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Introduction

When do firms undertake open, collaborative activities? Introduction to the special section on open innovation and open business models

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Abstract

The explicit goal of the inaugural World Open Innovation Conference (WOIC) was to attract both leading academic researchers in open innovation and leading industry practitioners of open innovation, seeking to get these two groups to engage with one another. This introductory article sets the intellectual context of the WOIC, summarizes the "top" four articles resulting from the conference, and provides a research agenda based on a high-level view of all the submissions and sessions.

JEL classification: O32, O31, O30.

1. The importance and relevance of open innovation

A considerable academic literature has arisen since the publication of *Open Innovation* in April 2003 (Chesbrough, 2003). According to Google Scholar, there have been over 11,000 citations to this book since its publication. Moreover, a number of academic and practitioner journals have organized special issues that were inspired by the book and the subsequent scholarship it motivated. These journals include *R&D Management*, *Technovation*, *Research Policy*, and *Research-Technology Management*.

This academic scholarship has been more than matched by the response of industry to the ideas of open innovation (OI). Google now reports millions of page links in response to the term "open innovation." Many consulting firms now feature an OI practice area in their work. Job titles like Manager, Director, or Vice President of OI are becoming more common in many industries. And perhaps most importantly, many firms have reorganized their innovation processes to better connect with external actors during all stages of development.

2. Definition of OI

OI has been defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, 2006a). This definition hearkens

back to a vibrant economic literature on spillovers that arise from a firm's investment in research and development (R&D). Because firms cannot fully specify the outcomes of this investment in advance, R&D inevitably produces outcomes that were not expected *ex ante*. These outcomes spill over beyond the ability of the investing firm to benefit from them.

This prior research points out the presence of spillovers, and the benefits of being able to utilize them when they exist in one's surrounding environment. Throughout this research stream, however, spillovers are deemed to be a cost to the focal firm of doing business in R&D, and are judged to be essentially unmanageable. This is the critical conceptual distinction made by the OI concept, which proposes that in the OI model of R&D, spillovers are transformed into inflows and outflows of knowledge *that can be purposively managed*. Firms can develop inbound processes to seek out and transfer external knowledge into their own innovation activities. Firms can also create outbound channels to move unutilized internal knowledge from inside the firm out to other organizations in the surrounding environment. Specific mechanisms can be designed to direct these inflows and outflows of knowledge. Thus, what was unspecified and unmanageable before can now be specified and managed in the OI model.

In the course of time following these initial insights, more research from different settings arose, causing the definition of OI to be refined. Following the original and more recent conceptualizations (Chesbrough, 2003, 2006a; Gassmann and Enkel, 2004; Dahlander and Gann, 2010; West and Bogers, 2014), Chesbrough and Bogers (2014) define OI as a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model. These flows of knowledge may involve knowledge inflows to the focal organization (leveraging external knowledge sources through internal processes), knowledge outflows from a focal organization (leveraging internal knowledge through external commercialization processes), or both (coupling external knowledge sources and commercialization activities). The latter perspective of coupled OI has recently been used to also connect the literature on OI with research on user innovation (Piller and West, 2014), a stream in the literature focusing on the contributions of users and customers for the innovation process.

The OI concept was later supplemented by the notion of open business models (OBMs), that is, a firm's use of the assets of external partners to develop its business model (Chesbrough, 2006b). This strategy is orthogonal to the use of OI, in that firms can combine OBMs with closed innovation strategies and all possible combinations thereof (Vanhaverbeke and Chesbrough, 2014).

3. The world open innovation conference: connecting OI theory and practice

While OI has been well adopted by both academia and industry, there have been surprisingly few open knowledge flows between these two sectors, a phenomenon not exclusive to OI (Van de Ven, 2007). There are barriers to intellectual trade between academic and industry participants in many instances, even at conferences, or events purposively designed to exchange knowledge. Industry presenters tend to highlight their achievements, and downplay or omit the failures, challenges, and problems they had to address to reach these achievements. In some cases, corporate public relations professionals vet these presentations in advance, which tends to magnify this selection effect. Academics, in turn, tend to write and present in a language that is unfamiliar to most executives and managers. While jargon can convey a lot in a relatively few words among academic colleagues, it also reduces the comprehension of academic research results to non-academics.

These barriers matter in academia generally, but matter arguably more in innovation. Academics rarely get the chance to design experiments that generate the innovation phenomena they study, so it is often necessary to secure cooperation from industrial organizations to study many aspects of innovation. Yet, academics may not be well informed on the activities of the organizations they study, and in particular, the context that motivated the organizations to initiate their innovation activities is often not well understood. Meanwhile, industry people may be unaware of interesting, helpful, and important academic research findings that might be of real value to them.

These considerations led to the creation of the inaugural World Open Innovation Conference (WOIC), which was held in December of 2014 in Napa Valley, California, and co-chaired by the editors of this Special Section.[1] The goal

1 The Open Innovation Blog has a number of informative blog postings on the conference, which can be reviewed here: http://oinet.blogspot.com/2014/12/WOIC2014.html. In November 2015, the second edition of the WOIC took place in Silicon Valley, and the third WOIC has been scheduled for December 2016 in Barcelona.

of the conference was explicitly to attract both leading academic researchers in OI and leading industry practitioners of OI. Furthermore, the conference program sought to get these two groups to explicitly engage with one another, in hopes of alerting academics to some of the problems reported by companies, and, equally, sharing academic research findings in OI with people in industry, government, and the social sector who are trying to make OI work.

The conference attracted 120 participants, about 70% of whom had academic affiliations, while 30% were working in companies, governments, or non-profit organizations. Prior to the conference, we published a broad call for papers.[2] We received 120 academic submissions for the conference, and at least two editors read over each manuscript, carefully assigned by Joel West to avoid conflicts of interest. About 30 of those initial submissions were selected for presentation at the conference. After rating each manuscript, we invited the authors of the 12 most highly rated submissions to submit full papers to go through an additional double-blind review process for this Special Section. After two rounds of review with two to four referees,[3] we selected the four articles below to be included in the Special Section.

Industrial and Corporate Change is an excellent venue for a conversation on OI. Why should researchers who mainly work on economics, sociology of organization, organization theory, political science, and social psychology, as they relate to corporate and industrial change, care about the opening of innovation processes within firms? The question is both relevant and topical. There are several answers, but the most obvious one is that innovation processes are at the heart of industrial and corporate change. An additional answer is that OI is very much about organizing the innovation process in a different way, adopting novel organizational arrangements like crowdsourcing (see below), and utilizing a wide set of incentives and motivations for a diverse set of actors to contribute to a firm's innovation process.

Finally, *Industrial and Corporate Change* also has also been an important outlet for a number of innovative contributions in the context of OI, including Henkel's (2009) study of the role of open source developers in commercial firms; there are several studies on the interplay between internal and external R&D activities in firms (e.g., Teirlinck *et al*., 2010; Berchicci *et al*., 2015), and more recently studies of user innovation in online communities (Seidel and Langner, 2015).

4. An overview of the articles in this special section

What are the main challenges in OI in 2016? Thirteen years after the publication of *Open Innovation* (Chesbrough, 2003), there is less need for descriptive studies that explicate particular OI processes, or evaluate whether OI is beneficial to firm performance. What is needed now is to go beyond these questions to probe the underlying conditions that motivate or discourage firms from engaging in OI, and what factors influence OI's effectiveness (Wincent *et al*., 2009; Vanhaverbeke *et al*., 2014; West and Bogers, 2014). The articles in this Special Section tackle several of these challenges. The first one develops a theory of performance relative to aspirations as an enabler of OI activities. Next, we have an article emphasizing the role formal intellectual property mechanisms play in encouraging OI, followed by an exploration of specific organizational practices that might enable inbound OI. The final article in this section is about OBMs and how start-ups incorporating them might be treated differently by venture capital (VC) investors. The emphasis of these articles has been on understanding what goes on inside firms to encourage OI adoption or OBMs, and how those decisions play out in the product or capital markets. In keeping with the goals of the WOIC, the results of each article are also relevant to managers practicing OI inside organizations.

The first article, *Toward an Aspiration-level Theory of Open Innovation* (Alexy *et al*., 2016), examines when companies might be tempted to undertake an OI exercise. While it is obvious that firms should undertake OI activities when it makes economic sense, up until now, there has not been a theoretically satisfying explication of the

2 For industry participants, a "Call for Problems," led by Frank Piller, offered the opportunity to share challenges of managing OI in a corporate context with the conference participants. Academic attendees actively participated in special sessions dedicated to industrial solutions and brainstorming industrial problems. From the 15 industry submissions, six were selected for presentation and discussion at the conference (space limitations here preclude further discussion of these sessions, but they were considered an excellent opportunity for knowledge transfer across the academia–industry border).

3 Christopher Tucci was assigned all manuscripts with conflict of interest with the other editors. No other article was handled by a Guest Editor with a conflict of interest with the authors.

underlying mechanisms contributing to the cost–benefit analysis of more open approaches. Hearkening back to Cyert and March's (1963) behavioral theory of the firm, the authors develop a theory around firm performance relative to aspirations, how under- or over-performing, combined with the firm's R&D resources, may lead to broader OI activities and test hypotheses on a sample of 313 small and medium enterprises (SMEs) in the UK. The article not only contributes important theoretical insights on what motivates organizations to undertake OI, but it also reports results from a novel sample constructed explicitly to examine OI questions. This is a marked improvement over early empirical OI work, which often relied on proxies constructed from surveys conducted for other purposes to conduct their OI analyses.

The second article, *Does Patenting Help or Hinder Open Innovation? Evidence from New Entrants in the Solar Industry* (Zobel *et al.*, 2016), contributes to the current debate on whether formal mechanisms of appropriation encourage OI, especially in "systemic" products that are part of business ecosystems. One argument against formal intellectual property (IP) is that free revealing rather than formal protection precedes collaborative behavior, whereas the counterargument is that firms may be unwilling to share with partners without some protections in place. This is an important theoretical issue for OI, with influential scholars advancing contrasting predictions about whether formal IP protection mechanisms (such as patenting) help or hinder OI activities. The authors examine the patenting and subsequent OI behavior of 346 firms in the North American solar power sector and find that indeed higher patenting does appear to precede more collaboration, especially in the technology development area. This contributes to our theoretical understanding of the link between appropriability and OI, and also uses a novel sample explicitly constructed from archival data in a single industry to examine these questions.

The third article, *Match and Manage: the Use of Knowledge Matching and Project Management to Integrate Knowledge in Collaborative Inbound Open Innovation* (Lakemond *et al.*, 2016), focuses on the organizational procedures that could be important for the absorptive capacity necessary to integrate inbound knowledge from OI partners. By examining the knowledge governance embodied in project management and knowledge matching procedures in 415 manufacturing firms in Finland, Italy, and Sweden, the authors find both organizational procedures to be important for inbound OI performance, and that project management techniques are particularly important when the breadth of partners is high. This deepens the theoretical connection between OI and absorptive capacity, and again contributes a novel data set constructed expressly for this analysis.

The fourth article, *Open Business Models and Venture Capital Finance* (Colombo *et al.*, 2016), aims to understand the kinds and structures of VC investments for start-up companies with more open, relative to more closed, business models. Do VCs need to involve more syndicated partners or stage the investments more when the start-up has a more OBM? The authors examine the funding for 500 VC-backed software companies, 119 of which had an open-source component to their business model, and find that indeed those more OBM-oriented companies had more syndicated investors as well as more staging of the investment, concluding that VCs use these techniques to manage the risk of investing in more complex and uncertain business models. This study integrates open-source technologies, appropriability questions, and business models from a theoretical perspective, and provides a helpful archival data set to examine these issues.

Summing up the four papers, they collectively extend our theoretical understanding of motivations for OI, boundary conditions that enhance or inhibit its effective use, and how OI relates to business models. They also explore OI in four different contexts, supported by novel empirical data and appropriate methods.

5. Opportunities for further research

Building on our learnings from the conference and working with the authors of all submitted papers, we see four key areas in which future research could enhance the state of the art in OI:

How can we clarify our understanding of the boundary conditions that underlie the practice of OI? Our current OI research is unbalanced, in that we have many, many more examples of "success" than "failure." The failure cases are critical to defining the limits of OI, and to revealing latent conditions that may thwart the effective use of OI in certain situations. Failure cases may also sharpen our definition of OI by examining where it does not work well.

How do we change "not invented here" into "proudly developed elsewhere?" While practices of how to acquire external input for an organization's innovation process have been well researched and understood, we still have little insight into what happens inside the firm that helps or hurts a firm's ability to put these external ideas into use. Beyond the limited existing research at the firm level, we need studies at the group and individual level on the open-

mindedness and willingness of employees to engage with and exploit the contributions of external individuals—and how that translates into successful commercialization outcomes. All too often, a mentality of "not invented here" (cf. Antons and Piller, 2015) still leads organizations to prefer internal knowledge and internally developed technologies to external inputs. Research and advice on how organizations can turn this attitude into a mindset of "proudly developed elsewhere" seems to be critical to truly capture the benefits of OI.

Remember the quote by Bill Joy that served as inspiration for the OI movement? "No matter who you are, most of the smartest people work for someone else." Another area ripe for future research is the link between OI and the exploitation of crowds, especially online crowds. "Crowdsourcing," as it has become known, has become an important phenomenon in firms' innovation, marketing, and fundraising toolkits, and research in this area has been growing rapidly for the last 10 years (Villarroel *et al*., 2013). Clearly, if we conceive of crowdsourcing as a source of problem solving in the most general sense, this taps into inbound knowledge flows from outside the boundaries of the firm (Afuah, 2015). But it may also "expand the markets for external use of innovation" (Chesbrough, 2006a) as well. Crowdsourcing involves structuring and widely disseminating a problem, especially an innovation problem (purposive knowledge outflows), and assimilating potential solutions to that problem (purposive knowledge inflows). OI is also about search breadth and depth (Laursen and Salter, 2006), and crowdsourcing may also be conceived as a solution to distant search (Afuah and Tucci, 2012). If there are dozens, or hundreds, or thousands of those smart people out there, what is the best way to organize and motivate/reward them? What role do communities play in corporate innovation crowdsourcing (cf., West and Sims, 2016)? How could crowdsourcing be used for outbound external innovation exploitation? And how does appropriability/value capture interact with the firm's OI strategy when problems are widely disseminated?

Relatedly, there is a need for more research on the network form of OI collaboration, such as communities, ecosystems, and platforms (Vanhaverbeke *et al*., 2014). Firm experiments with crowdsourcing and communities are creating a wave of new network forms that can be leveraged to provide innovations, complementary assets, and other benefits supporting firm innovation strategies (Viscusi and Tucci, 2016). However, the research to date has tended to focus on specific forms of network organization rather than considering, more generally, the parameters for designing, organizing, motivating, and harnessing such external OI collaborations (West and Sims, 2016). Additionally, studies have tended to focus on variation within these external networks rather than variations between networks, limiting our understanding of how such choices impact the performance and benefits of communities, crowds, and other external network collaborations.

We would like to thank all of the authors for their contributions to this Special Section, along with the external reviewers for being readily available and for doing such an excellent job of reviewing the manuscripts under tight deadlines. We hope readers of *Industrial and Corporate Change* find these articles stimulating, and that they expand the discourse on OI and OBMs. We also hope that this Special Section encourages additional research on these exciting topics!

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