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Which one goes well with? Exploring the link between theoretical perspectives and research contexts in Open Innovation research

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Abstract

The purpose of this paper is to investigate the possible relation between the most mentioned theoretical perspectives and the most studied research contexts in Open Innovation (OI) literature. To do this, a meta-review of highly cited literature reviews on OI was conducted to identify the most acknowledged theories and contexts. Articles including these concepts were retrieved with the software 'Publish or Perish' and analyzed with a qualitative approach to propose some clear relationships. The main results show that researchers apply similar theories to study certain research contexts, and this seems driven by promising publications trends. Altogether, the findings suggest that researchers are following a widening-narrowing approach of the theories and contexts used to study and validate OI. This paper also illustrates managers with relevant contexts e.g. industries, in which OI has been already adopted, motivating the implementation of OI efforts and practices in their practitioners contexts.

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Keywords: Open innovation; Literature review; Theoretical perspectives; Context dependency; Contingencies.

Introduction

The concept of Open Innovation (henceforth OI) has gained the attention of copious researchers and practitioners in the last decade. While some of them seem more involved in developing further an OI theory, others look more concerned with its validity in singular contexts. However, if they develop these two approaches separately, it could potentially mislead to general OI directions rather than specific to certain contexts and contingencies (Tidd, 2014).

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Moreover, if one of the main purposes of researchers interested in the OI phenomena is to advance a consistent OI theory, a certain level of coherence should exist in OI research (Lichtenthaler, 2011). Hence, it is particularly important to study the logic, the relationships, and the fit, i.e. the internal consistency among elements (Edmondson & Mcmanus, 2007), between relevant aspects in OI research such as the theoretical perspectives chosen and the contexts researched. Even though literature has emphasized the need for integrating disparate perspectives to create a uniform OI theory (Gassmann, Enkel, & Chesbrough, 2010), so far the question of what are the most recognized theoretical perspectives and research contexts in OI research and if there is a link between them remains open.

Based on the aforementioned, the objective of this paper is twofold. First, to summarize the main theoretical perspectives and the potential research contexts stated in highly cited OI literature reviews (LRs). Second, to explore the relation between the research contexts and the theoretical perspectives most recognized in OI literature and propose some preliminary connections. To achieve the later, the software 'Publish or Perish' was used to retrieve more than 1,450 articles emphasizing the most relevant theoretical perspectives used in OI research. These articles were scrutinized to analyze the 166 articles with higher impact, which then were analyzed through a qualitative approach to find some visible patterns between the two studied elements and propose some possible relationships.

The rest of this paper is structured as follows. Section 1 provides an overview of the framework used for this study. Section 2 briefly describes the research methodology and data used. Section 3 discusses the results and findings of the analysis. Finally, the last section concludes with the limitations and implications of this work.

1. Reviewing the literature using a meta-review approach

The literature in OI has dramatically increased in the last couple of years. One convincing evidence is the number of citations in Google Scholar of Chesbrough´s seminal book (2003a) which raised from 1,800 in July-2010 (Huizingh, 2011) to 9,700 in April-2015. This astonishing citation trend could be explained by the wide applicability of OI in different research contexts (ibid) but also by "a tendency towards a broader definition and application of the term" (Elmquist, Fredberg, & Ollila, 2009; p. 342). This situation has triggered abundant studies to understand the OI phenomena using different, and sometimes even contrasting, perspectives to verify its validity. In fact, it is not surprising to see divergent perspectives used in OI research, mostly because Chesbrough (2003b, 2006) recognized the rich source of antecedents when proposing and extending the OI model. While some researchers have considered little value in 'repackaging' previous Innovation Management (IM) concepts (Trott & Hartmann, 2009), in general, it seems that researchers have gradually adopted the use of previous IM concepts to study OI.

Probably, much of this acceptance has been influenced by clear researching agendas on OI. For instance, West, Vanhaverbeke, and Chesbrough (2006) outlined research streams revolving around the levels of analysis, implications for firms, data sources, and focusing on the practices in a given industry or sector. Similarly, Gassmann (2006) highlighted the need for a contingency approach, with an emphasis on an industry idiosyncrasies relation to globalization, knowledge leveraging, new business models, and technology fusion and intensity. Moreover, he confirmed that different research streams and perspectives such as collaborative R&D, early supplier integration, and user-driven innovation, have contributed to the OI literature. After these suggestions, plenty more agendas proposing research on OI have emerged. Reasonably, most of them have in common the emphasis on advancing OI in two key aspects in scholarly research, the research contexts targeted and the theoretical perspectives used.

First, OI models are sensitive to context and contingency, which is not surprising since the nature and patterns of innovation are contingent and can differ deeply by strategy, firm, and sector (Tidd, 2014). Second, in OI research, as in any other research field, a theoretical perspective is key because it provides a set of assumptions about the reality together with frameworks for directing the attention of observations and interpreting results (Tashakkori & Teddlie, 2003). These assumptions suggest interrelated propositions that specify relations among variables, and therefore, each perspective "has implications for every decision made in the research process" (Mertens, 1998; p. 3). This situation is very common in innovation studies where research can be greatly influenced by perspectives from economic literature such as e.g. institutional, industrial, or evolutionary economics (Léger & Swaminathan, 2007). Nevertheless, despite the relevant implications of identifying specific theoretical perspectives to research an increasing phenomenon like OI, limited discussions about this topic can be found in the literature.

In this regard, one notable work is from Bogers (2012) who reviewed some of the main theoretical perspectives related to knowledge sharing in open collaborative innovation. Framing the discussion on OI research within

theories of economic organization and strategic management, he stresses the relevance of five perspectives: transaction costs economics, resource-based view, dynamic capabilities, knowledge-based view, and technology-based view. More recently, when Randhawa, Wilden, and Hohberger (2014) investigated OI theoretical foundations with a bibliometric approach, they notice that OI literature fall within a cluster related to ideas like technology integration and business models. This cluster has a close bond with others related to absorptive capacity, exploration and exploitation of knowledge, and complementary assets, and a more distant link with clusters related to the knowledge-based view, resource-based view, dynamic capabilities, user-driven innovation, and network theory.

To identify further potential theoretical perspectives and research contexts in OI research, a meta-review of LRs focusing on OI was made by stressing the Normalized Citation Impact Index (Holsapple, Johnson, Manakyan, & Tanner, 1994) of each LR. The summary of this meta-review is listed in Table 1, which helps frame the scope of this study. To avoid repetition of concepts in the table, the notions in the last two columns are consistently labeled.

Table 1. Most relevant theoretical perspectives and research contexts in highly cited literature reviews. The publications are ranked using the NCII, which is calculated as the total citations per publication divided by the publication longevity in years.

Title of publication	Author/s (year)	NCII	Theoretical perspectives	Research contexts
How open is innovation?	Dahlander & Gann (2010)	168.0	A. modes of openness, B. network C. transaction costs economics, D. absorptive capacity, E. practice-based, F. complementary assets, G. user innovation. H. exploration and exploitation, I. contingency, J. resource (knowledge)-based view	1. low-tech industries (Is), 2. mature Is, 3. manufacturing sector, 4. high-tech Is, 5. open source software, 6. electronics I, 7. foundry I, 8. mining I, 9. automotive I, 10. robotics I, 11. pharmaceutical I, 12. ICT, 13. large firms, 14. medium-sized firms
Open innovation: State of the art and future perspectives	Huizingh (2011)	127.5	A, B, C, D, E, F, G, H, I, J, K. real options, L. competence-based, M. organizational theory (change), N. business models	3, 5, 6, 13, 14, 15. small firms, 16. food I, 17. financial services I, 18. biotechnology I, 19. Services I, 20. goods I, 21. inno. intermediaries
The future of open innovation	Gassmann, Enkel, & Chesbrough (2010)	106.2	A, D, G, O. dynamic capabilities, P. process perspective, Q. tool perspective, R. institutional theory	1, 2, 3, 4, 5, 6, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 22. construction, 23. education I, 24. chemical I
Open innovation: Past Research, Current Debates, and Future Directions	Lichtenthaler (2011)	72.8	A, B, C, D, E, G, H, I, J, L, M (org. capabilities, learning, design), N, O, S. firm boundaries	4, 5, 6, 11, 12, 13, 14, 15, 18, 19, 20, 24, 25. medical equipment I, 26. idea competitions, 27. communities
Leveraging External Sources of Innovation: A Review of Research on Open Innovation	West & Bogers (2013)	47.5	A, B, D, F, G, J, L, M (org. culture), N, O, T. technology-based, U. market-feedback	1, 4, 5, 6, 12, 13, 14, 15, 18, 19, 20, 22, 26, 27. 28. textile I, 29. external stakeholders (e.g. supplier or client)
Exploring the field of open innovation	Elmquist, Fredberg, & Ollila (2009)	26.3	A, B, D, F, G, I, M, N, S, T, V. leadership, W. evolutionary econ. X. inno. systems, Y. ind. dynamics	3, 5, 11, 12, 13, 20, 24, 30. mass collaboration, 31. crowdsourcing, 32. B2B markets
Broadening the scope of OI: past research, current state and future directions	van de Vrande, Vanhaverbeke, & Gassmann (2010)	16.6	A, B, D, E, G, J, K, L, M, N, O, X, Z. value creation and value capture, AA. relational view	1, 3, 4, 5, 6, 12, 13, 14, 15, 24, 30, 33. sports I, 34. gaming I, 35. design sector, 36. start-ups, 37. creative I.
A critical review of empirical research on open innovation adoption	Schroll & Mild (2012)	6.0	A, D, F, G, I, J, L, M, N, O, S, T, V, Y, AB. technology transactions, AC. upper echelons	1, 3, 4,5, 6, 9, 11, 13, 14, 15, 18, 19, 30, 32, 38. middle-tech, 39. plastics I, 40. wood I, 41. life science I.
Implications of Openness: A Study into (All) the Growing Literature on Open Innovation	Giannopoulou, Ystrom, Ollila, Fredberg, & Elmquist (2010)	5.6	A, B, D, G, H, J, L, M, N, O, Q, S, T, V, X, Y, AB, AD. strategy, AE. ambidexterity, AF. technology-push, AG. market-pull	3, 5, 13, 19, 21, 26, 30, 32, 42. user co-creation, 43. triple helix scenarios (industry, government, academia)
Structuring of the Open Innovation Field	Wikhamn & Wikhamn (2013)	2.5	A, B, C, D, F, G, I, M, N, O, Q, R, S, T, V, X, Y, AD, AH. promoter, AI. enactment, AJ. ecosystems, AK. social brokerage, AL. open system/society, AM. stakeholder	1, 2, 4, 5, 9, 11, 13, 14, 15, 16, 19, 20, 21, 26, 30, 31, 32, 33, 44. Firms in diverse stages of their life cycle, 45. crowdfunding, 46. patent auctions, 47. cement I.

2. Research Methodology

To explore the link between the theoretical perspectives and research contexts in OI, the data in this paper was based upon systematic samples of articles retrieved with the software 'Publish or Perish' (Harzing, 2007). Publish or Perish helps to retrieve and analyze academic citations using Google Scholar database, which has shown to be useful due to its more comprehensive coverage than ISI Web of Knowledge. The first step was to use the theoretical perspectives listed in the fourth column of Table 1 as keywords for the search and retrieving process of articles published between 2003 and 2015. Variations of some concepts were included, e.g. organizational-organisational or contingent-contingency, and as a result more than 58 keywords were used. It should be noted that the attention on the search was on the theoretical perspectives used rather than on the researched contexts, since it is more probable that the former will drive the later (Bryman & Bell, 2007).

Once the results were cross-matched to avoid duplicates, a total of 1,450 articles were listed as having complete information. Similar to Wikhamn and Wikhamn (2013) approach who chose to analyze only highly cited articles, in this paper the criteria used was the NCII since it accounts for the impact of a publication considering its longevity (Holsapple et al., 1994). The threshold value used for the NCII was 2.3, which is above the average value of the retrieved articles. This filter provided 159 articles emphasizing at least one or in some cases up to three perspectives. After this step, the essential parts of each publication i.e. title, abstract, and conclusions (Giannopoulou et al., 2010) were manually reviewed to confirm if the associated perspective was truly considered and also to determine a specific research context. The subsequent step included a two-level analysis where first, a classification of the related perspectives and contexts helped forming clusters between them. Second, some specific links between them were identified in an exploratory manner i.e. reading, grouping, and regrouping (see e.g. Elmquist et al., 2009).

3. Results and Discussion

A general analysis of the 159 publications shows that 85% are journal articles and the rest consist of 9 books, 4 conference proceedings, and 10 working papers. With respect to the two key research aspects investigated, we found that from the 39 theoretical perspectives listed in Table 1, five of them are not explicitly emphasized in any of the examined publications i.e. relational view, upper echelons, market-feedback, enactment, and promoter theories. Instead, we identified four new perspectives used in studies but not highlighted in any of the LRs, namely lifecycle perspective, cluster, systems, and game theories. Likewise, we found that from the 47 contexts listed, 29 appeared as being studied in these publications and the rest i.e. 38% are not stressed in any publication. Nevertheless, we found 13 additional contexts already studied under the lens of OI which were classified into: a) industry settings: retail industry, health industry, aerospace industry, oil & gas industry, agriculture sector, and energy sector; and b) non-industry settings: living labs, consultancies, citizens, foundations, public sector, open data, and big data.

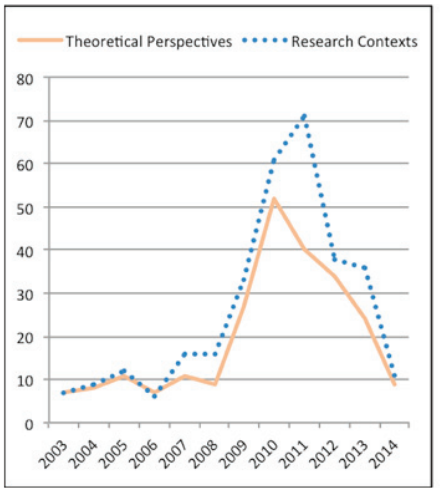
However, a note of caution here is appropriate: the 18 research contexts not stressed in the publications (Labels: 7, 8, 10, 17, 22, 28, 30, 32-35, 37-40, 42, 44, 45) are only applicable to the studied sample. Thus, it is probable that several of these settings have been already studied in OI literature but these publications have a relative low NCII. Equally, we also analyzed the top 10 publications (NCII > 43.3), which account for 42% of all the citations from the sample of publications. The results of this analysis did not show a clear pattern between the 10 theoretical perspectives emphasized (Labels: A, B, D, G, M, N, O, P, AB, AD) and the 15 research contexts studied (labels: 1, 2, 4, 5, 9, 12, 13, 14, 15, 23, 24, 26, 27, 46) in top publications. Nevertheless, it was interesting to notice that most of them endorse the use and research of OI in general settings i.e. firms of all sizes, sectors, and industries, rather than specific ones. In fact, this general focus could be a reason that has aided the high citation of these publications in numerous studies but also triggered a tendency to validate OI in other more specific contexts.

Related to this idea, we found in the sample that 16 publications are more conceptual rather than empirical and thus, the implied contexts to use OI are 'firms' in general. Additionally, five publications used data from firms of all sizes and sectors taken from the Community Innovation Survey – CIS, and other five publications considered similar samples but investigated with tailored OI surveys. Even though, these 26 publications do not accentuate a specific research context, the rest and majority of the publications in our sample i.e. 83%, focus on a specific setting. This finding suggests that there is a similar tendency to validate OI by widening and then narrowing the use of different theories and contexts (see Figure 1.a). Moreover, the findings of this 'validation crusade' in OI literature

confirms the idea that OI is highly context dependent (Huizingh, 2011; Tidd, 2014) and also indicates that academics are progressively advancing towards a unique OI theory (Gassmann et al., 2010).

Finally, we analyzed the stressed perspectives and the studied contexts as individual categories to find relationships between them. However, this approach did not yield clear results. Therefore, we grouped similar perspectives into 7 clusters based on some previous categorizations (Elmquist et al., 2009; Randhawa et al., 2014; Wikhamn & Wikhamn, 2013). Similarly, we created 11 clusters of contexts trying to have juxtaposed settings e.g. high-tech vs. low-tech, goods vs. services, or large firms vs. SMEs. Because in several cases the research contexts overlapped in two or more clusters, a mutually exclusive criterion was not used and instead one context could be accounted in more than one category that helped to create a correlation matrix (see Figure 1.b). Based on this table we suggest that the three clearest patterns of relationships between perspectives and contexts in OI are:

- SMEs and large firms in mature industries from the manufacturing sector studied mostly with org. theory and views related to practices and modes of openness, but also with absorptive capacity and dynamic capabilities.
- Large firms in high-tech industries from the service sector together with value chain stakeholders studied with processes and practices views, as well as views related to resources, knowledge, and capabilities.
- Firms in high-tech emerging industries collaborating with external stakeholders and communities studied with lead user innovation, strategy and business models views, but complemented with network and systems theories.



< 10
20 to 30
10 to 20
> 30

Research Contexts \ Theoretical Views	Firm boundaries views	Resources & capabilities views	Technology related views	Business models & value views	User & communities views	Ecosystems & systems views	Other relevant views
Inside firm boundaries	10 to 20			10 to 20	10 to 20	10 to 20	
Low-tech industries	10 to 20			20 to 30			
Manufacturing sector	20 to 30	20 to 30		20 to 30			
Mature industries / phenomena	20 to 30	10 to 20		20 to 30			
Large firms	20 to 30	10 to 20		10 to 20			
SMEs	10 to 20			10 to 20			
Primary sector							
Outside firm boundaries	20 to 30	10 to 20		20 to 30	20 to 30	20 to 30	
High-tech industries	> 30	20 to 30		20 to 30	10 to 20	10 to 20	
Service sector	> 30	10 to 20		10 to 20	10 to 20	10 to 20	
Emerging industries / phenomena	10 to 20			10 to 20	20 to 30	10 to 20	

Fig. 1. (a) Assertions frequency of the perspectives and contexts found. (b) Assertions correlation matrix according to the proposed clusters.

Conclusions

While still exploratory in nature, this study attempts to propose some potential relationships between the most stated theoretical perspectives and the most studied research contexts in OI literature. The overall findings in this paper can be useful to guide research in terms of how and where to study OI. The analyzes of published articles investigating the fit between certain research aspects can be a challenging process (Edmondson & Mcmanus, 2007); hence, this study has certain limitations. For instance, the manual review and organization of the studied concepts is not collectively exhaustive and thus, it could exclude other interesting perspectives and settings. Similarly, other bibliometric approaches e.g. co-citations analysis, may have provided a diverse view of the relations and trends that researchers have chosen to study OI. In general, this paper confirms that OI is a complex multi-dimensional phenomenon that compels us to use different perspectives in order to better understand it (Vanhaverbeke & Cloodt, 2014). Its findings show the extent to which several perspectives and contexts have been used so far in OI, even though these are sometimes implied in the literature. Nevertheless, one surprising discovery was that in the studied sample, 51% of the publications explicitly emphasize e.g. mention in the title, at least one theoretical perspective

and a research context. This and other results from the study highlight the relevance of acknowledging the context and contingency dependency of OI. In other words, we could say that one Open Innovation model does not fit all contexts. Therefore, to continue developing OI research that integrates earlier theories, contexts, and findings to arrive at a coherent OI body of knowledge (Lichtenthaler, 2011), it seems promising to use a partial narrowing-widening approach i.e. to narrow the used theories and to widen the contexts to confirm these theories. Finally, this study provides two main implications. For theory development, it offers a collection of theoretical perspectives and contexts to study, validate, and advance OI. For managers interested in adopting OI, it illustrates several contexts in which OI has been used with the hope to stimulate the implementation of OI practices and initiatives in their firms.

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