How open innovation shapes strategy: an explorative multiple case study in the ICT industry

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Abstract

Purpose of the paper: *This paper explains to what extent open strategy draws on open innovation, and how different degrees of open strategy exist because of the adoption of open innovation.*

Methodology*: Since the relationship between open innovation and open strategy represents an empirically under-explored research area, we adopt an exploratory multiple case study design to develop new theoretical and empirical insights pertaining to this topic.*

Findings*: The present study reveals that open strategy is grounded in the implementation of an open innovation approach and that, once developed, it may, in turn, affect open innovation implementation. Moreover, our results show how the degree of "openness" of the strategy depends on the extent to which the firm shares information with external stakeholders and transforms external inputs in open strategy actions/interventions.*

Research limits: *Given the exploratory nature of this study, the conceptual linkages between open innovation and open strategy may represent a starting point for future research in this area, which requires further empirical validation.*

Practical implications: *Our theoretical framework may be useful for practitioners to approach an open strategy starting from open innovation implementation. Furthermore, it displays two variables, i.e. stakeholder engagement and open communication, that managers should control to regulate the openness of their strategy.*

Originality of the paper: *The present study represents a first attempt to explore a theoretical connection between open innovation and open strategy from the firm's perspective.*

Key words: open strategy; open innovation; inclusion; transparency; entrepreneurship

1. Introduction

A frontline topic in the management and innovation literature is represented by "open innovation" (e.g., Kim *et al.*, 2015; Chesbrough and Bogers, 2014; Chesbrough and Crowther, 2006; Randhawa *et al.*, 2016; West and Gallagher, 2006; Enkel *et al.*, 2009). An open innovation approach leverages external knowledge to accelerate a firm's internal innovation and expansion toward new markets (Lichtenthaler, 2015; Chesbrough, 2003; Lichtenthaler, 2008; Prandelli *et al.*, 2008).

In particular, the combination of internal and external knowledge is a key element for strategy innovation fostering the involvement of a firm's internal and external environments (Love, 2014; Martinez-Conesa *et al.*, 2017; Vrontis *et al.*, 2017).

According to a recent definition provided by Chesbrough *et al.*, 2014, open innovation is a "distributed innovation process based on purposely managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model [...], knowledge inflows to the focal organization (leveraging external knowledge sources through internal processes), knowledge outflows from a focal organization (leveraging internal knowledge through external commercialization processes), or both (coupling external knowledge sources and commercialization activities)" (p. 17).

The adoption of open innovation approaches by organizational processes has been increasing (Chesbrough and Appleyard, 2007; Doz and Kosonen, 2008; Chesbrough, 2006), leading researchers to adopt the notion of openness and insert it into the concept of strategy. Accordingly, the idea of "open strategy", which "embraces the benefits of openness as a means of expanding value creation for organizations", (Chesbrough and Appleyard, 2007, p. 58) has emerged. Open innovation and open strategy represent the new "imperative" of firms' competitive advantage in current business contexts (Chesbrough, 2003; Chesbrough and Appleyard, 2007; Rivkin, 2000; Whittington *et al.*, 2011).

To date, little knowledge exists on the relation between open innovation and open strategy (Bogers *et al.*, 2017; West and Bogers, 2017). Prior research, for example, has conceptualized openness within the open innovation literature (e.g., Dahlander and Gann, 2010), or identified different types of open innovation processes (e.g., Gassmann and Enkel, 2004). Some research has explored the way in which, for instance, open-source software enhances a firm's competitive advantage by leveraging open innovation (e.g., Chesbrough and Appleyard, 2007; West and Gallagher, 2006). Further research has identified factors driving the opening of strategy-making (e.g., Whittington *et al.*, 2011), while some studies analyze the relationship between openness and product innovation performance (e.g., Barge-Gil, 2013). Nevertheless, the extant research does not explain the extent of the interplay between open innovation and open strategy, to explain how the latter draws upon the former, or if the former may exhibit different degrees of openness (Hautz *et al.*, 2017).

Therefore, by jointly analyzing such relationships, the present paper aims to understand the relationship between the two elements. Drawing on a multiple case study methodology, the research question of this study is two-fold: First, how and to what extent does open strategy draw on open innovation? Second, are there different degrees of open strategy?

Our paper is structured as follows: In section 2, we argue for open innovation and open strategy; in section 3, we display the methodology that was adopted to conduct the research; in section 4, we closely discuss the key findings; in section 5, we conclude with a final discussion, managerial implications, research limitations, and some implications for future research.

2. Literature background: from open innovation to open strategy

Open innovation is the process by which organizations increasingly innovate by pooling the knowledge of external stakeholders, such as customers, business partners, universities, spinoffs, competitors, technology providers, startups, and consultants (Almirall and Casadeuss-Masanell, 2010; Chesbrough, 2003). Hence, the importance of "business" or "entrepreneurial ecosystems" as proper contexts where relationships and interactions among multiple stakeholders are developed has been growing (Moore, 1993). Due to increased competition, the development of entrepreneurial ecosystems is crucial, wherein stakeholders interact with one another to foster innovation (Campbell Davis and Carayannis, 2016; Davey, 2014; Ferraris and Grieco, 2015; Invernizzi *et al.*, 2012). From the perspective of open innovation (Christopher and Gaudenzi, 2015; Salter, *et al.*, 2014), these ecosystems facilitate knowledge sharing inside and outside the firm (Dahlander, *et al.*, 2014; Dodgson, *et al.*, 2006; Salter, *et al.*, 2014), and enable it to better manage and coordinate these flows (Gawer and Cusumano, 2014; Nambisan and Baron, 2013; Martinez-Conesa *et al.*, 2017).

In recent years, there has been an increase in the adoption of open innovation approaches, thus revealing the need to apply the notion of openness to strategy, and challenging the basic tenets of traditional business strategy based on the importance of constructing barriers to competition, rather than promoting openness (Chesbrough, 2006; Chesbrough and Appleyard, 2007; Doz and Kosonen, 2008; Appleyard and Chesbrough, 2017; Saebi and Foss, 2015). Open innovation encourages the meaningful involvement of both internal and external stakeholders (Chesbrough, 2004; Scuotto *et al.*, 2017) in multiple ways: facilitating collaboration performing tasks like information sharing (Fichter, 2009); adopting new technologies (Fey and Birkinshaw, 2005; Laursen and Salter, 2006); sharing products' sources (Henkel, 2006; Henkel *et al.*, 2014); new product development (Bahemia and Squire, 2010), and the use of external knowledge for internal R&D (Chesbrough, 2006).

Open innovation and open coordination represent the "grounds" upon which the concept of open strategy has been developed (Chesbrough and Appleyard, 2007; Witthington *et al.*, 2011). (Note: see the main differences in Table 1.) A strategy design inclined towards open innovation is essential for innovative ecosystems based on "coopetition" among multiple stakeholders (Afuah, 2000; Bouncken *et al.*, 2015).

Tab. 1: Differences between open innovation and open strategy

Open Innovation	Open Strategy
- Firms open up to internal and external ideas to advance technology (Chesbrough, 2004);	- Openness links to strategy-making: "balances the tenets of traditional business strategy with the promise of open innovation" (Chesbrough and Appleyard 2007, p. 58);
- Open innovation encompasses a multi-level relationship with internal and external stakeholders, the involvement of external resources (i.e., ideas, people and technology), and open communication (Chesbrough, 2004; Scuotto *et al.*, 2017);	- Open strategy involves internal groups of employees in strategy development as "a means [of creating] shared understanding, stronger commitment, and effective implementation" (Stieger *et al.*, 2012, p. 46);
- The key target of an open innovation approach is represented by external stakeholders, for instance, in sharing information with external innovation communities (Fichter, 2009), obtaining technology from other firms (Fey and Birkinshaw, 2005; Laursen and Salter, 2006), or sharing the sources of their own products with an external audience (Henkel, 2006; Henkel *et al.*, 2014);	- The key target of open strategy is represented by organizational members. External stakeholders are seldom involved in open strategy-making, as in the case of Wikimedia (Dobusch and Müller-Seitz, 2012; Heracleous *et al.*, 2017);
- Open innovation is typically open to an external audience by leveraging either collaboration or competition-based tools (Fichter, 2009);	- Open strategy focuses on "joint sense-making", for instance by participating in meetings and workshops (Baptista *et al.*, 2017; De Gooyert *et al.*, 2014; Hardy *et al.*, 2006; Werle and Seidl, 2015). It draws on "collaborative exchange" as part of "collaborative strategizing where both parties interact" (Dobusch and Müller-Seitz, 2012, p. 5);
- Open innovation mostly concerns technological and product-related knowledge (R&D assets). It emphasizes the importance of external sources of knowledge for internal R&D (e.g., Chesbrough, 2006; Cohen and Levinthal, 1990; Nelson and Winter, 1982; Rosenberg, 1994);	- Open strategy is mainly concerned with collaborative means of engagement with an internal audience (Tavakoli *et al.*, 2017);
- Open innovation couples defined knowledge regarding technologies and products (Chesbrough *et al.*, 2014);	- Open strategy unites opinions, ideas, and interpretations on a wide range of social issues as well . Since its primary focus is on joint sense-making, people who participate in open strategy provide primary ideas and interpretations, along with opinions on what the others state (Hutter *et al.*, 2017; Luedicke *et al.*, 2017; Mack and Szulanski 2017; Malhotra *et al.*, 2017; Turco 2016).
- Open innovation generally does not require participating stakeholders to integrate new visions and values, but rather that they be open to new competence sets (Chesbrough, 2003).	- Open strategy involves an internal audience to foster innovation. Effective processes of open strategy exploit communication tools that enable participants (via forms of real-time interactions within groups) to handle uncertainty and emergent trends (Baptista *et al.*, 2017).

Source: adapted from Dobush *et al.*, (2017) Open strategy fosters a continuously updated and innovative strategy designed to fit market requirements while maintaining competitive advantage (Chesbrough and Appleyard, 2007). More specifically, open strategy embodies an emerging practice of executing strategy based on the broad involvement of internal and external stakeholders in strategy-making, facilitated by the strategic use of technology (Schlagwein *et al.*, 2017; Scuotto *et al.*, 2017; Tavakoli *et al.*, 2017; Whittington *et al.*, 2011). In particular, open strategy focuses on involving internal groups or targets to create shared understanding and greater commitment (Stieger *et al.*, 2012). By balancing value creation and value capture through greater transparency and inclusion, open strategy aims to create a growing competitive advantage, and even support open innovation (Chesbrough and Appleyard, 2007; Whittington *et al.*, 2011). Hence, it attempts to overcome traditional strategy thinking, often conceived as an "exclusive" and "secret" matter (Whittington *et al.*, 2011). An exclusive strategy is "the chief executive's job" (Andrews, 1971; Montgomery, 2008), supported by strategic planners, an "elite staff" that helps detached top management in conducting its strategic supervisor role effectively (Williamson, 1970), whereas secret strategy implies that information asymmetry will be used to gain a competitive advantage (Makadok and Barney, 2001). Conversely, open strategy leverages transparency and inclusion (Hautz *et al.*, 2017), ensuring higher creativity as a straightforward consequence of stakeholder involvement (Stieger *et al.*, 2012), as well as more commitment, joint "sense-making" (Baptista *et al.*, 2017; Gooyert *et al.*, 2014; Ketokivi and Castaner, 2004; Hutter *et al.*, 2017; Werle and Seidl, 2015), and positive-impression management (Gegenhuber and Dobusch, 2017; Yakis-Douglas *et al.*, 2017).

Transparency in the internal and external sharing of information concerning a firm's strategy enhances the ongoing exchange of ideas and knowledge (Chesbrough and Appleyard, 2007). Furthermore, inclusion facilitates internal and external consultation (Schmitt, 2010) or the "co-strategizing" phenomenon (Doz and Kosonen, 2008) to constantly develop a firm's strategy (Ghemawat, 2002; Mantere and Vaara, 2008; Westley, 1990). Nevertheless, the combination of internal and external knowledge may not only be considered a key element for strategy innovation, but also a source of trouble due to potential conflicts of interest (Love *et al.*, 2014; Vrontis *et al.*, 2017). In addition, excessive transparency may become a problem, for instance, in relation to information piracy. Thus, it is better to protect businesses through copyrights and patents (Chesbrough and Appleyard, 2007). Recent studies have identified yet another dimension related to open strategy, i.e., "reflexiveness", which represents the social ability to be reflexive, and specifically to integrate "open and emergent" feedback throughout an organization's strategy implementation (Baptista *et al.*, 2017). It implies the existence of feedback systems and employees' ability to apply practical reflexivity by acting as they were responsible for their jobs (Cunliffe, 2002), and to actively perform their roles in the "production, reproduction and transformation of their work processes" (Gorli *et al.*, 2015; p.3).

Open strategy may be explained according to three perspectives: the entity's view, the process' view and the practice's view (Tavakoli *et al.*, 2017). According to the entity's view, open strategy is seen as a "black box", where antecedent and consequent strategy factors impact it or are affected by it in return (Tackx and Verdin, 2014); the view thus tries to explain these relationships to finally identify which open strategy is best (Yeaney, 2011). This view suffers from the weaknesses of not providing necessary information on real actions pertaining to open strategy. The process view offers a more holistic understanding of open strategy by identifying open strategy procedures (for instance, IS/IT artifacts) which lead to specific outcomes. However, this view succumbs to several limitations as well, since it does not shed light on real efforts, tools, managerial activities, environmental factors at the micro level, and it is limited to the most relevant aspects of open strategy. Finally, the practice view conceives of open strategy as a practice characterized by the dynamic and open participation of people in strategic action that leads them to perform a set of practices, i.e., "traditional strategizing practices" and open practices based on IT-enabled transparent interaction, co-creation and democratic decision making (Tavakoli *et al.*, 2017; Frau *et al.*, 2017).

To fill the gaps highlighted above, the present study defines a theoretical framework explaining the connection between open innovation and open strategy and how different degrees of open strategy occur as a result of open innovation (Bogers *et al.*, 2017; West and Bogers, 2017).

3. Method and research design

Given the scant number of studies concerning open strategy, and particularly the relationship between open innovation and open strategy, we adopted an exploratory multiple case study design (Miles and Huberman, 1994; Yin, 2009) as the proper approach to explore new phenomena from the perspective of organizational actors (Burrell and Morgan, 1979; Langley, 1999) and develop new theoretical insights to deepen the understanding of the phenomenon under investigation (Stake, 1995).

3.1 Research sample and case selection

In selecting its sample, the present study focused on firms performing in different businesses in the ICT industry because they may provide deeper insights into open innovation and open strategy approaches since, in this industry, firms strongly leverage external information and stakeholders' requirements in strategy creation (Tavakoli *et al.*, 2017). Specifically, the present article considers the following selection criteria (Yin, 2009): 1) transparency, 2) access to key information, 3) good background knowledge of the firm and its environment (e.g., history, competitors and customers), 4) whether the firm size is medium or large, 5) the existence of a structured open innovation organizational function.

A first batch of 28 companies was identified. These companies differed in terms of size and type, but shared the adoption of an open innovation approach. By applying the aforementioned criteria, a final sample of three companies was selected.

To carry out the study, we planned a two-step research method: 1) a pilot test study dealing with two companies, and 2) a multiple case study considering three companies (see Table 2).

We used pilot case studies to mark the procedures for formal data collection (Yin, 2009). We also tested the interview protocol with the CEOs of the two pilot case studies not included in the sample to establish whether the questions were clear and understandable, and then refined them. Feedback on ambiguities and difficult questions led us to adjust the protocol before full-scale utilization (Yin, 2009). Moreover, the issues encountered during the data analysis of the exploratory pilot case studies enabled us to redefine the variables for the second step of the investigation.

For confidentiality reasons, companies and respondents' details were removed and substituted with a distinctive title, e.g., Case Study 1, Case Study 2, or Case Study 3, and Respondent 1 and Respondent 2.

Tab. 2: Description of the case studies

Case Study	Country	Business Area	Size*	Staff headcount	Annual Turnover	Total balance sheet	(No. of interviews) Respondent
1	Sweden	Home and professional appliance	Large business	> 55.000	14,65 bln€	5,75 bln€	(1) Open innovation director; (1) Head of open innovation hub
2	Netherlands	Electronics	Large business	73.951	17,78 bln€	1,87 bln€	(2) Open innovation manager
3	Italy	Telecommunications	Large business	59.429 (49.689 in Italy)	19,83 bln€	1,12 bln€	(1) Open innovation analyst; (1) Strategy and innovation analyst

* Business size: Staff headcount > 250; Average annual turnover > 50 mln€ or Balance sheet total > 43 M€. All the firms are part of a group, so, according to EU Commission Recommendation 2003/361, we considered http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003H0361&locale=enhe staff headcount, turnover and total balance sheet data gathered from the holding 2017 consolidated financial statements.

Source: our elaboration

3.2 Data collection

We collected data from both primary and secondary sources: (a) semi-structured interviews with people involved in the development of strategy, innovation processes, and relationships with external stakeholders; (b) archival data and websites.

Primary data were collected through semi-structured interviews carried out on phone to enable respondents to freely discuss the open innovation approach. We completed the data collection phase with the analysis of each firm's website and sustainability reports in order to triangulate data sources. All respondents were managers (e.g., open innovation manager, strategy manager, etc.) or CEOs (in the pilot tests), depending on their familiarity with the firm's strategic actions and particularly their corporate entrepreneurship and collaboration efforts (Miller, 1983; Prahalad and Ramaswamy, 2004; Moi *et al.*, 2018a).

The main goal of the interviews was to understand how, and to what extent, open strategy draws on open innovation. Accordingly, we adopted an interview protocol consisting of five sections. The questions asked of the respondents included: "Can you explain your personal vision of open innovation?" "What is, in your opinion, the relationship between an open innovation approach and company strategy? Do you share any processes at the strategy level with external stakeholders?"

The findings were based on the analysis of the six interviews with firms from the sample, which were recorded and transcribed and lasted from 45 to 90 minutes. The interviews were recorded for a total of five and one-half hours and the interviewer took notes amounting to approximately 40 pages of text. We also relied on archival data to triangulate the self-reports of key respondents and, in turn, to mitigate possible "retrospective bias" in interviews with managers.

3.3 Data analysis

As typical of inductive, multiple case research (Miles and Huberman, 1994), we began to analyze the data by reconstructing the summaries of individual case studies, reviewing interview transcripts, archival data, and the firms' websites, in order tolook for descriptive codes (Miles and Huberman, 1994). Subsequently, we used replication logic to see whether the rest of the cases confirmed or refuted the emerging findings (Eisenhardt, 2007). Therefore, during the data analysis process, we compared this data with previously identified descriptive codes, and either categorized new data under existing codes or created a new code if it was analytically distinct. Such data analysis was performed by means of the Nvivo 10 software (Moi *et al.*, 2018b) Through this iterative process, we identified 15 descriptive codes. In the meantime, we started the generalization process by merging data into higher-order motifs, following a data-driven coding scheme (Gibbs, 2007). During this stage, we reanalyzed the bulk of descriptive codes, looking for interpretative codes that reflect the researcher's understanding of the data (Miles and Huberman, 1994). From the 15 descriptive codes, we extracted a set of six higher-order themes (see Table 3).

Then we performed a cross-case analysis to understand whether the interpretative codes were repeated in the three cases (see Table 4). The first coding stage was conducted separately and simultaneously by two authors and, at the end of this stage, we ran a coding comparison query through Nvivo 10. Then, together, we discussed the inconsistencies and reached an agreed-upon solution until the value of the Kappa coefficient was above 0.75.

Tab. 3: Data summary of the first coding stage

Interpretative code	Definition	Illustrative quote
Innovate by cooperating	The firm's attitude toward self-innovation by building partnerships with other stakeholders.	"Our partner's R&D will be an extension of our R&D" [Case Study 1]
Accelerate innovation	The firm's capability to speed up its innovation implementation by any means.	"We use this instrument in order to accelerate our processes concerning innovation and market adaptation" [Case Study 3; Respondent 2]
Participation	Increasing stakeholders' inputs for decisions (Mack and Szulanski, 2017)	"We have often received several suggestions… This situation has been the first step in the development of a database aimed at creating a new strategic business area" [Case Study 1]
Inclusion	External stakeholders' involvement in affecting changes in a firm's strategy. (Chesbrough and Appleyard, 2007)	"We periodically need to align the strategic and business areas… Our external agents are involved in this process, they drive us" [Case Study 2]
Disclosure	The firm's predisposition toward renouncing strategy confidentiality and exclusivity.	"It depends on the layer of the concerned strategy because some strategies are shared as they lead the company toward competitive advantages" [Case Study 3; Respondent 1]
Transparency	The firm's attitude toward sharing information, with other stakeholders, both internal and external. (Whittington *et al.*, 2011)	"We receive technical and strategic support from external agents… a bidirectional flow was created", [Case Study 3; Respondent 2]

Source: our elaboration.

Tab. 4: Cross-case summary of the interpretative codes

Interpretative code	Case Study 1	Case Study 2	Case Study 3
Innovate by cooperating	X		X
Accelerate innovation	X	X	X
Participation	X	X	X
Inclusion	X	X	X
Disclosure	X		X
Transparency		X	

Source: our elaboration.

Finally, we carried out the second stage of coding, which led the analysis to a further level of abstraction. In doing so, we started from interpretative codes and looked for patterns that recurred throughout the dataset (Miles and Huberman, 1994). During the second coding stage, we identified three dimensions which, according to our analysis, may underpin open strategy: open innovation, stakeholder engagement, and open communication (see Table 5).

Tab. 5: Data summary of the second coding stage

Interpretative code	Pattern	Definition	Illustrative quote
Innovate by cooperating Accelerate innovation	Open Innovation	"Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology" (Chesbrough, 2003, p. 24).	"[…] we argue that open innovation means go beyond listening and interacting with nontraditional players. There is a fundamental diversity, which very often is perceived as a barrier. This diversity means to talk with companies that are far away from us, for business area or technological competences", [Case Study 1]
Participation Inclusion	Stakeholder engagement	Stakeholder engagement is "the process used by an organization to engage relevant stakeholders for a clear purpose to achieve accepted outcomes" (Account Ability, 2008)	"We have just concluded an event where we met suppliers and even competitors, in order to speak openly about themes that will be aimed to drive some strategic processes and to find out if we are going in the right direction", [Case Study 2]
Disclosure Transparency	Open communication	Open communication is defined as the "increase in transparency, concerning an opening up of the communication process to include stakeholders previously excluded". (Whittington *et al.* 2011)	"There are advantages for all the parts involved through the sharing, which must be bilateral unless trilateral. Obviously, we must keep a balance within our ecosystem between collaboration and competitiveness, interpreting the strategy development step by step", [Case Study 3; Respondent 2]

Source: our elaboration.

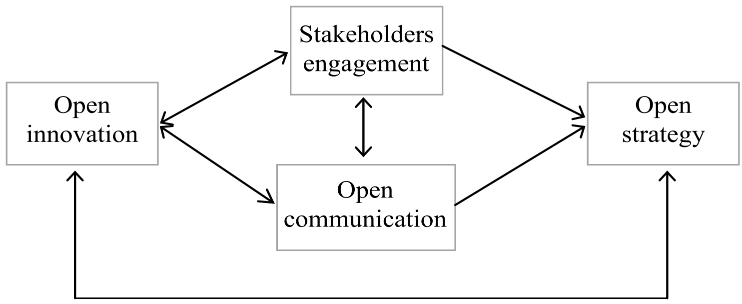
At this stage, we also performed a cross-case study to verify whether any patterns were repeated in the three cases. Finally, we checked the robustness of the codes by running a coding comparison query, and discussed inconsistencies again until the value of Kappa coefficient was above 0.75. Table 5 displays the aforementioned dimensions and provides illustrative, direct quotations from our fieldwork.

Once we concluded the data coding process, the final phase of data analysis involved assessing the semantic relationships among these patterns. This inductive process connected the identified dimensions and transformed them from static and standalone concepts into a dynamic, integrated, theoretical model.

4. Findings

Our findings are summarized in Figure 1, which illustrates the relationships between open innovation and open strategy.

Fig. 1: The pathway toward open strategy



Source: our elaboration

Open innovation could be one of the starting points to implement open strategy. In the attempt to implement an open innovation approach, firms try to detect external ideas. In doing so, they exploit the ability to capture external changes by opening their communication process up to previously excluded actors (stakeholder engagement and open communication).

Our theoretical framework also highlights a bidirectional influence played by open innovation on stakeholders' engagement and open communication. On the one hand, communicating with, and getting information from, a wide variety of external stakeholders provides good input for reconfiguring a firm's strategy to better fit environmental dynamics. On the other hand, thanks to stakeholder engagement, firms identify new sources of external information. This effort raises the degree of openness of the firms' communication processes.

Stakeholder engagement and open communication directly affect firms' strategies since companies are forced to share parts of their strategies when involved in participation, inclusion, disclosure, and transparency processes with external stakeholders. This implies totally or, more often, partially undermining any strategy's confidentiality and exclusivity. Therefore, open innovation indirectly impacts open strategy through stakeholders engagement and open communication (see Figure 1).

Open innovation also directly influences open strategy, since firms have to share parts of their strategy when they cooperate with other stakeholders in innovation activities. Nevertheless, we may observe that an open strategy stimulates open innovation. When companies start opening their strategies up, they provide more information to external stakeholders. Simultaneously, strategic information allows these external stakeholders to better understand the firm's need for greater innovation. This understanding means that, on the one hand, open innovation could serve as the beginning of a path that leads to an open strategy but, on the other hand, once the open strategy is implemented (even at an early stage) it helps companies improve their open innovation development.

In the following paragraphs, we analyze in detail the key dimensions that underpin an open strategy, namely, open innovation, stakeholder engagement, and open communication.

4.1 From open innovation to open strategy

Evidence from our analysis clearly shows how an open innovation approach forces firms to adapt their strategies to the external environment, following an outside-in path. Yet, gathering knowledge, competencies, and skills from external stakeholders are activities that encourage the firm to be open to communicate with external stakeholders even as far as its strategy is concerned (Figure 1). Our analysis highlights that open strategy is influenced by two levers that are provided by an open innovation approach: "innovate by cooperating" and "accelerate innovation". As stated by Respondent 1 of Case Study 1, companies seek innovation by cooperating with external stakeholders: "open innovation is a new way of making profits, through a synergy among ecosystems that diverge radically from one another, and consist of an internal one (1) the company, with its organizational systems and an external (2), the external network of innovators, which go beyond the traditional external networks of the company's strategic collaborators".

Also, openness was considered a good way of accelerating innovation development by the interviewees: "We argue that open innovation lies in the idea of exploiting the inflows and outflows of knowledge so that innovation as such may be speeded up. Our industrial area is currently exposed to major changes and increasingly becoming the land of open ecosystems that must constantly adapt to new market dynamics. We use this instrument in order to accelerate our processes regarding innovation and market strategy adaptation", stated Respondent 2 of Case Study 3. Similarly, we discovered from Respondent 1 of Case Study 1 that, "we must not count on the support of our internal resources, but also on external ones in order to create innovation and value. External resources are there, ready to be considered and exploited. Thus, the aim of open innovation is nothing more than accelerating innovation in our company".

Concluding, in all the analyzed companies, openness appears to be a fundamental element for accelerating innovation within the company by cooperating with other organizations which, in turn, forces the company to open its strategy up.

4.2 Stakeholder engagement

Our analysis underscores the importance of engaging customers, business partners, universities, spinoffs, competitors, technology providers, startups, and consultants during innovation development.

Stakeholder engagement is mainly associated with two focal aspects: participation and inclusion. It concerns the alignment of internal and external key information, even with a firm's strategy. Case studies revealed that, by implementing open innovation, firms pursue stakeholder engagement by asking for external contributions (Figure 1). For instance, Respondent 1 of Case Study 1 declared, "we received some suggestions that led us to present a new product that was not typical of our business area, but was in line with our strategic idea".

We also found that, thanks to an approach based on open innovation, the firm receives external influences that lead it to reconfigure its approach with partners, and achieve a greater degree of engagement. Therefore, open innovation fosters stakeholder engagement which, in turn, is based on open communication processes between the firm and external stakeholders (Figure 1). In our case studies, we discovered that firms created a process of collaborative strategy-making, which led to achieving shared knowledge, the engagement of external stakeholders, and greater participation and inclusion with respect to a firm's strategy. Respondent 1 of Case Study 2 asserts that, definitely, in terms of questions "about corporate strategy, we are building an engagement strategy and developing a set of activities that match our key stakeholders' expectations. In my unit, we are using the open innovation [sic] approach during meetings with a wide variety of actors".

Stakeholders engagement not only encompasses sharing information, but also receiving inputs due to continuous communication inflows and outflows which exercise influence over a firm's strategy. Therefore, the firms involved internal and external stakeholders in an endeavor marked by the joint exploration of strategic developments and trends. This is due to the influence of stakeholder engagement on management, which leads the latter to include external stakeholders in strategic development (Figure 1). These inclusions aim to align a firm's strategy implementation with partners' commercial or financial activities, along with those of competitors and universities.

4.3 Open communication

The last dimension concerns communication and how open innovation leads the firm to an open exchange of information among stakeholders, which also brings greater transparency (see Figure 1). Specifically, we observed the importance of bidirectional listening-and-speaking communication between management and stakeholders that enabled the firm to better fit strategy with external knowledge (Figure 1).

As mentioned earlier, open communication encompasses two specific aspects: transparency and disclosure of information. Based on our analysis, differences in the degree of openness can be deemed as differences in the degree of information disclosure that, in turn, affects open strategy. "In my unit openness is total and sustains an open dialog with a wide variety of actors and expecting the same behavior from them", claimed Respondent 1 of Case Study 2. We also observed that not everyone is willing to fully undertake open communication processes. For example, Respondent 2 of Case Study 3 stated, "obviously, it depends on the layer of the strategy concerned, since some strategies are shared because they lead the company towards competitive advantages, while others could lead the company towards some potential risks".

Another aspect concerns transparency in sharing information to gather feedback from stakeholders who are involved in innovation or strategy development. As previously discussed, open innovation involves bidirectional communication that includes both sharing and receiving information. Respondents emphasized that sharing implies a "conversation" in which both sides share pieces of strategic information. This encourages greater transparency between them (Figure 1).

4.4 Open strategy

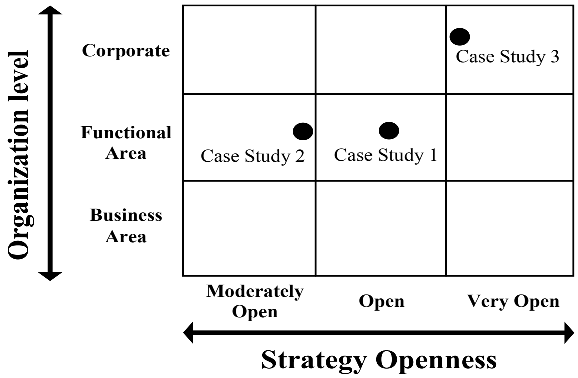
Overall, the evidence drawn from our analysis suggests that an approach of open innovation could lead to the openness of strategy implementation and to rethink key aspects like cooperation, inclusion, participation, and transparency (Figure 1). The data analysis revealed three different degrees of openness related to different levels or sections of business strategy: the corporate area, the functional area, and the business area. "If we focus on strategy levels below the core, there is even a strategy in different business areas. Every one of these areas has a strategy that plans how to reach the customer, which types of product to focus on, etc. Here open innovation has a strong influence. Therefore, for the first time in history, there was a flexibility that we have never had before. Why? Because our external agents and internal customers tell us what we [sic] can do. For instance, R&D could be not aligned with the marketing area. However, from the moment in which important inputs come from outside, we defined the potential paths for us to follow together. This pathway can lead me to create a new business area", stated Respondent 1 of Case Study 1. Others recognized that there are various degrees of openness. For instance, Respondent 1 of Case Study 3 claimed that, "obviously, not everything's black and white, the openness of strategy is a topic that must be assessed case by case. We usually have a strategic meeting with European partners, in which, according to a non-disclosure agreement, we exchange information. It is utopian to lock oneself within a walled garden and not talk to anyone, so we plan to speak with specific partners who could be important for the future and decide to share some level of our strategy with them, obviously up to a point, and they will do the same with us. There are several degrees, that are assessed each time according to the environment, and may imply telling everybody what we do".

Our data displays how open innovation leads to open strategy: firms tend to share strategic information up to specific organizational levels (corporate, functional and business areas) which, in turn, can affect the openness of innovation.

Strategy openness might be complete, but it is planned according to specific purposes. In fact, our data analysis displayed several "shades" of openness, i.e. what we might term "moderately open", "open", and "very open", so the open innovation approach may lead to at least nine degrees of open strategy. Based on our analysis, the three case studies have been placed within the "open strategy matrix" (see Figure 2).

Case Study 3's strategy implementation has a degree of openness close to "very open", as it engages a wide variety of stakeholders in adopting an open communication approach with them at the corporate level. Case Study 1 and Case Study 2 manifest a lower degree of openness compared to Case Study 3. Case Study 1 and Case Study 2's open strategy may be placed between "moderate" and "open" since they involve functional areas. In this last comparison, Case Study 1 achieved a higher degree of openness thanks to its quick innovation capability.

Fig. 2: Open strategy matrix



Source: our elaboration

Open communication could lead the firm to open its strategy at different levels (Figure 2) which, in turn, could modify open innovation (Figure 1). Specifically, our results emphasize a new perspective concerning the transparency of strategic development.

5. Discussions

In the attempt to analyze in detail how and to what extent open strategy draws upon open innovation, and how different degrees of open strategy could occur as a result of the adoption of open innovation, the present study provides several contributions to the extant research on innovation and strategy.

Openness to cooperate and speed up innovation. Prior research recognizes that firms combine internal R&D and external knowledge-acquisition to maximize innovative payoffs (e.g., Schlagwein *et al.*, 2017; Martinez-Conesa *et al.*, 2017; Vrontis *et al.*, 2017). Innovation strategies should specify in which way different types of innovation fit into business strategy and how resources should be allocated (Brohman *et al.*, 2009; Prahalad and Ramaswamy, 2004; Rayport and Jarowsky, 2004; Rhee, 2010). Different stakeholders' perspectives are critical for innovation success, but without a strategy that integrates and aligns them, their singularities may be limiting or self-defeating. Open innovation is a means to "inspire" a firm's strategy (Chesbrough and Appleyard, 2007; Whittington *et al.*, 2011). Our study acknowledges that open innovation is a key means to gather and extend stakeholders' contributions on strategy. In line with previous studies, our findings confirm that firms benefit differently from adopting open innovation strategies (e.g., Chesbrough and Appleyard, 2007; Lichtenthaler, 2008, 2015; Prandelli *et al.*, 2008). However, while prior research had only started to reveal the complex linkages between internal and external sourcing (Love, 2014), our results have now provided evidence on their complementarity within an open innovation strategy. Particularly, our findings emphasize that firms that pursue an innovation strategy need to accelerate innovation by cooperating with other organizations and, therefore, by exploiting an open innovation approach. Accordingly, our study contributes to complement previous research on open innovation by pinpointing two sub-aspects: innovation by cooperation, and accelerated innovation.

Stakeholder engagement for open strategy development. Prior research has broadly inquired into the strategic alignment that may occur through forms of joint sense-making and collaborative strategy-making (Doz and Kosonen, 2008; Ketokivi and Castaner, 2004). Innovation strategies are moderated by the external environment (Tavakoli *et al.*, 2017). The returns generated from innovation are the result of the interaction between the business environment and a firm's innovation strategy (Chesbrough, 2006), likewise promoting inclusiveness (Whittington *et al.*, 2011). Accordingly, this study aligns with the notion of stakeholder engagement as a situation granting the greater participation and inclusion of other interested parties in relation to strategic issues by involving internal and external stakeholders like customers, business partners, universities, spinoffs, competitors, technology providers, startups, and consultants (Schlagwein *et al.*, 2017; Whittington *et al.*, 2011; Scuotto *et al.*, 2017). Our findings support the role of stakeholder engagement in attaining a greater shared understanding or vision with external stakeholders who are involved in open strategy development (Schmitt 2010). In particular, our study acknowledges that the implementation of an open approach leads firms to consider participation (Mack and Szulanski 2017) and inclusion in order to promote their partners' greater commitment to strategy development (Whittington *et al.*, 2011). Our results highlight collaborative strategy-making, which generates greater inclusiveness (Hautz *et al.*, 2017; Stieger *et al.*, 2012; Whittington *et al.*; 2011). Furthermore, our study contributes to the extension of prior research by demonstrating that an open approach helps firms achieve increased stakeholder participation and inclusion in the course of its strategy development.

Bidirectional communication as the openness of strategy development. Previous studies defined communication as a combination of listening and speaking that must occur between management and stakeholders in order to create knowledge and a shared understanding (Stieger *et al.* 2012). Communication is also viewed as a "facilitator" for a shared understanding about the firm's strategy (Chesbrough and Appleyard, 2007). From the firm's communicative perspective, bidirectional communication aims to create shared knowledge with partners through an exchange of information concerning strategy (Barge-Gil, 2013; Stieger *et al.*, 2012; Whittington *et al.*, 2011). Our results extend the notion of "bidirectional communication" to the concept of "openness" for strategy implementation. In particular, it confirms that greater openness in strategy development might be one key result of information sharing and transparency. Open strategy creates joint sense-making and usually involves bidirectional communication by both sharing and receiving information.

Degrees of open strategy related to different organizational levels. Previous studies did not explain at which organizational level the firm's strategy may be subjected to openness (Chesbrough and Appleyard, 2007; Hardy *et al.*, 2006; Schmitt, 2010). Prior research considered open strategy as merely being a flat and uniform notion (Whittington *et al.*, 2011; Barge-Gil, 2013). This study contributes to extend such extant knowledge by identifying at least nine different degrees of openness. Our findings suggest that open strategy results from the combination of three degrees of openness (i.e., moderate, open, and very open) with three organizational levels or areas (i.e., corporate, functional, and business). The results reveal that open strategy does not imply a complete and automatic sharing of strategic information with partners at the top management level in strategy development. In line with Schmitt (2010), the degree of openness in innovation and strategy varies according to the level of information being shared. While a fully open strategy was not observed in our results, a pathway toward concrete degrees of open strategy has clearly been detected (see Figure 2).

5.1 Managerial implications

Practitioners may benefit from our theoretical framework to develop open innovation as a first step wards approaching open strategy. The framework also shows two more steps that managers should take in order to enhance the openness of their strategy: stakeholder engagement and open communication. First, our study suggests developing open innovation in a deep way, to the point of considering the inclusion of external stakeholders not only for new products and services development, but also for strategy implementation. Second, practitioners should likewise consider involving higher organizational levels, which would enable them to improve their inclusiveness and transparency and, in turn, foster open communication and stakeholder engagement. Nevertheless, managers need to be aware that involving higher organizational levels does not necessarily mean that strategy openness must be comeplete. Due to the associated risks, open strategy does not imply a comprehensive and automatic sharing of strategic information with partners at a corporate level. In fact, openness can be limited to levels immediately below the top, such as business and functional areas. However, in some circumstances, a broader strategy openn ess might be convenient. Therefore, strategy openness may indeed end up being plenary, but in such cases should be planned around specific purposes.

In conclusion, an open strategy matrix shows several combinations of open strategy resulting from the intersection between degrees of openness and organizational levels. Practitioners could use the matrix as a map for "jumping" from a combination of openness to another one depending on the organizational level they choose to involve and the degree of openness they would like to achieve.

5.2 Limitations and future research

This paper seeks to explain how, and to what extent, open strategy draws on an open innovation approach. It also provides a theoretical framework for the key dimensions that are encompassed in the pathway toward open strategy. Finally, it displays how different degrees of open innovation may occur as a result of adopting open innovation.

However, this study is just a first attempt to find theoretical connections between open innovation and open strategy. Given its exploratory nature, this study has some limitations.

For instance, our work is based on case studies gathered from a single industry: ICT. Future research probably should involve firms from several and different organizational settings. A plurality of industries may suggest different pathways leading from open innovation to open strategy.

Similarly, our study considers the firm's point of view. Hence, the analysis was based on data from just one actor, i.e., the firm. However, open innovation and open strategy also involve several stakeholders within the entrepreneurial ecosystem and each stakeholder may affect innovation and strategy openness. Therefore, future research could consider a multi-stakeholder perspective in order to analyze the same phenomena.

Finally, our qualitative findings may provide a starting point for future quantitative research. For example, future research could test the validity of our framework on a significant statistical sample. Also, quantitative studies could measure firms' strategic openness by adapting a scale that has already been developed in the literature (e.g., Laursen and Salter, 2006), or suggesting newly developed ones.

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