to introduce an inside-out approach translated into the establishment of a tentative exploitation network involving the customers of the TX Active and its further extension to other projects. The process is still in progress but the goal to be achieved is clear.

You can call it Open Innovation ... but we call it simply becoming a fully innovative firm in the current business environment
Head of R&D

6. Conclusions

The paper attempts to overcome two major limitations of extant research on Open Innovation, studying the journey through which a firm, operating in a mature and asset-intensive industry, has adapted its organisational and managerial systems to the Open Innovation paradigm. To this aim, the paper firstly develops a theoretical framework integrating contributions from different streams of research. This framework allows to systematically investigate the process through which a firm conform to the Open Innovation approach and will hopefully inform future research into the topic.

As far as research implications are concerned, we believe the paper strongly contributes to the ongoing debate on Open Innovation. On the one hand, it provides support to a number of findings on the adoption of the new innovation paradigm in mature industries, and in particular: (i) the prevalence of the outside-in dimension (Chesbrough and Crowther, 2006), where the reason for accessing external sources is the willingness to minimize risk by investing in technologies that are already proven in other applications; (ii) the enabling role of top management in promoting the transition towards an Open Innovation approach (Vanhaverbeke, 2006; van de Meer, 2007); (iii) the need for a champion promoting change along the managerial levers on which the implementation of Open Innovation occurs (Chesbrough, 2006). On the other hand, the paper allows identifying several new aspects that deserve further attention from scholars studying the implementation of Open Innovation in mature industries: (i) the fact that the starting point of the process of implementation of Open Innovation (in both its dimensions) is in the organisational structures level. The creation of independent organisational units for managing innovation projects represents a strong signal that the status quo has been unfrozen, but without interfering with the firms’ basic processes and routines; (ii) the marginal (if not irrelevant) role played, at least in the first phase of the process, by the firms’ network of customers and suppliers. This is somehow a new finding in the Open Innovation literature, which has very much stressed so far the relevance of the firm’s network as a key enabler of the adoption of the new paradigm; (iii) the pivotal role of the individual social network of the Open Innovation champion, which appears to act as an antecedent to firm-level relationships; (iv) the fact that, differently from the available evidence on Open Innovation in mature industries, according to which “companies using Open Innovation to extend their enterprise do not create new processes and metrics; instead they layer an Open Innovation perspective onto existing processes” (Chesbrough and Crowther, 2006), our case highlights a deep change also in the processes and evaluation metrics. Finally, the paper contributes also to organisational change research, as it is to our best knowledge the first attempt to apply the established Lewin’s model to study the process of adoption of the new Open Innovation paradigm.

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