



## Structuring of the Open Innovation Field

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### Abstract

Open Innovation is considered a 'hot' concept in research as well as in industry practice. At the same time, at least two critiques have been raised against the notion: that it is based on old theories and that the term is vague and non-precise. Based on a bibliometrical analysis, this conceptual paper structures the emerging field of open innovation into two interrelated perspectives; the firm perspective and the ecosystem perspective. By that, it introduces an integrated framework for open innovation and shows how various concepts under the umbrella of open innovation are related to each other. A discussion is presented on how the two perspectives relate to earlier innovation management literature and how they are linked by 'new' interaction approaches, such as toolkits, innovation contests, crowdsourcing, and innovation intermediaries.

**Keywords:** open innovation, bibliometrical analysis, framework, firms, ecosystem.

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## 1. Introduction

The research field of open innovation has grown exponentially since Chesbrough coined the term in 2003 (DAHLANDER and Gann, 2010), although it can be still considered as relative small in terms of published articles. A search in the ISI Web of Science shows that in December 2006 there were 21 open innovation articles listed in the database (with “open innovation” in the topic field). In January 2012, there were 272 articles and in September 2013 there were 451 articles. In addition to this are proceedings, papers, editorial material, articles in journals not listed in WoS, several books, book chapters, book reviews, conference tracks, news articles, blog posts and other material, which together manifest open innovation as “one of the hottest topics in innovation management” (HUIZINGH, 2011).

Two fundamental critiques of open innovation have emerged as the contributions to the field are expanding. First, opinions are raised that much of what open innovation highlights (e.g. innovation collaboration or knowledge flows across organizational boundaries) is old news. For instance, Mowery (2009) shows that many elements of open innovation were visible in the US industrial revolution in the late 19th and early 20th centuries. Trott and Hartmann (2009) argue that the open innovation research community “has given insufficient credit to previous researchers who described, analyzed and argued in favor of most of the principles on which Open Innovation was founded, long before the term for this new model was actually coined”. Second, as the research base has broadened the open innovation definition has also become vague and non-precise. Dahlander and Gann (2010) highlight that scholars use different definitions on openness in their studies of open innovation leading to “conceptual ambiguity, with empirical papers focusing on different aspects, inhibiting our ability to build a coherent body of knowledge”.

Put differently, open innovation is an emerging, attractive and promising but also blurry and confusing field of study. Some work has already been carried out to structure the research into various perspectives and themes (DAHLANDER and Gann, 2010; Elmquist et al., 2009; Gassmann, 2006; Gassmann et al., 2010; Giannopoulou et al., 2010; Huizingh, 2011; Van de Vrande et al., 2010) but it has mainly been focused on how to separate distinct research areas or industry activities from each other (e.g. SMEs vs. large corporations, inflow vs. outflow of knowledge, high-tech vs. low-tech, products vs. services).

Based on a structured literature overview, both the two mentioned critiques of open innovation are addressed in this paper. The purpose is to take a step toward an integrated conceptual framework of open innovation and to explore alignments between the various focus areas under the umbrella of open innovation.

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## 2. Method

As a start for the literature review, an analysis of the SSCI web of science database has been carried out. Data was extracted on the 17 of January 2012 with the search string “open innovation” in the topic field. It resulted in 558 posts, out of which 272 were articles (and 237 proceedings papers, 36 editorial material, and 16 reviews). Some relevant open innovation contributions are not included in the SSCI database (e.g. books and articles from journals not part of the SSCI), but the database is generally considered as the most comprehensive database for academic papers. The conceptualization of the open innovation field started by first sorting out contributions from the 272 articles which had the word “framework” anywhere in the abstract. It resulted in 31 papers, of which all the abstracts were read. There are also few literature reviews published (e.g. Dahlander and Gann, 2010; Huizingh, 2011; Van de Vrande et al., 2010), aiming to structure the open innovation field into models, streams and perspectives. It became, however, obvious that there were difficulties to just fuse all these papers together into one unified framework because of their very fragmented focus areas and purposes.

A bibliometrical analysis of the references used in the 272 open innovation papers was then conducted, using Bibexcel software, to identify the citations referenced in these publications. Since the citation map becomes highly complex when including all the cited documents, it is recommended that scholars impose some meaningful restrictions on the minimum number to include (Persson et al., 2009). We limited our analysis to those references that were cited at least 10 times, which left us with 114 publications. After establishing the map file in Bibexcel we used VOSviewer clustering software (VAN ECK and Waltman, 2011) to produce Figure 1 below.

The result of the bibliometrical analysis indicates two somewhat overlapping clusters which could be summarized as the firm perspective and the ecosystem perspective. In the middle, there are papers frequently referenced from both sides, such as Chesbrough’s seminal books (CHESBROUGH, 2003b; 2006), Cohen and Levinthal’s (1990) article about absorptive capacity, Laursen and Salter’s (2006) quantitative study about innovation performance among UK firms and Gassmann’s (2006) editorial paper suggesting a research agenda for open innovation.

## 3. Qualitative Review of the Open Innovation Perspectives

To further explore the two perspectives, an additional qualitative literature review is conducted. This analysis includes both references from the 272 open innovation papers listed

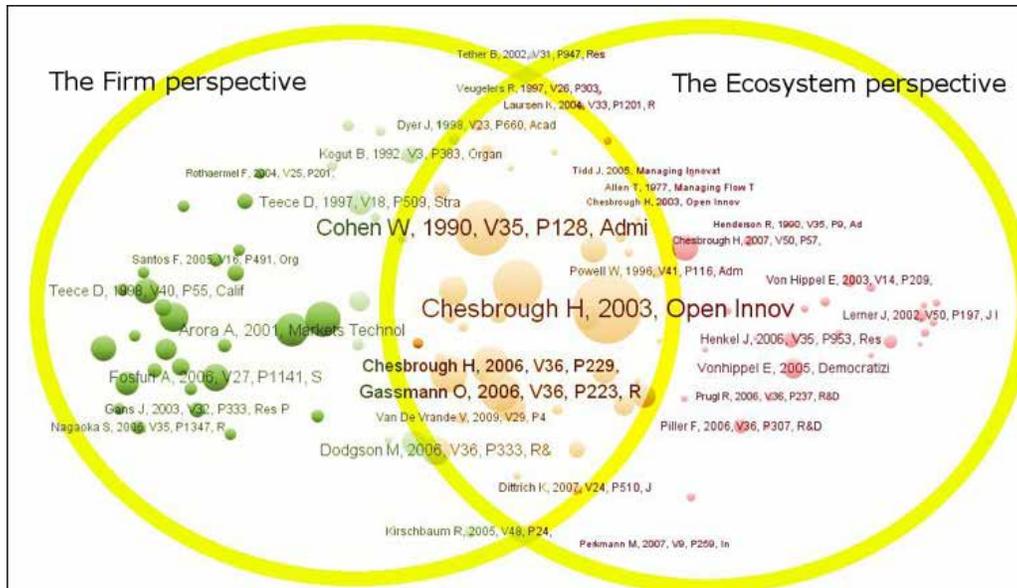


Fig 1: Mapping the open innovation paper's references

in WoS and other relevant contributions from books, book chapters and other journals, aiming to map the areas and issues covered by each perspective. This analysis is followed by a discussion on how the two streams interrelate and what different focus and underlying assumptions they have

### 3.1 The Firm Perspective

When Chesbrough introduced the notion of open innovation in 2003, he took a firm perspective to look at how ideas and innovations are to be transferred across the organizational boundaries in order to create value and new income streams. The most cited definition of open innovation illustrates this position: "open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (CHESBROUGH, 2003b). Instead of using the 'closed' innovation model of keeping all innovation activities inhouse, firms are being urged to open up controlled passages in their otherwise protective organizational walls. This standpoint is often illustrated by an innovation funnel, drilled with holes where knowledge can trickle in and out.

An (open) business strategy (CHESBROUGH and Appleyard, 2007) has been pointed out as an important aspect of adopting open innovation principles in the firm. Such a strategy makes it possible for the firm to create an awareness of how to compete on the market and how to position and differentiate itself in relation to external actors. Also a developed (open) business model (CHESBROUGH, 2006; 2007) and corporate venture capital investments (VAN DE

VRANDE et al., 2011) have been highlighted as crucial to enable the firm to both create and capture value in an open setting. Other variables which have been pointed out as important vehicles in adopting open innovation in the firm are for instance technology (DODGSON et al., 2006), corporate culture (HERZOG and Leker, 2010), top management support (HUSTON and Sakkab, 2006), Intellectual property management (CHESBROUGH, 2003a) and measures (AL-ASHAAB et al., 2011). Studies have also argued for contextual differences, such as high-tech vs. low-tech firms (CHESBROUGH and Crowther, 2006), MNCs vs. SMEs (LEE et al., 2010), product vs. service offerings (CHESBROUGH, 2011a) and where in the lifecycle the firm is located (FRISHAMMAR and Eriksson, 2011).

In this branch of research, a few case studies have been conducted to investigate how the focal firm implements open innovation in practice. For instance, Di Minin et al. (2010) show how Fiat evolves from 'closed' to 'open' during an economic downturn, indicating that open innovation became a strategic approach to protect the firm's technology base from rationalizations during periods of crisis. Remneland-Wikhamn (2011) explains how Volvo's transformation to 'soft' and 'open' innovation was contingent on previous path-dependent decisions, which to a large extent acted as inhibitors of change. Huston and Sakkab (2006) explain the radical top-down path of open innovation that P&G took with their new appointed CEO. Chiaroni et al. (2011) describe the open innovation journey of Italcementi, a mature Italian cement manufacturer, as going through three classical change management phases of unfreezing, moving and institutionalizing.

There have also been quantitative surveys on how firms adopt open innovation. In analyzing 2707 UK manufacturing firms, Laursen and Salter (2006) report that there is a curvilinear (inverted U-shape) relation between external search (breadth as well as depth) and the firm's innovative performance. Van de Vrande et al. (2009) analyze a database of 607 innovative SMEs in the Netherlands to explore the adoption of open innovation, and report that there were no major differences between manufacturing and services firms, but that medium-sized firms are on average more involved in open innovation than smaller firms, and that the major challenges relate to organizational and cultural issues. Love et al. (2011) conclude, based on a survey of 1100 UK service business that external openness is important in the initial, exploratory phase of the innovation process, while internal openness is important in the later stages. Mortara and Minshall (2011) suggest, based on a quantitative study of 43 large MNCs, that the way firms adopt open innovation varies according to their innovation requirements, timing of implementation and their organizational culture.

West and Gallagher (2006) identify three fundamental challenges for firms when adopting open innovation: 1) exploiting internal innovation, 2) incorporating external innovation and 3) motivating outsiders to contribute. They also identify four strategies that firms employ: 1) pooled R&D, 2) spinouts, 3) selling complements and 4) donated complements. Three core processes have also been pointed out (Enkel et al., 2009; Gassmann and Enkel, 2004) to differentiate open innovation activities of the firm: 1) the outside-in process (i.e. knowledge flowing in to the organization, also referred to as 'inbound'), 2) the inside-out process (i.e. knowledge flowing out from the organization, also referred to as 'outbound'), and 3) the coupled process (i.e. an ongoing co-creation of knowledge with other parties). It has been later noticed that studies of outside-in processes are much over-represented in the open innovation research field (HUIZINGH, 2011). Dahlander and Gann (2010) break it down further by adding the dimension of pecuniary vs. non-pecuniary processes, leading to four distinctive open innovation activities; acquiring (inbound/pecuniary) and sourcing (inbound/non-pecuniary), selling (outbound/pecuniary) and revealing (outbound/non-pecuniary). This implies that openness and closeness are not necessarily mutually exclusive but can either be seen as in a continuum (Dahlander and Gann, 2010). For instance, Henkel (2006) argues that firms in open settings apply a selective-revealing strategy based on rational choices on which information to share with others and which information to keep secret or sell on the market.

Trott and Hartmann's (2009) critique of open innovation as "new wine in old bottles" take its stance from the firm perspective. By examining Chesbrough's (2003b) six suggested principles for closed innovation, they conclude that this

foundation conveys the wrong impression that firms today follow these closed principles. Instead, naturally, it is possible to find examples from past research showing that firms collaborate with external parties. For instance, Lawrence and Lorsch (1967) with their contingency theory and Thompson (1967) with the open systems theory stated that the firm's organization is contingent on factors in the external environment. The stakeholder theory (FREEMAN, 1984), the value chain concept (PORTER, 1985) and Weick's (1995) notion of enactment are also examples of descriptions of the firm's dependence on and interaction with its environment in order to create and sustain market positions and competitive advantages. Allen (1983), with his notion of "collective innovation", maintains that firms often invent stuff together and make it available to their competitors. Teece (1986) speaks about appropriability regimes and complementary assets as factors which impact the firm's potential to gain from collaborative innovation work. Teece et al. (1997) also suggest that firms in an rapidly changing environment need certain dynamic capabilities, such as sensing, seizing and transforming abilities (TEECE, 2007). Cohen and Levinthal's (1990) notion of absorptive capacity (i.e. a firm's ability to absorb knowledge from external sources) can be viewed as one such capability, which is also much referred to in the open innovation literature.

Although not referred to by Chesbrough, open innovation could also be seen, as for instance Dahlander and Gann (2010) and Jacobides and Billinger (2006) suggest, as closely coupled with the broader debate about the boundaries of the firm (COASE, 1937; Williamson, 1985). In short, the level of transaction costs (such as collaboration cost, cost of opportunism, coordination costs, etc.) are said to influence managerial decisions on where organizational borders are set; whether to make or buy, collaborate or compete, being open or closed. Van de Vrande et al. (2010), for instance, argue that the firm's open innovation model can be divided into at least four dimensions, on which transaction cost economics with innovation partners is one. The other three they suggest are 1) dynamic capabilities, 2) value creation and capture via business models and 3) how to handle technological and market uncertainties within the innovation funnel.

Summarizing the review of the firm perspective of open innovation, it is quite understandable that questions have been raised about the novelty that the term brings. Neither the organizational form (i.e. cross-boundary collaboration for innovation purpose), nor the implementation challenges (e.g. aligning processes, technology, culture, business models, strategies, measures etc.) are new to innovation management literature. Rather, much of the processes can easily be described through traditional change management theories, whether to view it as Lewin's (1947) sequential model of

unfreezing – movement – refreezing or Leavitt's alignment model (1965) of task – structure – technology – people. From this point of view, it is logical that concepts such as absorptive capacity (Cohen and Levinthal, 1990) and the not-invented-here syndrome (Katz and Allen, 1982) undergo a revival. Although open innovation has also been applied to the stage-gate innovation process (Cooper, 2008; Grönlund et al., 2010), it can in general be seen as a critique of the rational, step-wise, controlled innovation funnel as it highlights an increased breadth and intensity of inbound and outbound collaborations in contemporary innovation work of the firm.

### 3.2 The Ecosystem Perspective

The other stance in the open innovation literature is looking more directly at the innovation activities happening outside the firm boundaries and within the wider business ecosystem. Users as innovators have been recognized long before the notion of open innovation was coined (VON HIPPEL, 1986; 1988). Lead user innovation (VON HIPPEL, 1986) suggests that firms can utilize the knowledge of highly experienced and motivated users in product development. In a more recent work, von Hippel (2005) has also put the lens on democratized, user-centric innovation that complements or even disrupts the innovations of firms. Instead of relying on manufacturers as (often imperfect) agents, users can develop exactly what they want and they tend to freely share their results to others (FRANKE and von Hippel, 2003; Lee and Cole, 2003).

A related branch of research to user innovation, and also open innovation, is that of open source development. Spaeth et al. (2010) describe open source development as a push model of open innovation, where knowledge is voluntarily created outside of the firm by various actors who push knowledge into a firm's open innovation projects. Rolandsen et al. (2011) discuss how individual programmers develop own strategies of how to handle the tension between closed proprietary and open modes of production. Gruber and Henkel (2006) discuss key challenges, such as liability of newness, for new actors to be engaged in the open source development process.

It has also been pointed out that firms actively host communities as vehicles for innovation (FLOWERS et al., 2010). A large strand of research linked to this perspective can be found in the area of innovation communities. Also here much of the published work is influenced by open source studies. West and Lakhani (2008) define a community as a voluntary association of actors united by a shared instrumental goal of creating, adapting, adopting or disseminating innovations. They can consist of amateurs as well as professionals, individuals, teams or unspecified large crowds. Dahl-ander and Wallin (2006) suggest that (open source) com-

munities can act as complementary assets to firms. Fleming and Waguespack (2007) point to two correlated but distinct social positions in open innovation communities: roles of social brokerage (see Burt, 1992) and boundary spanning (see Tushman, 1977) between technological areas. Fichter (2009) apply promotor theory, emphasizing the need of promoters as informal transformational leaders in cross-boundary innovation communities who keep the open innovation ideas and projects alive and thriving. Several other academic attempts have been made to analyze the motivational drivers in such 'open' constellations. Benkler (2006) introduces the notion of commons-based peer production as a different mode of production than the traditional hierarchy and market structures. It captures the large (often web-based) initiatives of distributed volunteers' creative contributions in a social process that is neither coordinated by managerial control nor by market price signals. von Hippel and von Krogh (2006) suggest a private-collective model for innovation initiatives, where private investments and collective action co-exist. This model works when free revealing provides more positive results for the disclosing actor than for potential free-riders. These positive outcomes of revealing can stem from positional power or influence on the commons, learning, reputation and joy (HERTEL et al., 2003; Lerner and Tirole, 2002; von Hippel and von Krogh, 2003).

Other participants than firms (CHESBROUGH, 2003b) and users (VON HIPPEL, 2005) are also highlighted in the open innovation ecosystem. Recent attention has been directed toward how suppliers are active sources for innovation (BREM and Tidd, 2012), with unique knowledge in the products and processes of the value chain. Remneland-Wikhamn et al. (2011) argue that power relations between firms and suppliers tend to shift, in that the suppliers get a more active role as creative peer-producers. Moreover, universities have been pointed out as important actors for shared value creation. Cooke (2005) describes the globalized knowledge regions as consisting of multinational corporations and SMEs in interaction with universities and public research funding resources. Also Perkmann and Walsh (2007) highlight the innovation links between universities and the industry, manifested through tight network relations (as opposed to arm-length transactional market links). Li and Vanhaverbeke (2009) propose that in the development of pioneering innovation suppliers of different knowledge fields, and nearby geographical fields, work most effective. When external actors, such as users, suppliers and universities, can add value without asking the focal firm for permission, this transforms the step-wise value chain to a more elusive ecosystem.

There are also clear links between the research on open innovation and standardization. David (1995) defines a standard as "a set of technical specifications that may be adhered to by a producer, either tacitly or as a result of a formal

agreement". Similarities with the open innovation field are found in the intricate balance between competition and collaboration among agents on the market. A standard gains value as a function of how many followers it has. Besen and Farrell (1994) argue that there is a strategic choice for an individual actor to compete within a shared standard or to make themselves incompatible, resulting in a competition between different standards. Various strategies are also presented for participants in the standardization process. Austin and Milner (2001) for instance argue that the strategy depends on whether the firm is a leader or follower. Grotens (2009) proposes that standardization can act as a neutral arena for open innovation and that different established policies within the initiatives lead to different open innovation processes. West (2006) discusses the open standards in relation to open innovation and highlights the fact that firms increasingly have sought to obtain commercial gains also within open standards. This takes place not only by supporting superior implementations but also by negotiating the rules of IP royalties.

The biological metaphors of ecology or ecosystem have been used for a long time in the management field (HANAN and Freeman, 1977; Moore, 1993). Based on the idea of natural selection and evolution theory, this stance suggests that organizations adjust themselves to fit in the environment and that environmental changes and 'shocks' determine firms' ultimate success or failure. The ecosystem view also highlights the complex relations built into the web of dependencies among the different 'species'. As Moore (1993) puts it: "In a business ecosystem, companies co-evolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations". Chesbrough and Appleyard (2007) present a descriptive model based on the two dimensions of in-house vs. community-driven value creation and company vs. ecosystem value capture, showing that it is not necessarily the creator of value who reap the main benefits of it. Christensen (et al. (2005) apply an industrial dynamics perspective on open innovation in a study of the sound amplification development and illustrate the complex interplay of various categories of actors. Industry-specific studies of open innovation encompass, for instance, pharmaceuticals (MUNOS, 2009), automotive (ILI et al., 2010) and food (SARKAR and Costa, 2008).

To summarize, even the ecosystem perspective of open innovation can to a large extent be criticized as merely repackaging ideas and phenomenon that have been studied for decades. As shown, business activities, viewed as part of ecosystems based on symbiotic relations that cut across organizational boundaries, are visible in many research domains, such as, industry dynamics, user innovation, communities, so-

cial networks, standardization and open source. Open innovation shows similarities with research streams of clusters (Porter, 1998), innovation systems (COOKE, 2001; Lundvall, 1992) and triple helix (ETZKOWITZ and Leydesdorff, 1997; Rickne et al., 2012). Strong ideological links could be traced to the notion of open society (POPPER, 1945), and social movements that include open access, open science, free culture, free and libre software and open data. 'Open' in this sense is defined more in terms of transparency and freedom to use than to Chesbrough's (2003b) more controlled and restricted form of 'openness'. Open innovation seen from an ecosystem perspective is, hence, joining the critique of rational, controlled and step-wise value chains constituted by clear roles and divided responsibilities. It also sheds light on more civic logics which exist in conjunction with (or opposing to) the capitalistic logics within markets as well as hierarchies. The open innovation paradigm embraces the complex emerging relations and disruptive power shifts that the paradigmatic changes of 'openness' may lead to, fueled by global competition, shorter product-life cycles, increased development costs, fusion of industries and knowledge fields, and changing societal values.

### 3.3 Interactions Between the Two Perspectives

Huizingh (2011) proposes that the attention and attraction of the open innovation notion rests on that "the concept fits very well with many trends in the broader management arena". This is true for studies on the innovative firm as well as on an ecosystem level, but also on the interaction activities between the two. One such means for interaction between the firm and surrounding stakeholders is the so called toolkits, which are "coordinated sets of user-friendly design tools that enable users to develop new product innovations for themselves" (von Hippel and Katz, 2002). Toolkits empower the users to be innovative and transfer design capabilities outside of the firm's walls (von Hippel, 2001), which leads to a possibility to serve and satisfy heterogeneous user needs (Franke and von Hippel, 2003). Franke and Piller (2004) have shown through experiments on watches that customers are willing to pay on average 100 % higher price for self-designed products. Piller and Walcher (2006) also launched a toolkit together with Adidas to learn how this method can support open innovation activities in practice. They conclude, among other things, that when firms decide to open up internal innovation processes, they also have to establish supporting functions and structures within the internal organization.

Another often referred to means of interaction in the open innovation literature is that of innovation contests, as a specific form of distributed ideation work (Bullinger et al., 2010; Terwiesch and Xu, 2008). Related notions are research tournaments (TAYLOR, 1995), idea contests (PILLER and

Walcher, 2006), idea competition (LEIMEISTER et al., 2009), design contests (BRABHAM, 2010) and innovation jams (BJELLAND and Wood, 2008). Bullinger et al. (2010) suggest, based on a literature review, ten key design elements for differentiating various types of innovation contests. The media environment can be online, offline or as a mixture. The organizers can be firms, public organizations, non-profit organizations or individuals. The target group can be specified or unspecified and the participants can be individuals, teams or both. The contests can have high or low task specificity and various degrees of elaboration (idea, sketch, concept, prototype, solution, evolving). The contest time can vary from very short term to very long term. The rewards for participation can have monetary, non-monetary or mixed elements and the functionalities for supporting community building can be given or not-given. Finally, the assessment of contributions can be based on jury evaluations, peer-review, self-assessment or mixed. There are obviously great potential benefits of utilizing innovation contests in established organizations, in terms of providing venues for marginalized actors to be part of problem-solving (JEPPESEN and Lakhani, 2010), giving new diverse perspectives (PAGE, 2007; Terwiesch and Xu, 2008) and challenging the rooted beliefs in firms and industries (COLARELLI, O'Connor, 2006). Innovation contests also have strong resemblance with the notion of crowdsourcing, coined by Howe (2008). Crowdsourcing takes place when companies or institutions outsource a specific task to an undefined and generally large crowd of people through an open call (BRABHAM, 2008), often online. Crowdsourcing is much linked to the idea of wisdom of crowds (SUROWIECKI, 2004) suggesting that large groups of independent individuals can together aggregate wisdoms even wiser than experts. Page (2007) explains this phenomenon with the crowd diversity, arguing that “diversity trumps ability”.

Third-party innovation intermediaries, such as Innocentive, NineSigma and others, have received specific attention in the open innovation research (WEST and Lakhani, 2008) as brokers between supply and demand of ideas and innovations. They normally connect research challenges in firms with a large crowd or community of problem-solvers. Innocentive, for instance, is said to connect more than 250,000 registered solvers from about 200 countries. Hence, these intermediaries balance inbound and outbound processes (ARORA and Gambardella, 2010), and although challenges with their execution have been discussed (DI GANGI and Wasko, 2009; Luthje, 2003) they are still considered as important vehicles for facilitating open innovation and crowdsourcing in practice (HULT et al., 2004; Huston and Sakak, 2006). Patent auctions (SNEED and Johnson, 2009) and crowdfunding initiatives (ORDANINI et al., 2011) could be viewed as special cases of such intermediaries.

These means of interaction in the open innovation literature provide perhaps the most ‘new’ or differentiating theoretical contributions in relation to general innovation management research. The ‘tools’ for open innovation collaboration – such as toolkits, innovation contests, crowdsourcing, and innovation intermediaries – are more or less interlinked and somewhat overlapping in both meaning and use. All of them are heavily influenced by the escalating use of information technology as means for communicating and facilitating innovative activities. Boudreau and Lakhani (2009) distinguish different forms of innovation platforms: 1) the integrator platform which is wedged between external innovators and customers, 2) the product platform in which the external innovators build on top of a licensed technological foundation in order to have direct access to customers, and 3) the two-sided platform, where the platform actively facilitates transactions and interactions between external innovators and customers. West and O'Mahony (2008) with their notion participatory architecture also talk about how the underlying infrastructure is guiding the emerged interactions and exchange through social, legal and technical built-in capabilities. Remneland-Wikhamn et al. (2011) suggest that open innovation initiatives are designed for the level of generativity they allow. As products and services are melting together (CHESBROUGH, 2011b), much due to digitalization, these information technological aspects increasingly involve both the production and consumption of the value propositions. Hence, aspects such as the use of social media (KAPLAN and Haenlein, 2010) and web 2.0 (O'REILLY, 2007) can also find at least weak ties to the open innovation field.

#### 4. Concluding discussion

Two critiques against the notion of open innovation were raised early in the paper: 1) that it does not bring anything new to the table and 2) that it is an imprecise and all-encompassing concept. Regarding the first issue, it seems incontestable that much of the theorizing used under the name of open innovation existed earlier than 2003. Especially if only concentrating on Chesbrough's firm perspective, much of what is brought forward in terms of theory and empirical data have been highlighted by other scholars before him in areas such as strategy, organization and change management. Even the ecosystem perspective has been around in the academic literature for decades. What can justify the open innovation concept, though, is that it captures a rather dramatic intensification of ‘open’ activities and possibilities – in firms as well as markets – and that these practices and empirical examples look somewhat different today than, say ten years ago. The notion of open innovation also provides an umbrella for fragmented empirical and theoretical streams of research looking at similar things.

This leads to the second critique, namely that the notion is vaguely defined. Van de Vrande and de Man (2011) urge for further cross-fertilization between the different streams of literature in relation to open innovation. They propose that “the integrative, practical problems that cut across the narrow domains of research” (VAN DE VRANDE and de Man, 2011) can act as a unifying quest for researchers in different disciplines and research traditions to meet around. At the same time, von Hippel (2010) and Dahlander and Gann (2010) point out that the different meanings of ‘openness’ among academics and the multidisciplinary origin of the open innovation researchers make it far from easy to form one strong, unified research community which shares one “workable, all-encompassing definition” that for instance di Benedetto (2010) requests. But are all the different strands of research around open innovation only partly loosely connected, and partly even disconnected? Or is it as the old Indian story of eight blind men and an elephant, touching different parts of the same animal to form their own truth and narrow the perception of it? Without critical communication, the man in the back of the elephant will continue to believe it is a rope and the man by the leg to believe it is a tree. This paper has aimed to bring at least some sort of structuring of the open innovation animal, resulting in two perspectives that are closely interrelated but with somewhat different research questions and focuses.

The escalating use of information technology is suggested in the paper as one main driver for open innovation. In the firm perspective, IT is often viewed as tools for enhancing a productive inflow, outflow and internal flow of knowledge to support the internal innovation process, or an important lever for the specific purpose of certain specific activities. In the ecosystem perspective, it is more often studied as a platform of infrastructure on which multiple actors interact and collaborate. In all cases, information technology is certainly an important area of study in the open innovation research. The literature review shows, however, that there are complex interconnections between the use of IT and several other elements as well. Two such important areas of interest are 1) the organizing mechanisms and 2) the value generation mechanisms. In terms of organizing, the firm-perspective generally looks more on internal dynamic capabilities in relation to the surrounding environment, while the ecosystem perspective looks more broadly on collective, cross-boundary aspects of innovative work. In terms of the value generation area, the firm perspective tends to highlight exploration and exploitation strategies and open business models, while the ecosystem-perspective looks on collective value creation in relation to individual actors’ value capture. To summarize, in discussion about the two perspectives of open innovation, several different questions need to be addressed. The contributing actors (i.e. who) and some examples of means (i.e. how) have been shortly discussed

above. The why-question relates to the motivational challenges brought up in the ecosystem perspective. The when-question involves aspects such as frequency of interactions (single vs. ongoing) and timing (e.g. proactive vs. reactive). What type of content is flowing across boundaries is, of course, also in focus and can include, to mention but not to limit, information, ideas, intellectual properties, employees, innovations, and money. The type of relations being established can also differ; i.e., weak vs. strong, formal vs. informal, controlled vs. uncontrolled, pecuniary vs. non-pecuniary. Interactions can be pure transactional, based on contracts and formal rules, or more social, based on trust, power and engagement. The direction of the flow can be, as mentioned, inbound, outbound or mixed. All these aspects, and arguably many more, will color the understanding of open innovation and its potential for value creation and value capture.

This paper provides a conceptual framework for open innovation. This framework is, as stated in the method section, not the first being suggested within the research community. There is, rather, a preoccupation among researchers to structure this new, emerging field. Most of these contributions have so far focused on specific empirical data or one specific angle of open innovation. They tend to end up summarizing various perspectives, research streams, gaps and trends, which is a good first step in starting to build an overall conceptual framework of open innovation (e.g. BOGERS et al., 2010; Dahlander and Gann, 2010; Elmquist et al. 2009, Enkel et al. 2009; Gassmann et al. 2011; Giannopoulou et al., 2010; Van de Vrande et al. 2010). Unlike previous work, this paper has aimed to provide a conceptual structure based on how different perspectives and streams are interrelated to each other on an aggregated level. As any framework or model, this structure is naturally a simplification of reality (with possibly missing variables and somewhat overlapping themes) - this is why it is arguably important to continue providing alternative views on how to structure the emergent, and somewhat fuzzy, field. This paper aims to initiate a critical discussion about which activities can/should be called “open innovation”, but also how different notions under the umbrella of open innovation are related to each other. Further research is thus suggested to continue this quest.

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