

# Designing and managing co-innovation: the case of Loccioni and Pfizer

Designing and  
managing co-  
innovation

Noemi Ombrosi

*Loccioni, Ancona, Italy*

Elena Casprini

*Department of Business and Law Studies,*

*University of Siena, Siena, Italy and*

*Institute of Management, Scuola Superiore Sant'Anna, Pisa, Italy, and*

Andrea Piccaluga

*Institute of Management, Scuola Superiore Sant'Anna, Pisa, Italy*

Received 5 September 2018  
Revised 15 November 2018  
Accepted 14 December 2018

## Abstract

**Purpose** – Knowing the factors influencing the success of collaborative innovation is particularly relevant for both academics and practitioners. Nonetheless, many studies have regarded the megatrends influencing innovation imperatives, the development of co-innovation strategies, the selection of partners and the involvement of user communities, but not so much the understanding of how the co-innovation process is concretely designed and managed. Adding to extant research, the purpose of this paper is to explore how companies collaborate in co-innovation processes.

**Design/methodology/approach** – A longitudinal, single case study has been conducted on the co-innovation process between Loccioni, an Italian medium-sized, high tech family firm, and Pfizer, one of the largest companies operating in the pharmaceutical sector.

**Findings** – From the case study analysis, three main results have emerged. First, the role of medium-sized companies in leading the co-innovation process as both the initiator and orchestrator. Second, the interplay between the local and the global dimension of co-innovation and the importance of (un)formal roles in innovation. Third, the “double funnel” of co-innovation, linking both the technological and the relational dimensions. Specifically, the case highlights the relevance of the relational – beyond the technological – aspects of co-innovation, providing a relational model that links the geographical dimensions (local/distant) and the role of specific individuals.

**Originality/value** – The paper presents an example of how a medium-sized firm has implemented its co-innovation process, shedding new light on possible barriers and success factors that other smaller or similar companies may follow when dealing with large multinationals.

**Keywords** Co-innovation, Open innovation, Single case study

**Paper type** Research paper

## 1. Introduction

The importance of innovating with partners beyond the traditional companies' boundaries is nowadays fully accepted. Increasingly, smaller and larger companies adopt open innovation (OI) processes (Enkel *et al.*, 2009), collaborate with heterogeneous partners (Laursen and Salter, 2006; Lazzarotti *et al.*, 2017) and focus on specific phases of the new product development (NPD) funnel (Bianchi *et al.*, 2008). Indeed, companies adopt OI for several reasons, such as accessing new knowledge, fostering creativity, reducing time-to-market, etc. Scholars have explained that not all the collaborations are equal (Laursen and Salter, 2006), that different types of openness exist (Dahlander and Gann, 2010; Lazzarotti *et al.*, 2017), and that OI is managed and executed (Casprini *et al.*, 2017; Marangos and Warren, 2017) in several different ways. However, although OI antecedents and OI outcomes have also been deeply investigated, scant attention has been given to the processes through which OI is concretely implemented.



---

In particular, regarding the under-researched topic of co-innovation (Castaldi *et al.*, 2013) and focussing on co-innovation between industrial partners (Tsou *et al.*, 2015), this paper explores how companies collaborate in co-innovation processes. Specifically, the present work links two dimensions of innovation. On the one hand, there is the technological dimension of innovation, which traditionally pays attention to the NPD funnel and to the different paths that a firm may take when dealing with OI processes. On the other hand, there is the relational dimension of innovation, with a focus on how partners' relationships are developed.

An in depth, longitudinal case on the Loccioni–Pfizer co-innovation process is presented. The Loccioni–Pfizer story is theoretically interesting since, although the technological innovation funnel is widely explored in the innovation literature (Cooper, 2001), its connection with the relational dimension has not been investigated. Hence, by offering an empirical account of how a relatively small firm manages a co-innovation process with a much larger company, this paper introduces the “double funnel” of innovation.

The paper is structured as follows. In the next section, we provide a literature review on OI and co-innovation. Then, in the methodology section, we present how data have been collected and analysed. The fourth section provides an in depth description of the findings. Hence, the “double funnel” of innovation is introduced and discussed. Theoretical and managerial implications, as well as limitations and future research perspectives, are presented.

## 2. Literature review

### 2.1 Open innovation: an overview

Research on OI has flourished in the last 15 years, investigating topics from how companies organize for (Chiaroni *et al.*, 2010) and execute (Casprini *et al.*, 2017; Usman and Vanhaverbeke, 2017) OI to the impact of OI on companies' innovation performance (Laursen and Salter, 2006; Lazzarotti *et al.*, 2017; Parida *et al.*, 2012). From previous studies about OI, four main contributions may be derived. First of all, OI is important for both large and small companies (Van de Vrande *et al.*, 2009), but these companies need to identify the specific OI process to adopt and which specific activity to implement. The literature distinguishes between inbound, outbound and coupled processes of OI (Enkel *et al.*, 2009), and distinguishes between different types of openness (Dahlander and Gann, 2010). For example, empirical evidence suggests that OI is increasingly adopted by European companies, but they really differ in terms of inbound and outbound activities (Schroll and Mild, 2011). Moreover, extant research notes that smaller companies benefit to a different extent from OI activities, such as technology sourcing and technology scouting (see Parida *et al.*, 2012), but also that less is known about OI strategies developed by SMEs with respect to larger companies (Marangos and Warren, 2017).

Second, companies need to choose carefully whom to collaborate with. A recent literature review on the theme (Lopes and de Carvalho, 2018) presents a contingent conceptual model that considers the choice of the partner as an antecedent of OI. Others suggest that the impact of the breadth (number of collaboration partner types) and the depth (the intensity of interaction with these partners) of innovation partners is crucial for innovation performance (Kobarg *et al.*, 2019; Laursen and Salter, 2006). In particular, Kobarg *et al.* (2019) link the collaboration breadth and depth to the intensity of innovation projects and find that radical innovation and incremental innovation follow an inverted U-shaped relationship with collaboration breadth and depth, respectively. However, which are the key elements a firm relies upon when choosing partners? Why are firms collaborating with some partners better than with others? For example, Chesbrough and Schwartz (2007) focus on co-development relationships and suggest that the alignment of business models and objectives is crucial. A very recent contribution (Tobiassen and Pettersen, 2018) explores how “SMEs attract and develop trusting relationships with customers” (p. 69). Relying on a multiple case study

---

analysis, they present an interesting model for the development of trusting OI relationships. This model clearly shows that to create a trusted partnership over time, SMEs need to demonstrate technology competence, have absorptive capacity and handle cultural differences, among the others. However, due to the research design, Tobiassen and Pettersen (2018) do not describe the emergence and the development of the relationship in depth and only consider the point of view of the founders/managers of SMEs. As the authors argue, “to investigate the phenomenon of OI between collaboration partners, researchers could adopt a longitudinal approach” and “emphasize the dyadic relationship between partners” (p. 79).

Third, once a specific OI process is adopted, those organizational factors that may facilitate or hinder such a process should be identified. For example, extant research has noticed that internal organizational factors are important for external knowledge sourcing (Brunswick and Vanhaverbeke, 2014), or that intermediaries are particularly important in the context of SMEs (Lee *et al.*, 2010). For example, Podmetina *et al.* (2013) investigate the influence of some HR practices such as the rewarding system on a firm’s openness. Moreover, an important role in determining successful knowledge sharing between organizations is the relational dimension (Bogers, 2011; Hasche *et al.*, 2017). Innovation performance, in fact, may depend on the social assets that companies possess (Canter *et al.*, 2010; Rass *et al.*, 2013). The strength and the nature of the relationships among partners play a part in influencing how knowledge is shared due to trust (Hasche *et al.*, 2017) and reduction of transaction costs.

Fourth, an emerging theme is linked to the human side and the role of specific individuals in order to activate/trigger OI. The importance of individuals such as champions (Howell and Higgins, 1990) and innovation brokers (Klerkx and Leeuwis, 2009) has been largely investigated by innovation management scholars. Littler *et al.* (1995) noticed that the success of collaborative product development is linked to collaboration champions, among other factors. However, little is known about the role of individuals in OI (Du Chatenier *et al.*, 2010). Fleming and Waguespack (2007), for example, noted that the emergence of leaders in OI communities is linked to strong technical contributions, but also to social brokerage and, in particular, boundary spanning. Fichter (2009) emphasized the role of promoters and networks of promoters in OI. Others have focussed start-ups, stressing how the start-up manager’s previous experience in a large firm may contribute in the relationship between the start-up and the larger firm (Usman and Vanhaverbeke, 2017). A recent contribution by Podmetina *et al.* (2018) looks at the individual competencies needed for OI, providing a measurement scale for OI competencies as well as exploring how these competencies are linked to OI activities.

However, while empirical evidence on the impact of OI on performance and on the implementation of OI within the firm’s boundaries is stratifying (Chiaroni *et al.*, 2010), scant attention has been posited to understand how an OI process is initiated and then managed. In particular, whilst innovation management research has usually tended to distinguish different OI activities according to the phases of the technological innovation funnel, less attention has been deserved to the actors who take care of these phases.

## 2.2 Co-innovation

In this paper we focus on a specific case of OI, that is co-innovation. Co-innovation is a source of value creation for all the involved stakeholders (Bugshan, 2015), where innovation occurs with the inputs of both the firm and the client (Castaldi *et al.*, 2013) or the stakeholders in general. Several definitions may be provided for co-innovation. For example, Dawson *et al.* (2014) define it as “innovation emerging from within business relationships’ interactions” (p. 496), while Lee *et al.* (2012) as a model “based on the platform where internal, external, collaborative, co-creative ideas can converge to create organizational and

---

shared value” (p. 818). In its broader terms, however, co-innovation may be defined as the innovation deriving from the collaboration of two or more parties. Of course, the reasons driving companies to co-innovate are manifold, spanning from accessing and co-producing new knowledge, to designing new products and services and decreasing time to market (Bugshan, 2015). Through co-innovation, partners want to increase their competitiveness by sharing knowledge and resources.

However, co-innovation is not straightforward, at least for two reasons. The first reason is linked to the resources and capabilities that the two (or more) stakeholders need to possess. For example, in studying knowledge-intensive companies, Castaldi *et al.* (2013) note that knowledge-related capabilities, in terms of both human and technological resources, and learning capabilities, represent the reasons why they are able to co-innovate. Second, which partner to select is crucial since this influences the co-innovation performance. For example, Tsou *et al.* (2015) identify four criteria for business partner selection, namely, partner reliability, partner complementarity, partner expertise and partner compatibility.

Moreover, the literature agrees on the longitudinal nature of co-innovation, a process requiring an interactive development among organizations. Hence, some scholars have described different stages of co-innovation development (e.g. Kreiner and Schultz, 1993; George and Farris, 1999), as well as the interaction patterns within these stages (Bossink, 2002). For example, Bossink (2002) distinguishes among four developmental stages of co-innovation strategies: autonomous strategy making, co-operative strategy making, founding an organization for co-innovation and realization of innovations. However, Bossink (2002) does focus on how multiple organizations begin to co-innovate, but regarding interaction patterns he mainly stresses the formalization of the co-innovation strategies rather than focussing on how the partners build the co-innovation strategies from a relational perspective.

Drawing upon innovation management literature, this last issue, i.e. understanding how two companies manage a co-innovation process, is the specific aim of this paper.

### 3. Research methodology

In view of the theoretical framework above depicted and the major research object aforementioned, a single, exploratory and longitudinal case study analysis was conducted (Yin, 2013). The choice of undertaking a single case study resides in the opportunity of acquiring detailed understanding of the target phenomenon. Specifically, the selected research setting concerns the birth of the dyadic business relationship between the Italian family firm Loccioni and the well-known pharmaceutical company Pfizer.

#### 3.1 Research setting

The Loccioni–Pfizer case was selected as it could provide distinctive insights into the phenomenon under investigation. Loccioni is a family-owned, medium-size, high-technological firm with solid business partnerships with large global players, and is successfully operating in a variety of industrial markets. Its core business is providing highly innovative solutions for improving measurement processes in several industrial sectors. Pfizer is one of the largest pharmaceutical companies in the world and focusses on several disease-related areas, among which chronic inflammatory and autoimmune diseases, vaccines, oncology, neuroscience and pain, cardiovascular and metabolic diseases, rare diseases. In fulfilling the mission of becoming the premier biopharmaceutical company in the industry, Pfizer is committed to improve the quality of products and processes by balancing internal and external knowledge acquisition. Table I offers an overview of the two companies (data refer to 2017; rounded amounts are expressed). They are profoundly different in a variety of aspect: size, core business and competencies, governance, organizational structures, values and history.

	Loccioni	Pfizer
Ownership structure	Family-owned enterprise	Public company
History	50 years	150 years
Turnover and employees	€80m – 394 employees <sup>a</sup>	\$50bn – 90,200 employees
Main sectors	Home appliances, automotive, energy and environment, train and transport, aerospace, healthcare	Pharmaceuticals
R&D expenses	10% of annual sales turnover in R&D projects	\$7bn of annual R&D investments for new drug development
Presence worldwide	International offices in 4 countries (with service-based activities)	Global sites in 50 countries (manufacturing plants, R&D centres, pilot facilities)

**Note:** <sup>a</sup>Although in the European Union, medium-size companies are those with 50–250 workers and annual revenue of less than €50m, Loccioni is here considered as such given that when the collaboration started the company had smaller size dimensions

**Source:** Authors

**Table I.**  
Comparing Loccioni  
and Pfizer

They started to work together in the development of a new technology in 2014 and since then the relationship has evolved and grown in importance. Although often being the smaller party in collaborations with other companies, Loccioni always represents the catalyst of all the partnerships undertaken with large industrial players. Moreover, Pfizer represents the first large customer of a new market for Loccioni. Such a relationship therefore raises curiosity about why a corporation like Pfizer should be interested in Loccioni for carrying out innovation and what Loccioni can benefit from Pfizer.

Hence, studying the dynamics of the birth of this specific collaboration is appealing for having novel perspectives on co-innovation management practices between diverging firm settings. What follows is a brief summary of the procedure pursued for data collection and analysis.

### 3.2 Data collection and analysis

To investigate the rich, fine-grained chain of events marking the birth of the Loccioni–Pfizer business relationship, a longitudinal/chronological approach for data gathering and analysis was pursued. Specifically, the case refers to the period 2014–2017 and involves all the people who had both a direct say and a supportive role in the development of the collaboration between the two companies. The research follows a single, embedded architecture which thereby focusses on different levels of the same unit of analysis (Yin, 2013). A sub-unit is identified: it copes with the first R&D project launched by Loccioni for Pfizer. It triggered, indeed, the exploration of new challenges. Finally, being the context an unavoidable variable to consider when dealing with case study research, the present design structure includes the analysis of contextual conditions in relation to the case, i.e., those motives leading to the development of the relationship and related to each of the two companies involved.

Three sets of questions were chosen to explore this “engagement story”. Each of them aims at understanding: the motives, i.e., the main reasons of occurrence; the dynamics of the relationship, i.e., the factors which have fostered its evolution and growth; the future and whether it will flow into a long-lasting “marriage”. To understand the motives, general information have been asked related to the reciprocal role for the continuity of the business (e.g. why is Pfizer important for Loccioni? Which is the role of Loccioni within the Pfizer suppliers’ arena?). To obtain an overview of the evolution of the collaboration, examples of the questions are the following: how did Loccioni develop the competencies required?

How did Pfizer organize to make the collaboration with Loccioni work? Finally, the future has been inquired showing curiosity on the two companies' opinions about the most important outcomes achieved, as well as about the best and worst events during their collaboration.

Details about data collection and analysis are provided in Tables AI and AII.

#### 4. Findings

The study started from the "why" of the research analysis, providing some theoretical insights on the concept of co-innovation. The exploration of modes through which this process takes place between different firm settings represents an interesting research gap to bridge. "How" questions were then investigated by taking the perspective of a quite atypical, medium-sized, high-tech firm which has started to partner with a large multinational enterprise in a new market sector. The main findings are explained below.

Section 4.1 describes the two companies' motivations for co-innovation, hence explaining why and how the collaboration began. Section 4.2 puts emphasis on the interplay between the local and the global dimension of the relationship, emphasizing the relevance of specific roles and therefore highlighting how the co-innovation process has developed. What emerges in Section 5 is the importance of the relational – beyond the technological – aspect of co-innovation; this will result in a more general statement defining co-innovation dynamics between a smaller and a larger company.

##### 4.1 Motives for the occurrence of co-innovation

The current paragraph aims at outlining the motives for the occurrence of co-innovation in the Loccioni–Pfizer case. Specifically, two major sets of drivers can be recognized: relationship-based reasons on the one side and technology-based reasons on the other side. Their emergence is firm-specific during the initial phase of the collaboration, but then becomes more diffused in its second phase. A detailed explanation of the two stages describing the occurrence of the co-innovation process between Loccioni and Pfizer will be object of the next session.

What emerges from the case is that relationship-based motives are linked to the willingness of innovating by collaborating with the other party so as to exchange novel knowledge, generate a continuous learning process and achieve better innovative outcomes. On the other hand, technology-based motives represent the fundamental means for the occurrence of innovation in order to compete and succeed on the market. The relational aspect contributes to fasten the technological innovation process between two firm settings, hence allowing the formation of a solid business partnership.

Table II indicates the two categories of motives as the main reasons for the birth of the collaboration between Loccioni and Pfizer, whereas Table III identifies them as main factors driving the endurance of the partnership.

	Relationship-based motives	Technology-based motives
Loccioni	Willingness to collaborate with the best companies in the world in well-defined markets, as stated in its vision and mission statements	Willingness and necessity to provide innovative and reliable technological solutions for improving the quality of industrial products and processes
Pfizer	Willingness to look for external partners able to face specific business challenges and co-design solutions together	Necessity to introduce new technologies in the supply chain due to regulatory and efficiency reasons

**Table II.**  
Co-innovation motives  
– first phase

**Source:** Authors

In the first phase, what drives Loccioni is mainly a relationship-based motive. Specifically, collaborating with global players, i.e., “the best in the world”, is part of the vision statement of the company which has in its DNA the ability to entice them into undertaking innovative paths together. In fact, Loccioni recognizes specific advantages in working with large multinationals: they have a better knowledge of market trends and dynamics, which allows Loccioni to learn a lot from its customers; they can help Loccioni to operate worldwide thanks to their geographical extension, with the opportunity to acquire new knowledge from each local reality, etc. Loccioni also carefully selects the “right” markets where to choose the “right” customers. This constitutes the essence of its mission statement that is about transforming data into value for the well-being of people and the Planet. All the markets where Loccioni operates therefore need innovation for monitoring important parameters for environmental issues and/or for improving people safety. These rationales explain why the pharmaceutical market is important for Loccioni[1].

Before starting a new business and hence developing a new market, Loccioni always puts emphasis on the importance of knowing the customer and establishing a tight relationship with the major representatives. The enterprise is not looking for a big global partner to share the risk coming from the uncertainty of the innovation process; rather, it wants to collaborate with a larger firm already present in a particular market so as to establish a learning process and decide together the best direction to innovate.

On the one side, there is Loccioni, with an uncommon attitude towards exploring unknown contexts; on the other side, there is the necessity from Pfizer to engage with external partners for improving and innovating its supply chain. Pfizer’s initial move is therefore linked to a strong technology-oriented motive. In fact, over the last decades, the pharmaceutical industry has witnessed the introduction of the so-called “Process Analytical Technology” (PAT)[2] tools within the drug production processes. This has given rise to the necessity of introducing new technologies within the manufacturing process, with the purpose of reducing costs, products’ time-to-market and the quality of drugs.

The second phase is triggered by more powerful co-innovation fundamentals. The two companies present both relationship-based and technology-based reasons to strengthen and continue the collaboration. For the relational side, Loccioni can share new knowledge and ideas with companies/people with the same values and approaches with regard to innovation, whereas Pfizer representatives appreciate the strong cultural identity and the clarity of vision of the Italian counterpart, as well as the opportunity to work with a young and flexible team. Another considerable advantage is represented by the attitude of the enterprise towards innovation: multinational companies are fascinated by Loccioni’s ability to adapt to novel challenges in new markets. In this respect, a Pfizer representative claimed: “We are looking for companies like yours; companies that are willing to risk outside their core range of activities. In Pfizer we are challenged to aspire to be world class

	Relationship-based motives	Technology-based motives
Loccioni	Loccioni realizes that the first Pfizer representatives involved in the project are aligned with its values (the importance of people, beyond the focus on the company as unique organization)	Pfizer makes a special effort in developing and implementing technological innovation, besides investing in R&D for drug discovery
Pfizer	Loccioni has a culture that fascinates Pfizer (especially with regard to the opportunity to collaborate with young and flexible professionals)	Pfizer finds in Loccioni much more technological competencies than expected (Loccioni as a “one stop shop”)

Source: Authors

**Table III.**  
Co-innovation  
motives – second  
phase

---

in what we do and how we do it. It is truly inspiring to see a company who are world class in anything they chose to do”.

For the technological side, on the one hand, Loccioni finds not only one of the largest pharmaceutical multinationals in the market, but also a company uniquely dedicated to technological innovation for improving the industry's processes; on the other hand, Pfizer is attracted by the amount of highly specialised complementarity assets of the family enterprise and thus by the possibility to have access to a great variety of services and technologies with a relatively limited effort. From a technological and strategic viewpoint, Loccioni's main competitive advantage is to act as an exceptional “one stop shop”: Loccioni can provide the client with different technologies and related services, from the feasibility study, to the prototype development, to the development for commercialization and the training for specific competencies. As a Pfizer visitor once said, “You have the diversity we hope to have: get the data, collect the data, and look at the next step. I think it is really exciting to play in this space”. Another Pfizer representative claimed, “It is very powerful to see different applications across various industries and the way you adopt them. Something that is for the automotive sector and then you apply it in another sector. It does not happen so often to see so many competencies in such a small space. Loccioni is really a small big company!”

#### *4.2 The interplay between the local and the global phase in co-innovation dynamics*

The present section introduces how the co-innovation process evolved over three years of business relationship. Specifically, a local and a global phase can be recognized. The global phase is a direct consequence of the collaboration established at the local level, where the technological aspect assumed a determinant role. Indeed, the development by Loccioni of the first technological solution for a local Pfizer manufacturing site[3] represented the entrance ticket for the Pfizer world. This first period of the collaboration was hence characterized by a prevalent technology-push approach, where Loccioni solved a Pfizer problem locally, trying to “convince” the customer and to establish a solid relationship. In this way, Loccioni satisfied the Pfizer technology-based motive for initiating the co-innovation process. The final solution was sponsored within Pfizer, first, at the local level and second, at the global level. The second phase, i.e., the global phase, was more market-driven and communication-based: Loccioni always answers to the customer's requests but without following a strictly project-based approach, as it had occurred in the first place. The main purpose was indeed to explore the customer's network in depth so as to meet some of Pfizer global representatives and decide how to proceed. The most interesting thing is that for each phase in Pfizer there has been a sponsor acting as facilitator of the relationship and collaborating with the Loccioni team. Tables IV and V summarize the whole chain of events and explain the transition from the local to the global phase, identifying specific stages and pointing out the major technological and relational aspects[4]. The role of the local and the global sponsor is then highlighted.

Individuals are crucial in this framework; the role of the Pfizer sponsors is particularly important. In fact, within the larger company they allow the smaller firm to have access to their own formal and informal internal networks. Specifically, the local sponsor is more focussed on the level of sophistication of the technology, whereas the global champion looks more at the business potentiality of the collaboration. Table VI describes them in detail.

In the local arena, the most important idea which was generated was about solving a problem within a plant through a specific technological innovation and this project moved along the different phases of the innovation process until the acceptance from the customer. In the international phase, it was characterized by the growth of the relational network, several reciprocal visits all around the world, some internal feasibility studies carried out by

Geographical dimension Local phase (2014–2016)	Co-innovation modes	
	Technological	Relational
July 2014 – Genesis of the idea for the first technological project	The first meeting was organized at Loccioni to start discussing about the project and to better present the first technological challenge	<p>A representative from the management body of Loccioni met a Pfizer engineer of the local plant during a visit to another Italian pharmaceutical company and they started discussing about technical issues the plant needed to solve<sup>a</sup></p> <p>The first meeting was the opportunity to have more information about the local Pfizer plant and also to better introduce Loccioni, its culture, its approach to innovation</p> <p>At this stage, some members of the management body of both Loccioni and Pfizer took part in the meetings (both R&amp;D and business representatives)</p>
October 2014–June 2015 – Development phase of the first technological solution	<p>The development phase was characterized by</p> <ul style="list-style-type: none"> <li>the feasibility study (where Pfizer presented the details of the project and Loccioni verified the feasibility of solving the problem)</li> <li>the development of the first prototype (at this point, the solution was ready and it had to be tested at Pfizer)</li> <li>the development of the final solution</li> </ul> <p>Objectives and technical details of the first project were jointly defined</p> <p>The first two stages of the development process were carried out at Loccioni labs; the last one at Pfizer's</p>	<p>The role of the Pfizer local sponsor clearly emerged at this point. Indeed, Pfizer identified a project manager to better manage the project and support the development of the solution by Loccioni (cross-knowledge). Therefore, he/she participated in all the meetings, actively contributing to the improvement of the first prototype and trying to involve specific figures within the local plant</p> <p>From the Loccioni side, a light-weight team composed of three people was created to face this initial phase. The team was made of technical figures, working in R&amp;D and by a representative of the business area in charge of managing the initial stage of the relationship</p>
July 2015–June 2016 – Sharing phase within Pfizer internal network	The solution was ready to be installed and promoted within the Pfizer network (at the local level at first and then at the global level)	<p>This phase was characterized by the presence of the local sponsor who acted as a product champion, introducing Loccioni to the global sponsor. Indeed, the local sponsor was so satisfied about the objectives which had been achieved that he decided to promote the partnership within the Pfizer international arena, presenting it within his/her own network, directed by the person who would then become the global sponsor</p> <p>The local sponsor asked Loccioni to invite the global sponsor to visit the company</p> <p>At this point Loccioni dedicated a specific pharma project team leader, hence going towards the creation of a heavy-weight team</p>

**Table IV.**  
Designing and  
managing co-  
innovation between  
Loccioni and  
Pfizer – local phase

**Note:** <sup>a</sup>Loccioni was very interested in the pharmaceutical market as part of its business and innovation strategy and started exploring it by looking at the Italian territory, as well as at the internal contact network developed over 50 years of history

**Source:** Authors

Geographical dimension Global phase (2016–2017)	Technological	Co-innovation modes Relational
Beginning of 2016 – Attempt to verify whether the first technological solution is needed at the international level	The solution was so sophisticated that some international Pfizer representatives decided to visit Loccioni	The Pfizer global sponsor, with a more business-oriented role, started to advocate Loccioni as a very innovative company and invite other global representatives to visit Loccioni The objective was to know each other better and explore other opportunities, not only to validate the market potential of the first solution
From June 2016 – Brainstorming for selecting new technological challenges valid worldwide	Pfizer presented other challenges and Loccioni verified whether it was possible to move forward through some feasibility studies (service-based logic)	The global sponsor visited Loccioni several times and began to involve other Pfizer representatives with leadership position A knowledge exchange process started: some members of the Loccioni pharma team visited other Pfizer plants to have more thorough insights of the pharmaceutical world
From September 2017 – Widening the Pfizer international network	The global phase did not stop in September 2017. Both Pfizer and Loccioni are now carrying out a prioritization process to decide about the next project to set up	Thanks to the global sponsor, Loccioni has widened the network of Pfizer key figures at international level In September 2017, ten Pfizer global representatives visited Loccioni and an informal agreement was taken to start a more formal co-innovation process at the international level

**Table V.**  
Designing and managing co-innovation between Loccioni and Pfizer – global phase

**Source:** Authors

Dimensions	Local sponsor	Global sponsor
Background Leadership	Technical background Leadership role limited to the local level	Technical background Global leadership position (he/she often supervises the activity of the local sponsor)
Attitude towards technological innovation	Oriented towards assessing the effectiveness of the technological innovation	Oriented towards assessing the business value of the technological innovation
Personal network Contribution to the development of the business relationship	More limited General information on the history of the company, the organization and the governance	Very large Information on the main market dynamics and the future directions of the company
	Contacts and suggestions for reaching the central/corporate level	Contacts for expanding the relationship at a worldwide level

**Table VI.**  
Pfizer local and global sponsor

**Source:** Authors

Loccioni to boost the dialogue at a higher level, and what resulted was the agreement to enter into a broader co-innovation partnership to start working together in the longer term.

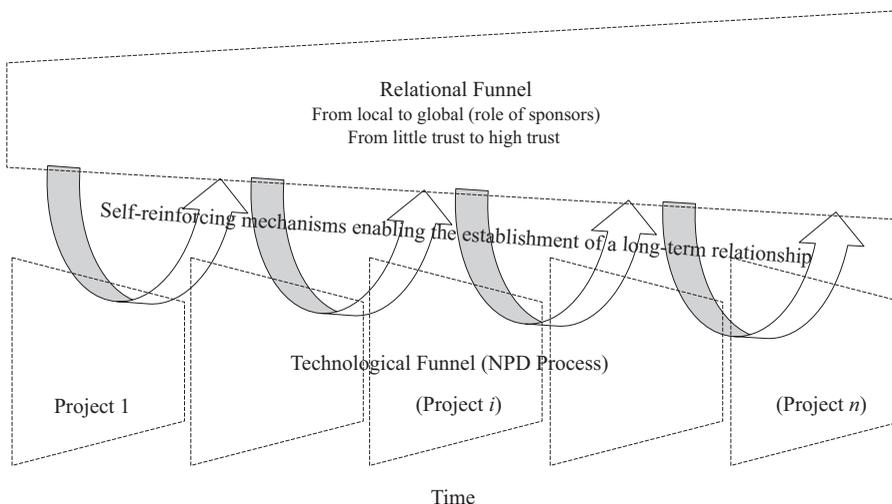
Several iterations of the same approach as the relationship moves forward until reaching the highest level of a multinational company can hence bring not only to novel technological

innovations, but also to the beginning of a more general business partnership. It is not anymore about co-developing one single solution, it is about planning to co-innovate some peculiar aspects of the whole pharmaceutical manufacturing process.

Although all the Loccioni interviewees agreed on claiming that the birth of the relationship with Pfizer presents common technological patterns compared to other customer development stories, they also emphasized its uniqueness thanks to the engagement of the two kinds of sponsors and thus to the possibility of meeting and knowing important personalities able to guide the co-innovation choices at the beginning of the partnership.

### 5. Towards a “double funnel” of co-innovation: discussion and conclusion

Extant research on OI stresses the importance of understanding how to design and manage OI projects. Qualitative contributions have usually focussed on the modes and practices adopted, for example, by start-ups with larger companies (Usman and Vanhaverbeke, 2017) and the importance of trust in collaboration (Hasche *et al.*, 2017). However, as Lopes and de Carvalho (2018) note, little is known about the relational side of OI (a recent exception is represented by Tobiassen and Pettersen, 2018). The present case study offers several suggestions on how to manage a co-innovation process. Adding to innovation management research, our case reveals that co-innovation happens along a double funnel of innovation (Figure 1) that builds over a technological and a relational dimension. The technological dimension is represented by a series of co-developed projects, each of whom follows the typical innovation funnel or Stage-Gate product innovation process introduced by famous scholars (Cooper, 2001). All these projects in the long-run constitute the technological funnel of co-innovation. What counts in the present research is represented by the dynamics that spur the interaction between the technological and the relational path, hence defining the co-innovation process. In particular, the technological dimension fosters idea generation and further developments of novel solutions, while the relational dimension triggers trust formation and expands the relational network. They form a virtuous innovation cycle: the more this mechanism works in collaboration between the two companies, the more the



**Note:** We would like to thank one of the anonymous reviewers for having suggested us to represent the technological funnel as a sequence of projects

**Source:** Authors

**Figure 1.**  
The double funnel  
of innovation

---

smaller party can enter into the larger party's key processes and therefore activate higher value co-innovation processes. Being a system integrator, Loccioni can easily combine different technologies for one single solution and integrate them within the production process. As one Pfizer representative has well understood, Loccioni substantially always adopts the same basic scheme for their collaborations with very large companies, although this happens in different market scenarios and with a certain degree of flexibility and adaptation. Concretely, such a scheme implies the development of highly innovative and personalized technological applications for solving costly and very challenging problems that large industrial customers painfully experience in their products or in their manufacturing processes. For this to occur, the client has to be present in all the phases of the development process as the final outcome is not a standardised product, but rather a unique solution for that specific customer.

For what concerns the relational dimension, extant studies stressed that co-innovation "often occurs in trustful long-term relationships when a fruitful match is found" (Lehtimäki *et al.*, 2018, p. 1). Moreover, they have focussed on criteria of partner selection, often focussing on reliability, complementarity, expertise and compatibility (Tsou *et al.*, 2015). Of course, our case shows that these characteristics must be somehow communicated and experienced by partners. Our case also shows that these characteristics are particularly important when one of the two partners is a much smaller one. In this case, the smaller firm needs to lead the relational dimension and to capture the larger firm's attention and trust. The basis of this relational dimension are the principles of relationship marketing and customer relationship management practices (Grönroos, 2000; Gummesson, 2004). Although easier to manage as it requires little financial efforts, the relational dimension of the funnel is difficult to activate as it mainly depends on behavioural and attitudinal factors. This has also been stressed by a very recent study that has identified the importance of handling organizational cultural differences and the commitment to the relationship among the mechanisms needed in developing trusting OI relationships by SMEs (Tobiassen and Pettersen, 2018). In other terms, it seems to be that technology competence is necessary but not sufficient in assuring long-lasting relationships. Indeed, the high-tech Loccioni engages with customers following a more service-based approach: Loccioni technical experts and business development representatives always ask the questions, "What if I add this component? What if we succeed in solving this problem? What comes next?" They also spend a considerable amount of time at the customer when projects start, which is a typical service-based firm's routine.

Moreover, the case reveals that a key resource needed to maintain the relation is that of the "sponsor". It is important to have both a sponsor at the local phase and one in the global phase. Consequently, building a relational funnel requires to start locally, convincing and bewitching "bottom-lines" and then slowly reaching and fascinating top managers. This is in line with recent research that suggests that co-innovation actors perceiving risks linked to time, IPR, financial, but also social risks, benefit from prior experience (Abhari *et al.*, 2018). In other terms, having a positive local experience is important in order to start a global relation.

The relational process must also be paired by an extraordinary technological capability and expertise. In fact, Loccioni puts a lot of effort in aligning individuals' ideas and organizational needs at all levels by combining technological and relational endeavours. Loccioni's strong technological leadership played an important role in convincing Pfizer to continue and further develop the collaboration. Smaller companies are usually part of the network of larger companies and act as facilitators of co-innovation initiatives, rather than as major initiators. However, the case of Loccioni and Pfizer offers a different perspective: on the one side, it describes a model on how to steadily integrate the customer into a firm innovation process in business-to-business environments; on the other one, it provides valuable insights on how a smaller firm can initiate the co-innovation process with a larger

firm, even in a new market, and develop a partnership based on an equal exchange of knowledge and best practices.

The case therefore shows how a strong institutional leadership by the smaller company can play a determinant role in convincing the larger company to explore the collaboration, besides the technological skills. It therefore informs managers of smaller companies on how to behave when dealing with large corporations. Moreover, some factors are confirmed: co-innovation processes are based on high-level of communication, trust and transparency. The main purpose of the co-innovation partnership is indeed to collaborate in the long-term to solve different problems along the value chain through technological solutions that constitute specific high-technological market niches.

This study is not without limitations. First of all, it focusses on a three-year co-innovation project. Hence, the timeframe might be not long enough in order to understand the evolution and outcomes of the whole process. However, our case emphasizes the dyadic relationships between partners, thus answering to previous research that asked for understanding both sides of OI relationships (Tobiassen and Pettersen, 2018). Second, the theoretical generalizability of our model might be hampered by the fact that it is a co-innovation process between high-tech companies. Does the same process happen in lower tech sectors? Nonetheless, we think that the double funnel proposed is helpful in that it stresses how being a technology leader *per se* could not assure the development of long-term relationships. The technological dimension must be paired by a relational dimension that would assure the development of trust, allow knowledge sharing and spur multiple co-innovation projects.

## Notes

1. These thoughts were expressed by all the most experienced people (management body) and the leading figures of the Pharma project. They emphasized the importance of diversifying the business activity and hence exploring the pharmaceutical sector by listing some fundamental characteristics of Loccioni's ideal markets: "markets with a high technological need and the possibility to find niches", "markets that are rich with a few international global players", "markets that struggle to improve people's lives", "markets that are closed to our medical division".
2. PAT tools are systems for analysing and controlling manufacturing through timely measurements (i.e. during processing) of critical quality and performance attributes of raw and in-process materials and processes with the goal of ensuring final product quality (US Department of Health and Human Services, Food and Drug Administration, CDER, CVM, ORA, 2004).
3. The Pfizer plant in question is closed to the Loccioni headquarters and manufacturing facilities. For privacy reasons, further details on the technological solution cannot be provided.
4. These aspects are hereof defined as co-innovation modes and derive from the co-innovation motives aforementioned.

## References

- Abhari, K., Davidson, E.J. and Xiao, B. (2018), "A risk worth taking? The effects of risk and prior experience on co-innovation participation", *Internet Research*, Vol. 28 No. 3, pp. 804-828.
- Bianchi, M., Cavaliere, A., Chiaroni, D., Frattini, F. and Chiesa, V. (2008), "Organizational modes for open innovation in the bio-pharmaceutical industry: an exploratory analysis", *Technovation*, Vol. 31 No. 1, pp. 22-33.
- Bogers, M. (2011), "The open innovation paradox: knowledge sharing and protection in R&D collaborations", *European Journal of Innovation Management*, Vol. 14 No. 1, pp. 93-117.
- Bossink, B.A.G. (2002), "The development of co-innovation strategies: stages and interaction patterns in interfirm innovation", *R&D Management*, Vol. 32 No. 4, pp. 311-320.

- 
- Brunswick, S. and Vanhaverbeke, W. (2014), "Open innovation in small and medium-sized enterprises SMEs: external knowledge sourcing strategies and internal organizational facilitators", *Journal of Small Business Management*, Vol. 53 No. 4, pp. 1241-1263.
- Bugshan, H. (2015), "Co-innovation: the role of online communities", *Journal of Strategic Marketing*, Vol. 23 No. 2, pp. 175-186.
- Canter, U., Conti, E. and Meder, A. (2010), "Networks and innovation: the role of social assets in explaining firms' innovative capacity", *European Planning Studies*, Vol. 18 No. 12, pp. 1937-1956.
- Casprini, E., De Massis, A., Di Minin, A., Frattini, F. and Piccaluga, A. (2017), "How family firms execute open innovation strategies: the Loccioni case", *Journal of Knowledge Management*, Vol. 21 No. 6, pp. 1459-1485.
- Castaldi, C., Faber, J. and Kishna, M.J. (2013), "Co-innovation by KIBS in environmental services – a knowledge-based perspective", *International Journal of Innovation Management*, Vol. 17 No. 5, pp. 1-17.
- Chesbrough, H. and Schwartz, K. (2007), "Innovating business models with co-development partnerships", *Research-Technology Management*, Vol. 50 No. 1, pp. 55-59.
- Chiaroni, D., Chiesa, V. and Frattini, F. (2010), "Unravelling the process from closed to open innovation: evidence from mature, asset-intensive industries", *R&D Management*, Vol. 40 No. 3, pp. 222-245.
- Cooper, R.G. (2001), *Winning at New Products: Accelerating the Process from Idea to Launch*, Perseus Books, Reading.
- Creswell, J.W. (2009), *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 3rd ed., Sage Publications, Thousand Oaks, CA.
- Dahlander, L. and Gann, D.M. (2010), "How open is innovation?", *Research Policy*, Vol. 39 No. 6, pp. 699-709.
- Dawson, B.K., Young, L., Tu, C. and Chongyi, F. (2014), "Co-innovation in networks of resources – a case study in the Chinese exhibition industry", *Industrial Marketing Management*, Vol. 43 No. 3, pp. 496-503.
- Du Chatenier, E., Verstegen, J.A.A.M., Biemans, H.J.A., Mulder, M. and Omta, O.S.W. (2010), "Identification of competencies for professionals in open innovation teams", *R&D Management*, Vol. 40 No. 3, pp. 271-280.
- Enkel, E., Gassmann, O. and Chesbrough, H. (2009), "Open R&D and open innovation: exploring the phenomenon", *R&D Management*, Vol. 39 No. 4, pp. 311-316.
- Fichter, K. (2009), "Innovation communities the role of networks of promoters in open innovation", *R&D Management*, Vol. 39 No. 4, pp. 357-371.
- Fleming, L. and Waguespack, D.M. (2007), "Brokerage, boundary spanning, and leadership in open innovation communities", *Organization Science*, Vol. 18 No. 2, pp. 165-180.
- George, V.P. and Farris, G. (1999), "Performance of alliances: formative stages and changing organizational and environmental influences", *R&D Management*, Vol. 29 No. 4, pp. 379-389.
- Grönroos, C. (2000), *Service Management and Marketing: A Customer Relationship Approach*, Wiley, Chichester.
- Gummesson, E. (2004), "Return on relationship (ROR): the value of relationship marketing and CRM in business-to-business contexts", *Journal of Business & Industrial Marketing*, Vol. 19 No. 2, pp. 136-148.
- Hasche, N., Linton, G. and Oberg, C. (2017), "Trust in open innovation – the case of a med-tech start-up", *European Journal of Innovation Management*, Vol. 20 No. 1, pp. 31-49.
- Howell, J.M. and Higgins, C.A. (1990), "Champions of technological innovation", *Administrative Science Quarterly*, Vol. 35 No. 2, pp. 317-341.
- Klerkx, L. and Leeuwis, C. (2009), "Establishment and embedding of innovation brokers at different innovation system levels: insight from the Dutch agricultural sector", *Technological Forecasting and Social Change*, Vol. 76 No. 6, pp. 849-860.

- Kobarg, S., Stumpf-Wollersheim, J. and Welpel, I.M. (2019), "More is not always better: effects of collaboration breadth and depth on radical and incremental innovation performance at the project level", *Research Policy*, Vol. 48 No. 1, pp. 1-10.
- Kreiner, K. and Schultz, M. (1993), "Informal collaboration in R&D: The formation of networks across organizations", *Organization Studies*, Vol. 14 No. 2, pp. 189-209.
- Laursen, K. and Salter, A. (2006), "Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms", *Strategic Management Journal*, Vol. 27 No. 2, pp. 131-150.
- Lazzarotti, V., Bengtsson, L., Manzini, R., Pellegrini, L. and Rippa, P. (2017), "Openness and innovation performance: an empirical analysis of openness determinants and performance mediators", *European Journal of Innovation Management*, Vol. 20 No. 2, pp. 463-492.
- Lee, S., Park, G., Yoon, B. and Park, J. (2010), "Open innovation in SMEs – an intermediate network model", *Research Policy*, Vol. 39 No. 2, pp. 290-300.
- Lee, S.M., Olson, D.L. and Trimi, S. (2012), "Co-innovation: convergenomics, collaboration, and co-creation for organizational values", *Management Decisions*, Vol. 50 No. 5, pp. 817-831.
- Lehtimäki, T., Komulainen, H., Oinonen, M. and Salo, J. (2018), "The value of long-term co-innovation relationships: experiential approach", *International Journal of Business Innovation and Research*, Vol. 16 No. 1, pp. 1-23.
- Littler, D., Leverick, F. and Bruce, M. (1995), "Factors affecting the process of collaborative product development – a study of UK manufacturers of information and communications technology products", *Journal of Product Innovation Management*, Vol. 12 No. 1, pp. 16-32.
- Lopes, A.P.V.B.V. and de Carvalho, M.M. (2018), "Evolution of the open innovation paradigm: towards a contingent conceptual model", *Technological Forecasting and Social Change*, Vol. 132, pp. 284-298, available at: <https://doi.org/10.1016/j.techfore.2018.02.014>
- Marangos, S. and Warren, L. (2017), "A mapping for managers: open innovation for R&D intensive SMEs in the life sciences sector", *European Journal of Innovation Management*, Vol. 20 No. 2, pp. 210-229.
- Parida, V., Westerberg, M. and Frishammar, J. (2012), "Inbound open innovation activities in high-tech SMEs: the impact on innovation performance", *Journal of Small Business Management*, Vol. 50 No. 2, pp. 283-309.
- Podmetina, D., Soderquist, K.E., Patriate, M. and Teplov, R. (2018), "Developing a competency model for open innovation: from the individual to the organisational level", *Management Decision*, Vol. 56 No. 6, pp. 1306-1335.
- Podmetina, D., Volchek, D., Dabrowska, J. and Fiegenbaum, I. (2013), "Human resource practices and open innovation", *International Journal of Innovation Management*, Vol. 17 No. 6, pp. 1340019-1-1340019-22.
- Rass, M., Dumbach, M., Danzinger, F., Bullinger, A.C. and Moeslein, K.M. (2013), "Open innovation and firm performance: the mediating role of social capital", *Creativity and Innovation Management*, Vol. 22 No. 2, pp. 177-194.
- Schroll, A. and Mild, A. (2011), "Open innovation modes and the role of internal R&D: an empirical study on open innovation adoption in Europe", *European Journal of Innovation Management*, Vol. 14 No. 4, pp. 475-495.
- Tobiassen, A.E. and Pettersen, I.B. (2018), "Exploring open innovation collaboration between SMEs and larger customers: the case of high-technology firms", *Baltic Journal of Management*, Vol. 13 No. 1, pp. 65-83.
- Tsou, H.-T., Cheng, C.C.J. and Hsu, H.-Y. (2015), "Selecting business partner for service delivery co-innovation and competitive advantage", *Management Decisions*, Vol. 53 No. 9, pp. 2107-2134.
- US Department of Health and Human Services, Food and Drug Administration, CDER, CVM, ORA (2004), "Guidance for industry PAT – a framework for innovative pharmaceutical development, manufacturing, and quality assurance", Food and Drug Administration, available at: [www.fda.gov/downloads/drugs/guidances/ucm070305.pdf](http://www.fda.gov/downloads/drugs/guidances/ucm070305.pdf) (accessed 7 September, 2017).

- Usman, M. and Vanhaverbeke, W. (2017), "How start-ups successfully organize and manage open innovation with large companies", *European Journal of Innovation Management*, Vol. 20 No. 1, pp. 171-186.
- Van de Vrande, V., de Jong, J.P.J., Vanhaverbeke, W. and de Rochemont, M. (2009), "Open Innovation in SMEs: trends, motives and management challenges", *Technovation*, Vol. 29 Nos 6-7, pp. 423-437.
- Yin, R.K. (2013), *Case Study Research: Design and Methods*, Sage Publications, Thousand Oaks, CA.

## Appendix

Source type	Data type	Use in the study
Archival records	Books about Loccioni and its management culture Company presentations Project-related presentations Confidential documents about several technical projects Internal information system	Archival records have been decisive for: (a) verifying the validity of the information about previous events; (b) understanding the specificities of each project, i.e., each sub-unit of analysis; (c) building a model of innovation for the Loccioni enterprise
Interviews (14), of which, 9 recorded and 5 non-recorded	Context-related interviews (5) Case-related interviews (9)	Interviews have been important for: (a) comparing different interpretations of the same facts to identify some common points and patterns of analysis; (b) knowing the importance of such a relationship with respect to Loccioni strategic goals; (c) building a model of innovation for Loccioni
Field written notes	Direct participation to 20 meetings Several hours of informal conversations	Field written notes have represented a crucial data source to integrate some information not expressed during interviews, as well as to grab particulars emerged during the flow of discussions
<b>Sources:</b> Adapted from Creswell (2009) and Yin (2013)		

**Table A1.**  
Synthesis of the main data sources

---

Data collection procedures

---

Data collection plan	Three chronological periods can be identified for data collection 1. June–September 2016 2. December 2016–March 2017 3. May–August 2017 As soon as data were gathered, they were consistently organized so as to extract new information and fix new objectives for the following steps of data collection In particular, prior to each interview, all the material collected was reviewed so as to complete the list of questions with some missing information, hence avoiding feedback loops Each interviewee was asked to provide some coherent documents and to indicate a key person to talk with so as to constantly verify the accuracy of data
Data analysis	Following a temporal and spatial logic, the major phases describing the birth of the relationship were identified For each phase, the major drivers of innovation, as well as the collaboration modes and the key actors were identified Finally, in line with the theoretical propositions stated at the beginning of the present work, the attempt to connect all the considered elements to find some common patterns was pursued

**Source:** Adapted from Yin (2013)

---

**Table AII.**  
Data collection and  
analysis procedures

**Corresponding author**

Noemi Ombrosi can be contacted at: [noemiombrosi@gmail.com](mailto:noemiombrosi@gmail.com)