

# The novelty of Open Innovation

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**Abstract: Proponents of Open Innovation argue in support of its novel additions, critics however question its novelty and argue that the roots of Open Innovation predate Chesbrough. We investigate what is novel about Open Innovation by comparing predating theories and concepts with the main themes we found using a literature review. Our results indicate that the novelty of Open Innovation lies in its holistic approach. These findings were synthesized into a star model that could help both scholars and managers in their work with Open Innovation.**

## 1. INTRODUCTION

Open Innovation (OI) is a hot topic in innovation management with over 275 000 hits on Google Scholar. It has sparked the interest of scholar in a wide array of disciplines (Huizingh, 2011). There is, however, an ongoing disagreement regarding the novelty of OI. Research splits into two main standpoints: proponents of OI who emphasize its novelty and superiority over previous ‘closed’ models, and critics who question the novelty of OI by pointing to previous theories and the ambiguity of the term OI. The recent debate in Technovation (see Groen & Linton, 2010) shows this disagreement and puts the definition of OI into question.

Chesbrough first coined the term in his 2003 book *Open Innovation: The new imperative for creating and profiting from technology*, and Chesbrough, Vanhaverbeke & West (2006) defined OI as *the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. 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 they look to advance their technology* (p. vii). OI thus encompasses all open innovation management approaches with regards to knowledge flows and market exploitation. Being very broad, together with its indistinguishableness, contributes a lot to the lack of focus when it comes to usage of the term. Dahlander & Gann (2010) argue that the ambiguity of the term as well as usage of different definitions further inhibits the construction of a coherent body of knowledge.

Reasons given to support the novelty of OI includes mention of how industries are moving from closed innovation to open innovation (Chesbrough, 2003a; 2003b), as well as list of ‘erosion factors’ that is claimed to render the closed model obsolete in most industry sectors thus supporting said move (Chesbrough, 2003c). Chesbrough (2003b) further emphasizes the novelty with examples of how the closed model is obsolete. Two such examples are DuPont’s and AT&T’s internal research focus, subsequently arguing that *internal R&D is no longer the strategic asset it once was. The answer lies in a fundamental shift in how companies generate*

*new ideas and bring them to market* (p. 36). Many support this claim of a industry shift from internal R&D and closed innovation to OI (e.g. Chiaroni, Chiesa, & Frattini, 2009; Chesbrough, 2003b, 2003c; Chesbrough & Crowther, 2006; Enkel, Gassmann & Chesbrough, 2009; Gassmann, Enkel & Chesbrough, 2010; Lichtenthaler, 2008a, 2009; Herzog, 2008 etc.). Other examples of how OI is portrayed as being novel include, but are not limited to the following indications/statements:

- of a shift away from an internal focus; *companies are increasingly rethinking the fundamental ways in which they generate ideas and bring them to market – harnessing external ideas [...] (Chesbrough, 2003c, p. 35)*
- regarding the shift in academic focus towards external openness; *as the focus shifted from purely internal R&D activities, the academic community started emphasizing that the firms should be open to outside innovation (Enkel et al., 2009, p. 311), and*
- that OI is a new paradigm; *as an emerging paradigm for managing and understanding innovation processes (Chiaroni, Chiesa, & Frattini, 2011, p. 34).*

Those more skeptical to the novelty of OI argue from different theoretical standpoint. Whilst not questioning the ‘erosion factors’, Huzingh (2011) and O’Reilley (2010) both argue that the OI concept can be traced far back in history, and that *use of innovation sources began before they were labeled “open innovation”. This is nothing new, it is the past, just more of it.* (O’Reilley, 2010, p. 45). An example of the OI concept in history is found in Joel Mokyr (1992), who argues that differences in innovativeness between nations throughout history is to a large part due to the social environment that determined the ‘openness to new ideas’. Another in Reg Little’s (2005) review of John Hobson’s *The Eastern Origins of Western Civilization*, where he highlights the role ‘receptive capacity’ played in Western European progress. Lamoreux & Sokoloff (1999) unravel many historical examples of open approaches to innovation and claim that it was only a small number of large firms, with DuPont being the prime example, who deployed in-house R&D in the early 20<sup>th</sup> century. They continue by giving numerous examples of open approaches to innovation conducted by large companies; including but not limited to, AT&T and Bell labs. More present day focused research also puts the claim of a ‘fundamental shift’ in question. Aylen (2010) argues that the development of wide strip mill for steel in the 1920s shows how open approaches to innovation are long established. He also highlights the fact that DuPont and ICI had a patents and processes agreement that *led to extensive sharing of know-how between 1929 and 1948* (p. 40).

Two main OI research streams seem to exist with regards to its novelty; those in favor, and those against. We argue that the rising popularity of OI, together with its ambiguity and broad definition, have led to many misinterpreting any open business event or industry collaborative effort as OI, adding an element of confusion about what OI is and to its perceived novelty. This claim is based on a previous study conducted by one of the authors<sup>1</sup>. Furthermore, its popularity has led to many using it as a buzzword. The purpose of this paper is thus to improve the understanding of OI with regards to its novelty, which in turn can be both in

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<sup>1</sup> Altmann & Kämpe (2010) analyzed three large MNE in Sweden, all who claimed they were engaged in OI activities and found that one of them only acquired external companies with creative ideas, the other was part of a large collaborative effort with a clear focus and goal in mind, and the third was the only one that used OI.

terms of a partial or holistic focus. Those who argue that the novelty in OI lies in its holistic approach have so far not elaborated on how such a holistic view of OI could be depicted. Our aim is to map OI themes using a literature study, and to compare these themes with prior open approaches to innovation to account for the partial novelty view. In our analysis we present our findings in a table and ultimately synthesize said findings into a model of OI that is both distinguishing and non-ambiguous, which is a contribution in terms of depicting a holistic novelty view of OI. Our results map parts (see methodology for delimitations) of the field that is OI today, and gives suggestions for future research as well as managerial implications.

## **2. LITERATURE REVIEW**

### **2.1. PREVIOUS RESERACH**

Groen and Linton (2010) started a debate in *Technovation* entitled *Is open innovation a field of study or a communication barrier to theory development?* This marked the start for a debate on the novelty of OI, and is the only work we found on the specific topic of examining the novelty of OI. Groen & Linton (2010) start the debate by comparing OI to supply chain management (SCM), and argue that OI fits very well within the definition of SCM. This fit was supported by von Hippel (2010), and von Krogh (in press) points to an apparent ‘overlap’ between SCM and OI but adds that approaches on the extreme open end of the spectrum would not typically be considered integral to a firm’s supply chain due to the intrinsic characteristic of open processes, e.g. hard to plan, lack of contract R&D, high turnover of project participants etc. Badawy (2011) argues against the overlap, and states that OI is a business model and a paradigm, whereas SCM is aimed to achieve efficiency in the supply chain. He argues that the concept of open innovation is much more encompassing, spontaneous, free-wheeling, and organic than that of SCM. The contrasting argument of Badaway (2011) further highlights the ambiguity of the term OI, (c.f. section 2.2.). As above stated; the ambiguity inhibits building on a coherent body of knowledge. Linstone (2010) adds his view on OI by explaining how terminology is a common problem in dynamic fields, and how a new term can gain popularity as younger researchers are unaware of earlier work done by their predecessors. He continues by claiming that the use of ‘new labels’ occur even if only an improvement or extension of a concept is involved.

Overall, the standpoint of those that argue that it is similar to SCM is based on the overlap between OI and a preceding concept. Badawy (2011), who argues against the importance of the overlap, claims that significant differences exist if one views OI holistically. Groen & Linton (2010) point to a possible extension of previous theories.

### **2.2. HOLISTIC OR PARTIAL? THE AMBIGUITY OF OPEN INNOVATION**

Aside from the *Technovation* debate, debate around the novelty and usability of OI has also been addressed, albeit circumstantially, in other articles. First we present four of the review articles we found, followed by an extract of relevant articles

The main themes found in literature has been mapped by Elmquist, Fredberg & Ollila (2009). Enkel et al. (2009) published a comprehensive list on the OI phenomenon (e.g. a list of main

aspects). The third review article is that of Gassmann, Enkel, & Chesbrough (2010) who's article divides the field of OI into nine perspectives as well as mentions previous work in the area. Since these three articles often only mention preceding theories instead of building upon them, they are considered to be proponents of OI's novelty. Huizingh (2011) contrasts the other three with regards to OI's novelty. In his historical overview he claims that OI is nothing new at all and that its elements can be traced back far before Chesbrough coined the expression. Huizingh (2011) also presents his view on why the term OI became so popular and widely used by arguing that it includes a collection of terms; embodying and connecting external knowledge acquisition and internal knowledge exploitation. The review articles cover two interesting and for our research question relevant topics: that of its holistic approach, and that openness in history.

As Huizing (2011) argues, the holistic view is what makes OI truly novel, an idea supported by Herzog (2008). But the literature is fragmented in terms of to what extent OI needs to be applied for a firm to be called an open innovator; some account any cross-border event between two entities to OI, others claim you need a holistic focus. Furthermore, there is no agreement on what OI actually is, and a lot of activities are claimed to be OI activities. Aylen (2010) mention supplier manufacturer collaboration as OI, and then also mentions acquisition as an OI activity as well as university firm collaboration. Chesbrough & Appleyard (2007) mention a lot of IT related examples like Linux and Wikipedia, Chesbrough (2003b) adds licensing, joint ventures and spin-offs to the list of OI activities, and Herzog (2008) talks about how joint R&D, minority investments and corporate venture capital are 'tools' of OI. While all of these activities fit under the definition of OI, their inherent differences raise the question whether or not the definition is so broad that it embodies every cross-border activity between entities, and thus rendering the term irrelevant. As for the extent to which OI needs to be applied for a firm to be considered as engaged in OI; Herzog (2008) and Huizingh (2011) seem to argue for its holistic approach, whereas Chesbrough & Crowther (2006) conclude that OI concepts were adopted by the firms in their study, although their findings indicate that it is only inbound OI activities that existed. The importance of this distinction, i.e. holistic or partial, is of paramount to OI's novelty.

The collection of historical examples of activities that fall under the OI definition is one example why the distinction between holistic or partial is so important. There are plenty of examples and studies of open approaches to innovation throughout history. In Allio's 2005 interview, Chesbrough states that *companies having sales of less than say \$100 million have likely already been open innovators for a long time* (p. 27), a statement which is supported by another in his 2006 book *Open Innovation Researching a New Paradigm* where he, and his co-authors Vanhaverbeke and West, claim that innovation was at the time of the rise of corporate R&D labs and IP laws a rather open system. These claims are interesting and are supported by Mowery's (2009) view that innovation historically always has been open, and that society and industry just had a closed period from which they are recovering from. Aylen (2010) further adds to this by claiming that *open approaches to innovation are not a new idea* (p. 67), and uses the development of wide strip mill for steel in the 1920s to support his reasoning that OI is a long established approach. He further claims that instances of supplier

producer collaboration can be traced back at least to 1803. The examples he uses include the patents and processes agreement between ICI and DuPont between 1929 and 1948 which shows that there are at least instances of companies not locking up their IP, which Chesbrough (2003a) argues is a step away from an inward focused innovation strategy. Aylen (2010) covers in detail the successful development of the wide hot strip mill at Columbia Steel which was a collaboration effort with their plant supplier: United Engineering and Foundry Co., and how Columbia Steel relied heavily on both manufacturers and suppliers during the development. Columbia Steel managed to outperform their competitors and was finally acquired by Armco, to which he comments that *Ironically, it can be argued that Armco embraced open innovation when they bought Columbia* (p. 75). Lamoreaux and Sokoloff (1999) presents their patent study with data that shows how an extensive market trade in new technological ideas developed over the 19<sup>th</sup> century, supported by emerging information channels and the establishment of the patent system. They argue that firms responded to this expansion of trade by developing capabilities to assess and learn about externally generated inventions. Lamoreaux and Sokoloff (1999) then continue their argument by presenting data on the extent of external focus. In 1894 Bell's patent department investigated 73 publically submitted patents and 12 internal ones, and in a letter from the head of the patent department to the company GM, T.D Lockwood writes: *I am fully convinced that it has never, is not now and never will pay commercially, to keep an establishment of professional inventors, or of men whose chief business it is to invent* (p. 42). The example from Bell is not unique: Channing Whitaker invested resources to be able to keep up with outside inventions so that the company did not waste resources reinventing existing inventions, Standard Oil of New Jersey showed little interest in promoting internal R&D during late 19<sup>th</sup> early 20<sup>th</sup> century, and Westinghouse and Edison Electric (General Electric) followed a similar strategy focused on external sources of inventions rather than internal R&D (Lamoreaux and Sokoloff, 1999). It seems that the majority of companies were focused on external sources of inventions, with DuPont being the 'prime example' of the small number of firms that built in-house R&D facilities prior to 1914.

More recent examples are highlighted by Laursen and Salter (2006), who mention absorptive capacity and that *openness and interaction in studies of innovation reflects a wider trend in studies of firm behavior that suggests that the network of relationships between the firm and its external environment can play an important role in shaping performance* (p. 137). They continue by citing several studies (published between 1994 to 2001) that study the importance of 'open behavior' in firms' search for innovation opportunities. They also mention the study conducted by Nelson and Winter 1982, who found that a firm's openness to the external environment can improve its innovation abilities, and von Hippel's work on the importance of building and sustaining links with suppliers, users and institutions inside the innovation system (Laursen & Salter, 2006). Rothwell (1992) supports this claim with his study on innovative UK firms, showing that these firms have dense external networks of firms, universities as well as private sector research institutes.

As seen above, there seems to be no lack of research arguing in favor of open approaches to innovation. However, most articles written or co-authored by Chesbrough and/or Gassmann

often argue in favor of OI's novelty, and assert that previously closed fields are adopting the OI paradigm. Chesbrough (2003a; 2003b) mentions cases that have moved from closed to open innovation, and asserts its obsolescence in most industries, in Wilson's (2009) interview von Hippel states that the closed model is obsolete in all sectors. One thing that seems to be lacking is a thorough comparison with previous open models (as opposed to the closed one) and reasoning as to what OI adds to the body of knowledge that previous open approaches failed to address.

The holistic or partial view of OI also bears relevance in light of our presented findings, which suggest that OI is neither widespread nor always fully implemented. In contrast to Gassmann (2006) and West & Gallagher (2006), Ili, Albers & Miller (2010) show a picture of a closed automotive industry. Lichtenthaler & Lichtenthaler (2009) showed that the failure rate of adopting OI is very high, indicating difficulties in totally opening up the innovation process. Lichtenthaler & Ernst (2006) showed that the majority of firms are actually very reluctant to commercialize knowledge externally, a finding that indirectly supports the study Kline conducted in 2003 which showed that it is only pioneering firms that exploit knowledge externally (Lichtenthaler, 2005). Lee, Park & Song (2009) investigated whether an inward focused or an open strategy was better for Korean SME's financial performance and found that *a closed innovation strategy as represented by family control of the SME relates positively to financial performance* (p. 57). There has been an increase in external technology commercialization over the past five years (Lichtenthaler, 2007), and SMEs adopt openness to an increasing degree (van de Vrande, de Jong, Vanhaverbeke & de Rochemont, 2009). However, the degree and extent to which firms are open seems to vary. Lichtenthaler (2008a) studied industry openness, and found that 67.5% of the companies in the study were closed in both their exploration and exploitation of knowledge. The degree of openness was primarily a function of firm size and the increasing radicalness of its innovation process. Other industry dependent factors were: a highly competitive environment, technology turbulence and high transaction rates suggest that some industries are more apt to adopt OI, but the choice is still firm strategy dependent (Lichtenthaler, 2009). These findings not only question the alleged 'shift in focus' from closed to OI, but furthermore add to the relevance of the holistic or partial view of OI. If it is holistic then empirical findings suggest that very few if any firms use OI, whereas if it is to be considered that partial implementation is enough for firms to be labeled using OI many more are, have always been, and will always be open innovators.

To conclude: the tendency to ascribe so many different open approaches to OI, together with the lack of one distinguishing definition makes it hard to pinpoint exactly what OI is or what about it is truly novel. However, there are some novel elements to OI that have been pointed out by several researchers from both sides of the debate. The first element of novelty is the unifying and holistic nature of OI that embodies many of the research fields regarding openness in innovation and knowledge management under a single term/model (Huizingh, 2011; Herzog, 2008). This is supported by Lichtenthaler (2011) who argues that the novelty of OI lies in its integration of inward and outward knowledge transfer, and that it contributes to the integration of research streams. We do not wish to argue that the holistic view is the only truly novel element of OI, but we would like to extend a word of caution to any who try

to find novel elements to it. Many claims of novelty initially sound valid, but upon further review seem to have been covered in earlier work, e.g. the claim that OI is novel due to its focus on a more offensive intellectual property management (Gassmann et al., 2010), which Aylen (2010) mentions as a long established strategy for knowledge enhancement.

### 2.3. PRECEDING THEORIES AND OPEN INNOVATION

The tendency to ascribe so many different open approaches to OI, together with the non-distinguishing definition, as well as the ambiguity of the term makes it very hard to construct a unifying model. Our ambition is therefore not to construct such a model but merely to extract useful concepts, models or theories in literature that questions the novelty and use those to extract keywords and concepts which serve as a very rough theoretical framework to which we later compare OI. Note that we will not conduct an in-depth review of each useful concept, model or theory, but only to show potential overlap with OI. There are a few concepts, models and/or theories not mentioned in OI literature, which we include to complement the ones we found during our OI literature review. For a complete map of themes and fields, including a list of articles, see appendix A. We start of by a brief introduction of concepts, models and/or theories, which will be summarized in table 1 to give a quick overview of previous work on open approaches to innovation.

The collaborative effort of R&D partnerships is mentioned in numerous OI literature (e.g. Gassmann, 2006; Chiaroni, Chiesa & Frattini, 2011; Dittrich & Duysters, 2007 etc.). R&D partnerships is not a new field of study but in this article we will use the work of Hagedoorn (2002), who defines R&D partnership as *the specific set of different modes of inter-firm collaboration where two or more firms, that remain independent economic agents and organizations, share some of their R&D activities* (p. 478). The related concept of strategic alliances and networks are mentioned by several, e.g. van de Vrande, Lemmens & Vanhaverbeke (2006) and Lichtenthaler (2008b), as an important aspect of OI. Rasmussen (2007) agrees but argues that the *emphasis placed by 'open innovation' on the importance of networks and shared knowledge in the innovation process is not new* (p. 31) and refers to the work of Powell, Kenneth & Laurel (1996). In their work, Powell, Kenneth & Laurel (1996) argues that in a regime of rapid technological development *no single firm has all the internal capabilities necessary for success* (p. 117) and highlights the importance of strategic alliances. They also comment on the need for learning capacity if a firm is to be adept at both internal and external R&D, i.e. to be able to contribute to such collaboration as well as to be able to learn from such participation (Powell, Kenneth & Laurel, 1996). Allen & Cohen (1969) discusses the role of gatekeepers as intermediaries between parties in a network and conclude that *In both laboratories, the gatekeepers held significantly more patents, had published significantly more papers than their colleagues* (p. 18). Several articles also mention complementary assets in terms of internal leveraging of external ideas, licensing, external technology acquisition and so on when discussion OI. Dodgson, Gann & Salter (2006) refers to the work of Teece, Pisano & Shuen (1997) on dynamic capability (concept first discussed by Teece & Pisano in 1994). Teece, Pisano & Shuen (1997) define dynamic capabilities as *the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments* (p. 516). User integration is yet

another concept that receives ample mention. It is mentioned in for instance Gassmann, Enkel & Chesbrough (2010) where they build on the seminal work of von Hippel. von Hippel (1978), who introduced the concept of the customer active paradigm and puts large emphasis on the customer to develop an idea for a product, select a supplier and then contact the supplier. In von Hippel's 1986 work he discusses the role of Lead Users in development, and highlights the importance of close integration of lead user preferences and perceptions. He also discusses their ability to provide new product concepts and design data. Regarding external acquisition of information, ideas and technology, Dodgson, Gann & Salter (2006) and Christensen, Olesen & Kjær (2005) both mention absorptive capacity. Christensen et al. (2005) claims that *the notion of Open Innovation does not signify an altogether new phenomenon*. (p. 1534), and then refer to the work of Cohen and Levinthal (1990) on absorptive capacity. Cohen & Levinthal (1990) argue that absorptive capacity is *the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends* (p. 128). External acquisition of technology and the focus on intellectual property trade is also mentioned in several OI articles (e.g. Chesbrough, 2004; Gassmann, Enkel & Chesbrough 2010). Feller, Finnegan, Hayes and O'Reilly (2009) however point out that purchase or licensing of external technology is nothing new. This is also pointed out in Aylen (2010) mentioning DuPont ICI patent trades as well as by Lamoreaux & Sokoloff (1999) where they discuss how prevalent the acquisition of external IP was during late 19<sup>th</sup> and early 20<sup>th</sup> centuries. Davis & Harrison (2001) discuss the opportunities of additional revenue streams through external exploitation of licenses by asking *Why not license it out and enable others to avoid having to go through the expense of re-developing what we had already developed, at the same time open up a whole new revenue stream* (p. 81). Rivette & Kline (1999) devote their entire work to licensing and commercialization of intellectual property, and point to, amongst others Xerox's, inability to capture value from inventions. Feller, Finnegan, Hayes and O'Reilly (2009) also point to the previous research done on external acquisitions of resources, and claims that *Researchers such as Coase (1937) envisaged that all resource production, for example product components, associated services etc., would take place within a firm unless the cost of doing so exceeded the cost of acquiring the resource externally*. (p. 299). Some other noteworthy additions, used to create our rough theoretical framework, is the work of De Bondt (1996) who pointed out that *the challenge for players may not always be to be among the first to produce the new information, but may instead be how to recognize, obtain, employ and complement the relevant innovative information* (p. 2). This claim has striking resemblance to one of the OI principles mentioned in Chesbrough (2003b), i.e. *We don't have to originate the research in order to profit from it* (p. 38). Woo, Willard & Daellenbach (1992) points to the previous research that was done on the performance gains by spinoffs. However, OI literature seem to be more focused on using it as a direct strategic tool to exploit on ideas that do not fit the current business model (cf. Chesbrough, 2003a). These concepts, models and theories function as a rough theoretical framework and are summarized in table 1 below:

**Table 1 - Existing theories linked to the novelty debate**

<b>Theory/concept</b>	<b>Summary, definition or note</b>	<b>Source</b>
Dynamic capability	(A) firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments	Teece, Pisano & Shuen, 1997
Absorptive capacity	The ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends	Cohen & Levinthal, 1990
Collaborative R&D	The specific set of different modes of inter-firm collaboration where two or more firms, that remain independent economic agents and organizations, share some of their R&D activities	Hagedoorn, 2002
Strategic alliance	Strategic alliances encompass a wide range of inter-firm linkages, including joint ventures, minority equity investments, equity swaps, joint R&D, joint manufacturing, joint marketing, long-term sourcing agreements, shared distribution/services and standards setting	Rasmussen, 2007. Quoting an OECD study in 2000
Lead user	Highlights the importance of close integration of lead user preferences and perceptions during development. Lead users as input to new product concepts and design data	von Hippel, 1986
Networked innovation	Using networks as the locus of knowledge and innovations	Freeman, 1987; Arora, 1990, in Rasmussen, 2007
Licensing out and external exploitation	Business tool instead of legal instrument. Instead of obscure pieces of paper patents should be seen as 'Rembrandts in the attic' waiting to be exploited.	Rivette & Kline, 1999
Licensing in and external acquisition	all resource production, for example product components, associated services etc., would take place within a firm unless the cost of doing so exceeded the cost of acquiring the resource externally	Coase, 1937, in Feller, Finnegan, Hayes & O'Reilly, 2009
Divestitures	Previous research has found that spin-offs and sell-offs were associated with significant positive cumulative abnormal returns	Woo, Willard & Daellenbach, 1992
Origin of information	the challenge for players may not always be to be among the first to produce the new information, but may instead be how to recognize, obtain, employ and complement the relevant innovative information	De Bondt, 1996

### 3. METHOD

The article review is based on 119 articles out of which 62 were included in our analysis. Those that were excluded either referred to the same object of interest or did not have a primary focus on OI (as indicated by OI only being mentioned in the keywords, conclusion, introduction or title). The two main databases used were Google Scholar and ISI Web of Science. Using ISI Web of Science we could get a good picture of the field of OI; the most influential authors, relevant journals etc., and thus acted as an initial step in our study. Google Scholar was then used to broaden the scope of our work, and also to find complementary articles. These two databases mainly facilitated finding proponents of OI. To find the others,

e.g. the work of Joel Mokyr required more research, where we visited different university home pages and analyzed the work they did in industrial and economic history. Key words used to find the articles were: open\* innovation\*, external innovation\*, crowd sourcing, tech\* exploit\*, external\* technolog\*, absorptive capacity, external\* knowledge, dynamic capabilit\*, external\* competenc\*, open project\*, network innovati\*, collective innovation and cooperative innovation. Additional keywords were used to find a specific subject or theory, these include but are not limited to: absorptive capacity, dynamic capability, university collab\*, \* chain innovation, user innovation, open source, and free revealing. We also followed up on references in interesting cases and gathered additional articles and information in that way. This was particularly useful when finding opposing views, e.g. we used the work of Huizingh (2011) to get ideas on what to look for. By focusing on articles dealing with OI themes (e.g. licensing, IP trade, collaboration, outsourcing etc.) during the period between 1870-1930 we had found articles that provided useful information on OI and its novelty.

A word analysis tool provided metrics such as word counts and sentence counts. SciPlore (open source software) was used to create the mind-map. This work started by us underlining relevant information in the articles and adding them to the mind-map, this led to a large mind-map where every article acted as a node. We then tried to find common themes between article nodes and grouped them into larger themes. This mind-map then formed the basis for the final mind-map by merging the similar themes until six 'main themes' remained that embodied all of the articles included in our analysis. The final mind-map was then used throughout the paper to highlight the novelty (both partial and holistic), suggesting reasons behind disagreements amongst scholars on the degree of novelty, and also to devise our managerial implications and suggestions for future research. During the process of creating themes we found several perspectives that would be interesting to include or study, e.g. that of power to control process or end result in an OI initiative, but we felt that the six presented in this article best captured the entire field with the least overlap between the different themes.

We would however like to point out that our articles database only consists of 62 articles and two books, which may not be adequate for covering the whole Open Innovation research area. There is also an overrepresentation of proponent articles from R&D management and Technovation. The affect on our results should be small though, since these two journals are mentioned by Dahlander & Gann (2010) as being amongst the most influential within the field of OI. The selection and merging of the themes is based on our interpretation. We include our mind-map to increase the ability to add to our study and its reliability.

#### **4. THEMES OF OPEN INNOVATION**

We analyzed 62 articles published between 2003 and 2011, and two books (Chesbrough, 2003a; Chesbrough et al., 2006). Information extracted from our articles includes different areas of study, in what context OI was mentioned, as well as a handful of definitions of the field (see appendix A). We begin by presenting one popular definition, Open Innovation is defined by Chesbrough et al., 2006) as *the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. 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 they look to advance their technology* (p. vii).

Information regarding different areas of study was grouped into six different ‘themes’ (see table 2) in order to simplify analysis. These themes are by no means perfectly distinguishable from one another but do have distinct features separating them from each other.

**Collaboration** was the largest theme in terms of number of mentions, and includes the following collaborative efforts: strategic alliances, joint ventures, academia & research institutes, networking, and value/supply chain collaboration. The common denominator was collaborative events, efforts or undertakings between at least two involved parties. Strategic alliances were used in the sense of strategic technology alliances (Dittrich & Duysters, 2007) or in more general terms (e.g. Rohrbeck, Hölzle & Gemünden, 2009; Rothaermel & Hess, 2010; van de Vrande, Lemmens & Vanhaverbeke, 2006). Strategic alliances was also mentioned in the sense of partnerships between companies (Chesbrough, 2003b), as well as those that are non-equity based (van de Vrande, Lemmens & Vanhaverbeke, 2006). Joint ventures were mentioned in the sense of being a part of both the coupled as well as the inside-out process (Enkel, Gassmann & Chesbrough, 2009), and in a more general sense by most other authors (e.g. Rothaermel & Hess, 2010; Dittrich & Duysters, 2007). Academia and research institute collaboration was mentioned by Gassmann, Enkel & Chesbrough (2010) in the sense of university collaboration, and most articles had a focus on technology exploration (e.g. van de Vrande, Lemmens & Vanhaverbeke, 2006; West & Gallagher, 2006) while others mentioned the need for university support (Allio, 2005). Network includes claims of inter-firm networks (e.g. Dittrich & Duysters, 2007; Chesbrough, 2003b), as well as the use of networks to scour for ideas or to create supplier networks (Huston & Sakkab, 2006). The emphasis in value/supply chain was collaborative undertakings between suppliers and the firm (e.g. Gassmann, 2006), or between customers/users and the firm (e.g. Piller & Walcher, 2006), or a combination of several including competitors (e.g. West & Gallagher, 2006; Ili, 2010). **Complements** was another common theme. It includes undertakings that are in some way related to complementary exchange. These are: internal leveraging on external ideas, licensing and trade of intellectual property, external technology exploration/exploitation/acquisition, as well as mergers and acquisitions. Internal leveraging on external ideas is mentioned by West & Gallagher (2006) when he refers to Chesbrough’s (2003a) examples on success stories that successfully leveraged the basic research of others. Huston & Sakkab (2006) also mention internal leveraging but use Procter & Gamble’s Connect & Develop strategy to highlight the possibility of using internal capabilities, e.g. internal R&D, manufacturing, and marketing, to commercialize on external technology. Licensing or trading intellectual property was mentioned by several authors, with a clear emphasis on the licensing internal technology or intellectual property to the outside world, e.g. exploiting patents outside the current business portfolio (Ili, 2010). External technology exploration, acquisition and exploitation was also commonly mentioned, with emphasis on acquisition and exploitation. Mentions include straightforward technology acquisition (e.g. Lichtenthaler, 2010), and external commercialization of technology (e.g. Gassmann, 2006). Mergers and acquisitions received considerably less attention but was considered to be a form

of inbound open innovation by for instance Chiaroni, Chiesa & Frattini (2010). **Community** was also mentioned by several. Knowledge sharing and free revealing was for instance considered to be a central tenant of OI by von Hippel & von Krogh (2006). Open Source was held in high regard by authors, Chesbrough & Appleyard (2007) mentions Linux as *a poster child for open innovation* (p. 62), and Kuschel, Remneland & Holmqvist (2010) argue that open source is a frequently used example of open innovation. User communities and crowdsourcing were also mentioned by Kuschel, Remneland & Holmqvist (2010) as well as by Ili (2010) and a few other authors, not all of which were IT related (e.g. Hienerth, 2006). **New revenue streams** is a theme that includes concepts centered around creating new revenue streams through internal means of investment of knowledge. This includes discussion on spin-offs mentioned by several authors (e.g. Chesbrough, 2004; West & Gallagher, 2006; Elmquist et al. (2009). Exploiting internal knowledge externally was also mentioned as an area of high future potential (Gassmann, Enkel & Chesbrough, 2010), and as a form of outbound open innovation (Chiaroni et al., 2009). Corporate incubators and corporate venturing received attention and mention by a handful (e.g. Chesbrough, 2003b; Herzog, 2008). **Sourcing** includes access to outside knowledge: in- and outsourcing of R&D (e.g. Gassmann, 2006), or market search activities such as scouring the market for potential revenue sources (Chesbrough & Crowther, 2006), as well as tapping into external knowledge (e.g. Slowinski, Hummel, Gupta & Gilmont 2009). **Facilitation** includes the role or importance of IT in integrating outside knowledge or interacting with sources (e.g. Enkel, Gassmann & Chesbrough, 2009), as well as the topic of innovation intermediaries, e.g. Innocentive, NineSigma, YourEncore and other internet based innovation brokers (see especially Feller, Finnegan, Hayes & O'Reilly, 2009). The facilitation theme also includes all events/entities/instruments that facilitate OI.

These six main OI themes, shown below in table 2, will be used in our novelty analysis as well as in the synthesis.

**Table 2 - Presentation of OI themes**

<b>Open Innovation themes in order of occurrence</b>	<b>Includes</b>
Collaboration	Strategic alliances, joint ventures, academia & research institutes, networking, and value/supply chain collaboration
Complements	Internal leveraging on external ideas, licensing/IP, external technology exploration/exploitation/acquisition, mergers and acquisitions
Community	Knowledge sharing, free revealing, open source, user communities, crowd-sourcing etc.
New Revenue Streams	Spin-offs, exploit internal knowledge externally, corporate incubator, corporate venturing
Sourcing	In- and outsourcing, tap into external knowledge, market search
Facilitation	Role of IT, intermediaries

## 5. ANALYSIS

The analysis is grouped into two main parts: an analysis and comparison of the definition of OI with that of two similar theories, and a comparison between OI and existing theories, models and concepts mentioned during the literature review (which reflects our partial focus on the novelty of OI). The aim is to highlight existing potential overlaps.

### 5.1. DEFINITION OF OPEN INNOVATION

Due to the ambiguity of OI, we continuously asked ourselves three questions relating to the definition during our analysis: What is OI? What is it not? Could it be explained by something else? OI is as above defined by Chesbrough et al. (2006) as *the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. 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 they look to advance their technology* (p. vii). Judging from the definition, OI seems to be a work methodology as well as a paradigm.

As a work methodology OI argues for the use of purposeful inflows and outflows of knowledge to accelerate internal innovation, and expand the market for external use of innovation, in that order. It thus seems as OI as a work methodology argues for a purposive use of all kinds of sources of knowledge to accelerate innovation, and expand the markets for external use of said innovation. This argumentation does not take into account ability or possibility. Not all firms have the ability to use all kinds of sources, and those who do might lack the possibility. It also argues for a purposive use, which is superfluous since all use of knowledge sources is purposive, albeit not always beneficial. As a work methodology it finally argues for expanding the markets for the internally developed innovations.

As a paradigm OI assumes that firms should use external and internal ideas and paths to market as they look to advance their technology. As a paradigm OI advocates the use of all possible sources of ideas and market paths, which we argue is so broad that it actually embodies everything conceivable as far as idea sources and market paths go, and thus nothing that adds to a coherent body of knowledge.

We have now covered the first two questions relating to the definition of OI. For the third we would like to present a comparison of the definition of OI and two other theories that are closely related to it. This comparison is found below in table 3. All three theories highlight the importance of external integration of competences, information or knowledge as means to either to keep up with change, commercialize it or to use it to enhance internal innovative capacity. While the choice of words is not exactly the same, we argue that there is a significant overlap between the three in their inwards focus of information, knowledge or competence, e.g. the definitions would not lose their meaning if one word would be replaced by the other.

**Table 3 – Comparing definitions**

<b>Theory</b>	<b>Summary, definition or note</b>
Dynamic capability	the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments
Absorptive capacity	the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends
Open Innovation	the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. 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

Looking at the second sentence in the OI definition this becomes more evident. We argue that there is very little difference between “firms can and should use external ideas as well as internal ideas” and “firm’s ability to integrate, build and reconfigure internal and external competences”. There is however some degree of explicit novelty in the OI definition; it emphasizes the simultaneous and seemingly equal focus on both internal and external paths to market, and bi-directional flows of knowledge and ideas. It is however worth mentioning that the definitions of dynamic capability and absorptive capacity do not in any way rule out a strong focus on external paths to market. If the environment was, as most OI proponents argue, changing towards a more externally focused one, then a firm with a strong dynamic capability would integrate, build and reconfigure internal and external competences to address this change, i.e. they would become more open. Similarly the definition of absorptive capacity does not exclude an equal or strong focus on external paths to market. To us, the definition of dynamic capability is very well in line with that of OI, and absorptive capacity seems to cover much of OI’s external orientation. In order to synthesize a more distinguishing model of OI, we first must analyze the OI themes we found in literature.

## **5.2. OPEN INNOVATION THEMES – A COMPARISON**

The themes will now be compared to the previously listed theories that act as a rough theoretical framework. Potential overlaps will be highlighted and then discussed. It is important to note that parallel research streams are not mentioned here, e.g. research on open source development that does not mention open innovation, is not included here if it is published after 2003. Our ambition is not to answer to what degree OI is novel, nor to cover every article that has a potentially overlap. However, as table 4 arguably shows, there are potential overlaps between the OI themes and previously mentioned theories.

**Table 4 – Comparing themes**

<b>Open Innovation theme</b>	<b>Potential overlaps (including but not necessarily limited to)</b>
Collaboration	Collaborative R&D by Hagedoorn (2002). Strategic alliances covered in Rasmussen (2007) referring to the OECD study in 2000
Complements	Licensing and intellectual property management is covered by Rivette & Kline (1999). Coase’s (1937) reasoning, as referred to by Feller, Finnegan,

Hayes & O'Reilly (2009), largely covers most of the complements including mergers and acquisitions

Community	Innovation by user communities and discussion on open source software development is found in von Hippel (2001).
New Revenue Streams	Transforming R&D activities into new business ventures, i.e. internal corporate venturing is covered in Burgelman (1983). Woo, Willard & Daellenbach (1992) point to previous research on divestitures.
Sourcing	Dynamic capability, absorptive capacity, and Coase's (1937) reasoning, as referred to by Feller, Finnegan, Hayes & O'Reilly (2009).
Facilitation	Role of intermediaries is to a large extent covered by Lamoreaux & Sokoloff (1999), networked innovation covers the locus of innovation

The largest OI theme, i.e. **collaboration**, has received ample attention in previous research, e.g. by Hagedoorn (2002) whose definition of collaborative R&D together with the 2000 OECD definition of strategic alliance found in Rasmussen (2007) has a very strong overlap with the collaboration theme in OI. Comparing the two only leaves academic & research institutes as a gap. We did not find an article specifically dealing with this topic, but a quick search on Google Scholar lists 28,600 hits for “university collaboration innovation” for articles published up until 2002, indicating some interest in the topic. Rothwell (1991) showed that innovative firms in the UK have dense external networks with, amongst others, universities. Furthermore, the role of research institutions and universities in supplying industry with basic research was pointed out in Vannevar Bush's (1945) report on several places, for instance in the following sentence: *colleges, universities, and research institutes are the centers of basic research [...] there will be a flow of new scientific knowledge to those who can apply it to practical problems in Government, in industry, or elsewhere* (p. 10). The theme **complements** is overlapped by the discussion in Rivette & Kline (1999) in terms of licensing and intellectual property management. Furthermore, the broadly applicable statement by Coase (1937), as cited in Feller, Finnegan, Hayes & O'Reilly (2009), largely covers most of the complements including mergers and acquisitions. The **community** theme is in part overlapped by previous work on open source software development and free revealing of information, and in part by the discussion around communities, both to be found in von Hippel (2001). The **new revenue streams** theme shows overlap with prior work on corporate venturing, a Google Scholar search on the term “Corporate Venturing” resulted in 12,700 hits on articles published before 2003. Internal corporate venturing was for instance covered in the work of Burgelman (1983) where he studies the process of internal corporate venturing, i.e. the process by which R&D results are transformed into new ventures. Furthermore, Woo, Willard & Daellenbach (1992) point to previous research on divestitures, including spin-offs. The theme **sourcing** is potentially overlapped by dynamic capability (in the sense that companies could use external competences strategically by outsourcing), and absorptive capacity (in the sense of market search). Furthermore, the Coase (1937) quote in Feller, Finnegan, Hayes & O'Reilly (2009) explains the choice behind outsourcing, or why companies would like to tap into external knowledge. **Facilitation** is partly overlapped by the role of intermediaries that was mentioned in Lamoreaux & Sokoloff (1999). Even though the role of IT is absent in their work, we argue from a standpoint that focuses on the use of intermediaries and not the nature of said intermediary. Networked innovation overlaps the

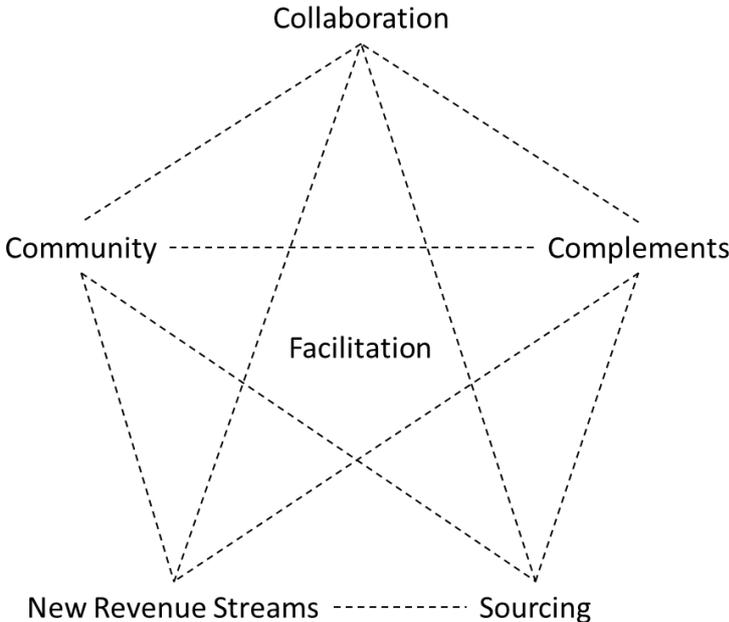
locus of innovation. This theme is however, the one where we feel the most novel contributions of OI exist. Articles that map the use of innovation intermediaries over the internet (especially Feller, Finnegan, Hayes & O'Reilly, 2009), add to our understanding of how these will and can change the landscape and nature of innovation activities. However, it is still possible to argue that firms with a high degree of dynamic capability would be equally able to adapt to this new environment as those who use OI. Facilitation should not be understood simply as a theme that incorporates IT, it is in fact the theme that covers all sorts of facilitation activities that enable cross-boundary contact between different entities. This includes, but is certainly not limited to, the role intermediaries play, gatekeepers, collaboration arenas etc.

**6. SYNTHESIS**

In creating a distinguishable and non-ambiguous model of OI, that depicts the holistic novelty, we need to synthesize the elements of novelty and the themes found in literature. The result of this synthesis is presented in figure 1, and it incorporates the different themes of OI into a holistic model with facilitation being the central catalyst to all OI activities.

As indicated by the connecting lines, the different themes are sometimes overlapping and connected but not directly linked. For instance: in a collaborative effort between three parties there could be simultaneous exchange of complements between many firms, as well as community involvement. But the collaborative efforts between the three parties have different and distinguishable characteristics from that of the community involvement.

**Figure 1 – The Open Innovation Star**



As aforementioned, this model is but one of many possible ways to thematize OI from a holistic view. The five ‘rim themes’ have been discussed in previous literature and in some cases the overlap between them is more evident than in our model depending on the definition

and perspective taken (cf. Chiesa, Manzini & Tecilla's (2000) work on sourcing strategies). In this paper we focus on analyzing the partial novelty of OI by comparing it to previous theories, and its holistic novelty by depicting existing themes in OI literature. Our work is thus complementary by providing means to categorize OI and showing one possible way to view it holistically.

The different 'rim themes' have all received a lot of attention in previous academic work, e.g. collaboration which contains strategic alliances, joint ventures, academia & research institutes, networking, and value/supply chain collaboration. The existing body of knowledge within the rim themes is well developed and we shall thus focus on the theme called facilitation which we feel has received less attention in OI literature. Facilitation is also central to this model, since it is the limiting factor in OI initiatives. Facilitation is the collaborative medium, arena and/or entity which bridges OI between the firm and the outside environment. Gatekeepers are examples of facilitation entities, as are intermediaries such as Innocentive. Facilitation arenas could manifest themselves as open arenas for innovative activities, e.g. Red Bull's Art of Can initiative, whereas facilitation mediums include IT related platforms. The different manifestations of facilitation explain why some OI initiatives, e.g. Linux or Wikipedia, benefit from an increased number of external knowledge sources (Chesbrough & Appleyard, 2007). Whereas in other cases the tipping point of positive returns of including external innovation sources deeply in innovation activities was shown to be three, after which a significant negative impact occurred (Laursen & Salter, 2006). We argue that this seemingly contradictory finding in OI research highlights the importance of focusing on facilitation. In the case of Linux, the facilitation enables the efficacy of including an additional number of knowledge sources to be high, as well as efficient. In the case of a large collaborative basic R&D effort between two major firms dealing with advanced future oriented cross-platform technology, the limitations in facilitation result in a non-existing efficacy after a very few number of involved parties. Another way of putting this would be that the added transactions costs per peer is much higher in this case than in the case of Linux.

Facilitation mediums/arenas/entities need to be adapted to the desired outcome, as well as the specific project to ensure efficacy and efficiency. If a company wishes to instigate a design project for its next product, and wants to use OI it has to consider a number of things. First it has to consider the match between its internal resources, strategic orientation, and other company specific characteristics to the facilitation medium/arena/entity. Then it has to consider the implications and efficacy of each OI theme. After it decides to pick a certain theme it has to focus on enhancing the efficiency and efficacy of the chose facilitation medium/arena/entity. If the company decides to use a community to design the next product, the facilitation medium would probably be IT platform, the arena a forum, and the entity employees and volunteers. But if it decides to use collaboration, or sourcing, then the facilitation medium/arena/entity would be very different in terms of number, role and nature.

Facilitation explains why OI has particular relevance to the IT sector (cf. Chesbrough, 2003c), since the IT sector has very efficient and effective facilitation – as compared to other industries – of mediums, arenas and/or entities. It also explains why one cannot simply study one OI project or event and generalize useful strategies, e.g. the number of knowledge sources

and their effect on innovative results. It finally explains the downsides of implementing OI, and why it could require substantial investments to make it work (Birkinshaw, Bouquet & Barsoux, 2011), which is in line with the findings of Lichtenthaler (2008a) regarding the degree of openness in relation to firm size and increasing radicalism.

## 7. DISCUSSION

Although our data only included 62 articles and two books we saw very little extension of existing themes after about 20 articles, indicating that our sample size was adequate to answer our research questions. The themes were then put under scrutiny and revealed that already existing theories do succeed to explain many if not all of the OI themes. The definitions analysis also indicates an overlap, with the difference that OI specifically focuses on the bi-directional flow of knowledge and ideas. We therefore feel inclined to take sides with those who argue against OI's high degree of novelty. We must side with the argument made by Linstone (2010), that perhaps 'new labels' are mere extensions. In the case of OI the partial novelty must be discussed from two angles; that of the definition, and that of the themes focused on in articles. The definition is perhaps a mere extension that adds a stronger bi-directional focus to the dynamic capabilities. All of the themes were overlapped by existing theories, models and/or concepts, indicating that there is nothing novel about OI when viewed from a partial perspective. But we have to acknowledge that OI is more than the sum of its parts and that it is a growing and wide spread field of study. Although some processes (such as the inwards flow or collaborative focus) is overlapped by previous concepts such as absorptive capacity, dynamic capabilities, strategic alliances etc., OI still adds a much needed and previously lacking holistic view of open approaches to innovation management. We therefore find support for the claims of Huzingh (2011) and Lichtenthaler (2011) that OI is novel when viewed holistically. However, no attempts have been made previously to depict such a holistic view, nor are we aware of any general discussion around the paramount role of facilitation and how this is linked to the different OI themes.

Of further importance is an interesting finding that emerged with the analysis of data, something we would like to call the perceived novelty of OI. Our analysis already suggests that the novelty of OI might be over exaggerated in terms of the themes we found, but not its holistic focus. But a mere overlap does not amply explain the booming interest in OI, nor why some argue that it is a new paradigm. The perceived novelty of OI fills these gaps by adding a few additional reasons to why it could be perceived more novel than what our analysis shows.

**No mention of previous open theories:** There is an abundant and clear lack of previous open theories in articles by Chesbrough. The term "absorptive capacity" received no mention in any article solely authored by Chesbrough, and received mention only in Gassmann, Enkel & Chesbrough (2010) and Chesbrough & Crowther (2006). The term "dynamic capability" received no mention at all in any article written or co-authored by Chesbrough. This could be due to a deliberate exclusion or due to us overstating the overlap. However, Herzog (2008) uses dynamic capability as a way to describe certain OI concepts, albeit not as frequently as he uses absorptive capacity. Rasmussen (2007) also mentions dynamic capabilities in his discussion around the constant adjustment needed to incorporate new technology into the firm

through alliances. Dahlander & Gann (2010) showed that the term ‘absorptive capacity’ is one of the most referred to concepts in OI literature. They also present a table of the most cited works in OI papers; the top six include four papers on open source, von Hippel’s work on *the sources of innovation* and Cohen & Levinthal’s work on *absorptive capacity*. Chesbrough’s book *Open Innovation: The New Imperative for Creating and Profiting from Technology* and his article *The Era of Open Innovation*, were the only ones amongst the 12 most cited works.

**Comparison with closed model:** The comparison often made to highlight the novelty of OI is done with the closed model and not with previous theories on open approaches, as for instance those mentioned in our article.

**Narrow and selective use of examples:** There are several examples to mention here but one of the most evident is that evidence to support the model is taken almost exclusively from the so called ‘high-technology’ industries (Chesbrough & Crowther, 2006). Chesbrough & Crowther (2006) therefore tried to expand the OI field by analyzing low-tech firms and found that certain OI concepts were being applied outside the ‘high-technology’ industries. We would argue that if what makes OI truly novel is its holistic approach, then the discovery of ‘certain’ OI concepts, while others (such as the inside-out) are completely lacking would not be enough to call a firm an open innovator. Another fact worth mentioning is that the literature seldom mentions the innovation climate in the late 19<sup>th</sup>, early 20<sup>th</sup> century (one exception is Lichtenthaler (2010) who mentions that *Many of the elements of the open innovation approach could be observed in the industrial research system of the United States in the late 19th and early 20th centuries* referring to the work of Mowery (2009)). If we examine OI in the context of the 1950s and onwards it seems way more novel than it would be if one would compare it to the more open era preceding it.

## 8. CONCLUSIONS

The recent debate in Technovation that Groen and Linton (2010) started around the question if OI is a field of study or a communication barrier to theory development, highlights the ambiguity of the term OI. Our purpose was to improve the understanding of OI with regards to its novelty. Our aim was to map OI themes using a literature study including 62 articles and two books, and to compare existing themes with prior open approaches to innovation. The articles were mapped on a mind-map and grouped into six main themes: collaboration, complements, community, new revenue streams, sourcing, and facilitation. These main themes embody all literature included in our study. By comparing these themes to theories or concepts published before 2003, we found an overlap in both the definition of OI and the main themes. The definition was similar to that of absorptive capacity and dynamic capability, and with theories and work published before 2003 we could show an overlap over all the OI themes. This indicates that neither the definition nor the themes found in OI can be considered novel. So, what is novel about OI? The answer, as indicated by data and past claims, lies in its holistic embodying of all research areas on openness into a single concept. It seems that open innovation has a very long past, but only a short history.

We also found that there are three main reasons why OI is perceived as a new model: the lack of acknowledgement of previous work on open approaches to innovation in Chesbrough's work, as well as OI being compared to a closed innovation model instead of previous open models. The examples used to highlight its applicability, novelty and usage is also very narrow, further adding to a perceived novelty. Our claims are in part supported by the results of Dahlander and Gann (2010) who found that Cohen & Levinthal's (1990) work on *absorptive capacity* was cited more times in OI literature than was Chesbrough. This could indicate that OI proponents now practice what they preach.

Our findings were synthesized into a model which we would like to call the OI star. Here the five themes collaboration, complements, community, new revenue streams, and sourcing are fitted and linked to one another so that they form a star. Facilitation, due to its paramount importance, is placed in the center of the star since it acts as the limiting factor to any OI initiative regardless of theme chosen. This model not only works as help to managers but also to scholars since it helps relate OI research findings to their respective themes.

Our suggestions for future research includes extending the literature data base by including articles from a broader selection of databases, as well as analyzing the specific interrelations mentioned in our work between themes and previous theories or concepts. Another suggestion for future researchers is for them to acknowledge the work done by previous scholars and not to assign any open phenomena to a general OI claim. Using our model researchers could add to existing bodies of knowledge and minimize the risk of misinterpretations, ambiguity or contrasting evidence. There exists a substantial body of knowledge within each theme, as indicated by both review articles as well as other work, to which scholars could add to.

The managerial implication of our study is a general recommendation not to try to open up the innovation process for the sake of being open. The poster-child of OI is Linux, and many articles about its superiority refer to open source software development or high tech industry. There are risks and costs involved with opening up the innovation process (Birkinshaw, Bouquet & Barsoux, 2011), and the high failure rates of adopting OI, as demonstrated by Lichtenthaler & Lichtenthaler (2009), should at least make managers cautious about what they open up and how. Using our model managers now have a tool which could enhance their decision making process in terms of efficiency and efficacy. Before our model, the concept of OI was very vague, non-distinguishable and ambiguous, leaving managers to potentially interpret a wide array of open approaches as OI. This is risky, as result-enhancing actions in one theme could be devastating in another. With our model managers now have a way to interpret OI research and suggestions and relate them to their own ideas and efforts. By relating their OI project goals with internal resources, strategic orientation, and other company specific characteristics, managers can get an idea of what potential results, opportunities and risks are involved with every theme. After they choose a certain 'ideal theme' our model also helps them focus on constructing facilitation mediums/arenas/entities which enhances the benefits of the selected OI theme and reduces the risks.

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