



Introduction

Open innovation: The next decade

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ABSTRACT

We review the contribution and evolution of open innovation since the publication of Chesbrough's 2003 *Open Innovation* book, and suggest likely directions going forward. We link the articles of this special issue to three key trends in open innovation research: better measurement, resolving the role of appropriability and linking that research to the management and economics literature. From this, we identify other trends and suggest opportunities for future research.

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In the decade since the publication of Chesbrough (2003a), the concept of open innovation has generated an avalanche of interest. Oriented at a managerial audience, the book *Open Innovation* was intended to change practice, by helping firms to span their boundaries in both the creation and commercialization of innovations.

For many practitioners, the concept of open innovation gave them a new language to speak about the nature of R&D, helping to shift the dominant logic of R&D away from the internal discovery toward external engagement. It has also helped to encourage these business leaders to experiment with a range of new models for generating and commercializing innovation. For some, indeed, open innovation has become a general catch-all term for any new model of innovation.

Innovation scholars have also embraced the concept. It has spawned conferences, special issues (such as this one), numerous books and hundreds of papers. As result of this interest, governments have also increasingly sought to re-align their policy frameworks toward open innovation.

Here we briefly discuss the antecedents, evolution and impact of open innovation across its first decade. We then review recent and incipient themes in open innovation research, as reflected by nine articles published in this special issue, and suggest potential research topics for the next decade.

1. Open innovation: the first decade

1.1. Germinating the idea

The idea of open innovation assumes that corporate innovation activities are more like an open system than the traditional (20th century) vertically integrated model. It was developed based on the observation of a handful of (large) innovative companies and their deviations from traditional practice (Chesbrough, 2003a, 2006). In some respects, the open innovation model can be seen as a call to a return to the late 19th and early 20th century model of innovation, with a rich, diverse market for technology and small, external oriented R&D labs (Mowery, 2009).

While exhorting firms to be more open in their practices, open innovation built upon the familiar model of vertically-integrated industrial R&D promulgated by Chris Freeman and others (Freeman, 1974; Chandler, 1990; Mowery, 1990; Pavitt, 1991). Under open innovation, large firms do not abandon this approach, but rather augment their traditional R&D practices with inbound sourcing of external technologies throughout the product development process, as well as controlled outflows of internal technologies seeking new markets through outbound licensing (see Chesbrough, 2006: pp. 2–3).

While open innovation offered new terminology and a new managerial paradigm, as Chesbrough (2006) acknowledged, it built upon antecedents in innovation research. There are at least three antecedents that helped play a key role in both enabling the ideas of open innovation and also its acceptance among managers and scholars.

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First, innovation scholars have understood since the 1970s that sources of innovative ideas often come from outside the firm. This includes the research of Freeman in the chemical industry (Freeman, 1974, 1979), Project Sappho (Achilladelis et al., 1971; Rothwell et al., 1974) and information sources for technical invention (Gibbons and Johnston, 1974). Indeed, Allen's (1977) landmark study of technology transfer of knowledge in R&D labs describes the lab itself as an "open system," relying on its external environment to help it generate ideas. Critical to this tradition was the work of von Hippel, who through a series of seminal papers documented the role of users in the generation of innovations (von Hippel, 1976, 1978, 1986) and later documented the role of suppliers and other external organizations (von Hippel, 1988). Related to this is research on the "two faces of R&D", i.e. that internal firm R&D investments not only generate new knowledge, but also increase a firm's ability to assimilate external knowledge (Allen, 1977; Cohen and Levinthal, 1989, 1990; Rosenberg, 1990; Chesbrough, 2006).

Second, open innovation builds on the profiting from innovation framework developed by Teece (1986), paying specific attention to challenges that firms face capturing returns from their innovative effort. This tradition is rooted in an understanding of the particular features of technology markets, with asymmetric relations between bargaining agents, and incomplete information and contracts (Arora et al., 2001; Gans and Stern, 2003).

The third antecedent to the book was an emerging interest in the role of business models, as firms during the 1990s leveraged the Internet to develop new value chains and revenue models (e.g., Timmers, 1998; Afuah and Tucci, 2001; Magretta, 2002). However, it was the work of Chesbrough and Rosenbloom (2002) that most closely foreshadowed the former's 2003 book. Studying the commercialization of Xerox PARC inventions by spinoff companies, they concluded that the role of the business model was to mediate between the technical inputs and economic benefits of a technology, by structuring how a firm created and captured value from a specific market.

1.2. The evolving scope of open innovation

Over the first decade, scholars have modified and extended the original conception of open innovation. As discussed below, we believe the papers in this special issue are part of broader themes within this evolving conception and scope of open innovation.

Even Chesbrough's definition of open innovation has evolved during this period. His first definition of open innovation was:

Open Innovation means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths... (Chesbrough, 2003a: p. 43).

One of the first large-scale empirical studies operationalized the concept as:

an 'open innovation' model is using a wide range of external actors and sources to help them achieve and sustain innovation. (Laursen and Salter, 2006: p. 131).

Reflecting what was learned from the practice of open innovation, the Chesbrough (2003a,b) definition was revised three years later to emphasize the intentionality of the knowledge flows into and out of the firm:

Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough, 2006: p. 1).

Most recently, in response to increasing interest in non-pecuniary knowledge flows (e.g., Dahlander and Gann, 2010; Chesbrough and Di Minin, 2014), the 2006 definition was extended as follows:

We define open innovation 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 (Chesbrough and Bogers, 2014).

1.3. A successful decade

In its first decade, open innovation had a tremendous impact on research and practice.

Through the end of 2013, the phrase "open innovation" appears in the title of 687 publications according to the Scopus database (418 publications in SSCI, SCI and other articles indexed by Web of Science) and 3150 according to Google Scholar. When seeking this phrase in the title, abstract and keywords, the number of publications rises to 1628 for Scopus and 996 for Web of Science. Open innovation has also influenced other research in strategy, management and innovation studies beyond papers primarily about open innovation. In the same period, *Open Innovation: The New Imperative* (Chesbrough, 2003a) had 2179 citations according to Scopus and 7300 according to Google Scholar. For the academic sequel, *Open Innovation: Researching a New Paradigm* (Chesbrough, 2006), the total was 836 citations in Scopus; in Google Scholar, the overall book recorded 1470 citations, plus 661 for its most influential chapter (Chesbrough, 2006).¹

Some of the development and diffusion of open innovation has come through conferences and special issues. The latter have included three special issues of *R&D Management* (Gassmann, 2006; Enkel et al., 2009; Gassmann et al., 2010), as well as one each for *Industry & Innovation* (Dahlander et al., 2008), *International Journal of Technology Management* (van de Vrande et al., 2010) and *Technovation* (Huizingh, 2011). As the body of open innovation research has increased, so too has the nuance and sophistication of the arguments: as the papers in this special issue demonstrate, framing an open innovation article today means more than just citing Chesbrough (2003a).

Open innovation has also had a considerable impact on practice. Daily industry press releases tout the latest "open innovation" initiative of an industrial or consulting firm. Middle managers have adopted "open innovation" in their job title, and conferences regularly promise to reveal open innovation secrets for their industry participants. Such managers increasingly realize the importance of specific organizational and managerial skills to effectively manage external collaborations. The internal management challenges are equally important, as managers struggle to align open innovation with strategic objectives. They understand the key role of top management in supporting such initiatives, creating a supportive culture, and enlisting key functions like legal and HRM.

Perhaps because of the familiar antecedents—and greater industry interest—the inbound mode has been far more popular among researchers than the outbound mode, accounting for more than twice as many studies in one recent review (West and Bogers, 2014). The greater interest in the inbound mode may also relate to its greater popularity among managers, either as a cost-reduction measure or because more firms are in position to use technology than to create it.

¹ We recognize that citation records in all three databases have significant errors, but even with such errors, we believe the data suggested a substantial trend of rising interest in the topic.

The development of open innovation has become increasingly institutionalized, analogously to the development of Systems of Innovation (see Sharif, 2006). As with the latter, open innovation challenged some elements of the traditional view of innovation management, with its primary focus on internal aspects of innovation management. Over the past ten years, an “epistemic community” has formed around the term, with a series of workshops, conferences, doctoral training programs and other events to catalyze and connect researchers working in this area. Researchers have increasingly self-identified themselves as “open innovation” researchers. In addition, the formations of clubs of firms with an interest in open innovation have formed around the world. These clubs provide an important place for industrial managers to share experience and practices and may have been important in helping to spur the wider adoption of the term by other firms. These industrial clubs have been supported by academics, helping to promote dialog and debate between open innovation scholars and practitioners. Alongside these academic and practitioner communities, the concept has been taken up by all levels of governments, whether local, regional, national or supra-national.

To summarize and synthesize insights from this groundswell of interest, open innovation has attracted a range of literature reviews, which we will not attempt to summarize here (e.g., West et al., 2006; Enkel et al., 2009; Dahlander and Gann, 2010; Chesbrough and Bogers, 2014; West and Bogers, 2014).

2. About the special issue

In the fall of 2011, the four guest editors approached *Research Policy* for permission to edit a special issue marking the 10th anniversary of Chesbrough (2003a). The journal approved the proposal in early 2012, and assigned Ashish Arora to act as lead editor for the special issue.

We announced the special issue and conference in March 2012. In response, we received 78 submissions of abstracts or papers for the conference, and 30 were presented at the Open Innovation: New Insights and Evidence Conference hosted by Imperial College London in June 2012. The first round of papers (including some not presented at the conference) were submitted in September 2012, with 20 papers asked to resubmit by April 2013. In the end, nine papers were accepted.

The special issue was among the first published by *Research Policy* utilizing the journal's revised policies for research integrity, described by editor Ben Martin (2013).² As with other recent RP articles, all submitting authors were required to self-disclose related work, and all of the accepted papers met the new standards.

3. Emerging themes for the coming decade

The papers in this SI reflect three emerging themes in open innovation research. The first is newer and better approaches to measuring open innovation. The second is a more sophisticated (and nuanced) understanding of the role of appropriability in enabling open innovation. The third comprises efforts to more closely integrate open innovation with established theories of management and economics. Here we review these three themes, and three others that (while not represented in the special issue)

will also shape the conception of open innovation in its second decade: coupled innovation, nonpecuniary motivations and multi-level analysis.

4. Novel measurement

The original conception of open innovation was developed based on case studies of industry practice in both Chesbrough's original book and its academic sequel (Chesbrough, 2003a, 2006). As elsewhere in management research, such case studies provide high internal validity but offer limited external validity: as such, they are better at “why” or “how” questions than “when” or “how often” (cf. Eisenhardt and Graebner, 2007; Gibbert et al., 2008).

Not surprisingly, there was an immediate demand for the greater generalizability that could be provided by a larger N empirical study. This demand was met by early studies (Chesbrough and Crowther, 2006; Fabrizio, 2006; Laursen and Salter, 2006). Since that time, the number of such empirical studies has exploded. Such studies have measured the benefits of OI (Spithoven et al., 2013), the limits to such benefits (Laursen and Salter, 2006), and the net costs of open innovation (Faems et al., 2010).

The patterns of empirical open innovation research naturally paralleled broader trends in innovation studies. For example, surveys were among the earliest and most popular sources of empirical data. Laursen and Salter (2006) spawned a trend of using Europe's Community Innovation Survey to measure firm open innovation practices, which have been followed by a wide range of studies on the use of external sources and collaboration more generally in the innovation process (e.g., Van der Meer, 2007; Frenz and Ietto-Gillies, 2009; Grimpe and Sofka, 2009; Leiponen and Helfat, 2010; Love et al., 2011). Others have used patent data to trace how inbound and outbound knowledge flows by firms are mediated by a firm's absorptive capacity (Fabrizio, 2009; Laursen et al., 2010).

In this special issue, we have other novel approaches to measuring open innovation. Consistent with typologies for innovation practice (Garcia and Calantone, 2002), in this issue, we have both “new to the world” measures and “new to the field” measures. In some cases, the new measures are measuring a new casual relationship or level of analysis, while in other cases they provide a better way to measure previously identified phenomena.

In the former category is our first paper by Dahlander and Piezunka (2014). They examine external suggestions by customers, perhaps the simplest and easiest form of inbound knowledge to obtain from customers. By analyzing the longitudinal results from a population of nearly 24,000 companies utilizing a specific online suggestion software package, they show that external cooperation by customers is the unusual (rather than usual) case, with less than 10% of the firms receiving multiple suggestions per month. They show how firm attention is crucial to priming the self-reinforcing process of external participation.

The success of new product development (and earlier stage R&D) projects has been a topic of earlier research (e.g. Balachandra and Friar, 1997). However, as Du et al. (2014) demonstrate, this is a level of analysis that has been overlooked by prior research in open innovation (e.g., West et al., 2006), making it more difficult to measure the outcomes of an aggregation of heterogeneous open innovation efforts. Utilizing a new dataset of 489 early stage R&D projects at a large European electronics company, they found that the projects had greater financial success if they collaborated for external technology knowledge, but external market-oriented collaborations had no significant effect.

Also at the sub-firm level of analysis is the work of Belderbos et al. (2014), who use co-patenting to measure open innovation collaboration at the level of the individual patent. Extending their earlier work with such measures (Belderbos et al., 2010), they

² Among the many failures of academic integrity detected by *Research Policy*, Martin (2013) refers to two open innovation articles retracted in June 2012 for omitting key variables from past studies and inconsistent reporting of statistical analyses from the same dataset of more than 100 European firms. The same author has had 13 articles retracted related to technology licensing, creating some confusion among potential open innovation scholars. We believe that this case is not representative of the broader open innovation community.

demonstrate different patterns of co-patenting with universities, complementors and competitors. They show how firms benefit financially from the former two forms of collaboration, but not from the latter. They also find that firms are less likely to cite (and thus further develop or exploit) co-patented inventions.

Finally, [Mina et al. \(2014\)](#) measure firm decisions in an under-researched but emerging area of open practice, that of services (cf. [Chesbrough, 2010](#)). Specifically, based on a survey from some 800 UK firms, they examine how manufacturing and service firms differ in their use of 14 different approaches to open innovation collaboration. Among other findings, joint corporate R&D and university collaborations are more common among high-tech manufacturers, as contrasted to marketing-oriented collaborations for service firms. They also find that informal collaborations are predicted by the importance of services and market-based knowledge, while formal collaborations are predicted by the importance firms place on formal appropriability (i.e., patents).

5. Impact of appropriability

Open innovation builds upon the research of Eric von Hippel and others in user innovation, and there is considerable overlap between the two bodies of research. Both encourage firms to look beyond their walls for sources of innovation, and both have studied topics such as open source software and crowdsourcing (see [Piller and West, 2014](#) for a recent review). Five years ago, researchers in the two communities were quite distinct (as noted by [Dahlander and Gann, 2010](#): p. 702), but since, then many user innovation researchers have since published on open innovation topics.

However, if there is one fault line between open innovation and user innovation, it is over the importance (and desirability) of strong rights for inventors to appropriate the returns to their inventions. The two extremes of the appropriability debate are largely associated with David Teece and Eric von Hippel.

Among other contributions, [Teece \(1986\)](#) introduced the idea that *de facto* appropriability was distinct from *de jure* IP policies, and that the ability of an inventor (especially a new entrant) was limited without the ability to either vertically integrate or to contract for services without leakage to rivals (see also [Teece, 2006](#); [Winter, 2006](#)).³ With outbound open innovation being effectively defined by [Chesbrough \(2003a,b\)](#) as out-licensing patented IP, during its first decade open innovation was (not unfairly) associated with strong appropriability (cf. [Christensen, 2006](#); [West, 2006](#); [West et al., 2006](#); [Dahlander and Gann, 2010](#)).⁴

Meanwhile, von Hippel has criticized strong appropriability on two fronts. First, strong appropriability is a drag on collaborative or cumulative processes of innovation, and thus diminishes societal welfare (see [von Hippel, 2005](#): pp. 112–118; also [Rai, 2001](#); [Murray and O'Mahony, 2007](#)). Secondly, inventors (particularly individual inventors) are often better off if they “free reveal” their inventions to others rather than seek or assert formal IP protection ([Harhoff et al., 2003](#); [Henkel and von Hippel, 2005](#); [von Hippel and Von Krogh, 2006](#); [von Hippel, 2007](#)). Some of this has been due to differences in outcomes and stakeholders, with the focus of von Hippel on consumer, individual and societal welfare, while open innovation is an (unabashedly) firm-centric theory of innovation ([West and Lakhani, 2008](#)).

These two traditions meet in research on when (and why) firms entitled to strong appropriability intentionally choose to surrender some part of that appropriability to achieve firm objective. Firms choose partial openness strategies to build reputation, gain market share, attract third party contributions, or to grow the market ([West, 2003](#); [Henkel, 2006](#); [Simcoe, 2006](#); [West and O'Mahony, 2008](#); [Dahlander and Gann, 2010](#)). They share their technologies as part of reciprocal exchange with other parties—even in cases where reciprocation is neither assured nor forthcoming ([Henkel, 2006](#); [Alexy et al., 2013](#)).

Two papers in the special issue advance our understanding of the impact of strong appropriability upon open innovation, and when (or why) firms waive such appropriability for their own advantage.

Rather than macro level measures of appropriability, [Laursen and Salter \(2014\)](#) study the formal and informal appropriability strategies used by 2931 firms in the 4th UK Innovation Survey. They link these attitudes to the breadth of external search (as in [Laursen and Salter, 2006](#)) and collaboration with six categories of external sources. On the one hand, they find strong firm-level appropriability is associated with greater external search, but find it linked to greater breadth of collaboration only when firms collaborate with competitors. They also suggest that appropriability is an important prerequisite to absorptive capacity if firms do not want to leak valuable knowledge as quickly as they absorb it.

Similarly, [Henkel et al. \(2014\)](#) extend their own earlier studies on selective revealing. They use qualitative and quantitative data to explain the initiation of such revealing of Linux-compatible software drivers by electronics manufacturers. They document the influence of industry shocks upon willingness to reveal, particularly the expectations of openness by downstream customers, showing how that leads to ongoing collaboration rather than merely out-bound (and/or in-bound) knowledge flows. Finally, they explain how this new openness shifted the basis of competition, suggesting a differential effect of openness upon firm strategies depending on their *a priori* competitive position.

6. Linking to management and economics

Although the original *Open Innovation* book drew on deep currents of research in the broader traditions of management and economics, it did not itself seek to directly align to existing underpinning theories in these fields. Over the past 10 years, researchers have sought to find mapping of concepts of open innovation to more general theories about the nature of the firm and its boundaries ([Vanhaverbeke and Cloudt, 2014](#)).

Since its initial articulation, open innovation has had strong links to resource-based view of the firm, as well as the related dynamic capabilities perspective. For example, [Teece \(2007\)](#) pointed to open innovation in his discussion of the dynamic capabilities to allow firms to “sense” and “seize” opportunities. Other scholars have highlighted the link between open innovation and resource dependency theory ([Alexy et al., 2013](#)). In addition, there are strong (and oft-explored) ties between open innovation and research on absorptive capacity ([Spithoven et al., 2011](#); [West and Bogers, 2014](#)).

Three papers specifically link open innovation to established theories in strategy and economics. One is an empirical study of open innovation and firm diversification, while the other two (conceptual) papers link open innovation choices to theories of governance.

[Colombo et al. \(2014\)](#) examine the intraindustry diversification choices of European small and medium-sized software companies. They focus on the use of open source software projects as a source of external innovations. From a survey of 100 firms, they find greater diversification efforts by smaller firms and firms more active as

³ Earlier, [von Hippel \(1982\)](#) found that if weak appropriability for process machinery inventions made it hard for firms to commercialize their inventions, these firms were more likely to apply such inventions for their own use in production (i.e., be industrial user-innovators).

⁴ Firms practicing open innovation were certainly encouraged to leverage inbound innovations from organizations (such as nonprofit or government labs) that allowed their innovations to spill over without monetary compensation ([Chesbrough, 2003b](#); [West and Gallagher, 2006](#); [Dahlander and Gann, 2010](#)).

open source contributors, but such diversification is limited by the internal competencies of the firm. From this, they identify the crucial difference between intra- and inter-industry diversification, and the influence of heterogeneous firm capabilities upon diversification choices. It also contributes to the relatively limited research on open innovation in SMEs (cf. van de Vrande et al., 2009).

Meanwhile, Gambardella and Panico (2014) develop a formal conceptual model for the allocation of property rights and decision rights to explain the *ex ante* incentives and *ex post* benefits of an open innovation collaboration. They show why firms with strong bargaining power should relinquish some of their rights when necessary to attract a capable collaborator—and how failure to relinquish any rights can impair the potential benefits of the collaboration. They make an important distinction between the allocation of decision rights during a project, and the control rights associated with intellectual property arising from the project. As such, they bridge open innovation to more formal theorizing in organizational economics.

Finally, when considering the governance of innovation efforts, Felin and Zenger (2014) offer a conceptual framework that extends the familiar hierarchy vs. market distinction in two ways. First, they subdivide these two categories into six governance forms, with two forms of internal hierarchy and four distinct categories of external sourcing. Second, building upon Nickerson and Zenger (2004), they consider governance of innovation efforts at the level of the project rather than the firm. From this, they predict the choice of governance form based on the nature of the knowledge being sought and the nature of the problem being solved.

7. Other themes

We would also like to highlight other important themes that were represented in the earliest submissions in the process and other recent scholarship, but not among the final articles published in this issue.

One theme has been the shift from the original two (inbound and outbound) modes of knowledge flow, to the “coupled” mode of Gassmann and Enkel (2004) that combines both inbound and outbound flows (see also Enkel et al., 2009; Piller and West, 2014).⁵ This has occurred in parallel with a shift of open innovation research beyond the dyadic interaction between two firms, to collaborations with external networks, ecosystems and communities (Vanhaverbeke, 2006; West and Gallagher, 2006; West and Lakhani, 2008; Fichter, 2009). Consistent with the Teece (1986, 2006) and subsequent conceptions of complementary assets, these studies have suggested that firms have an easier time using these network forms for value creation than obtaining an effective allocation of the value capture (West, 2014). However, more is needed to develop the conception of coupled open innovation and to show how open innovation practices are similar (or different) in such network settings. For example, innovation networks have their own distinct forms of governance (Nambisan and Sawhney, 2011; while such governance varies between alliance networks, ecosystems, communities and platforms, only limited research has examined how open innovation is practiced by firms working within these various network forms (West, 2014).

Such research could benefit from the availability of more advanced tools for network analysis, which make it possible to show how social capital – at different levels of analysis – can shape

open innovation. While research on strategic alliances has profited greatly from a network perspective, the link between open innovation and social capital is underdeveloped. Moreover, we still know little about how individuals who take up the open innovation role draw upon their networks to support them in this role. There are few emerging studies in this area, but more work is required. In addition, the link between open innovation and innovation ecosystems has broad potential for future work (Adner, 2006).

A second key theme of interest (not represented here) has been an increasing interest in nonpecuniary motivations (as defined by Dahlander and Gann, 2010) and with it, the application of open innovation to not for profit contexts. This has included universities (Perkmann and Walsh, 2007), nonprofit organizations (Holmes and Smart, 2009) and even government agencies (Chesbrough and Di Minin, 2014). Many network or community forms of collaboration include a mixture of for-profit and non-profit actors (e.g., Müller-Seitz and Sydow, 2012). There is some evidence that openness can help teams in the health care sector generate innovative solutions (Salge et al., 2013). Although the potential for nonpecuniary open innovation research is ripe for greater inquiry, we received only a few papers on this topic during the special issue process. At this stage, we encourage more researchers to examine open innovation in this context, and to show how such open innovation is similar to and different from the growing body of research on corporate open innovation practices.

As a third theme of interest, there is also a need to develop more multi-level perspectives on open innovation. Open innovation may be studied (or occur) at different levels of analysis: individuals, groups/projects, business units, ecosystems/communities, firms, regions or even national innovation systems (cf. West et al., 2006; Chesbrough and Bogers, 2014). To date, open innovation research has tended to focus on the level of firm, with more recent attention directed toward projects and teams. However, consistent with broader calls in organizational research (e.g. Klein et al., 1999), we highlight the opportunity for researchers to develop new insights by combining measurement at two (or more) levels. One possible topic would be to explore how the costs and benefits of open innovation are shaped by cross-level interactions; another would be to study the (mis)alignment of incentives and interests for open innovation (e.g. “not invented here”) are created, identified and addressed by firms.

Writing in parallel to this special issue,⁶ Vanhaverbeke with his colleagues (2014) identified a separate list of open innovation themes. While several themes overlap our list above, they also suggested the application of open innovation to new contexts (such as smaller, low-tech, or non-Western firms), the challenges managers face in organizing for open innovation, and the importance of open innovation for functions of the firm beyond R&D—such as HRM, procurement, manufacturing and IT.

8. Discussion

Open innovation has come a long way in the past decade, in both the quantity and quality of research on the topic. The original conception of open innovation has been enhanced through inbound knowledge flows from other frameworks and theories in innovation, strategy and economics. At the same time, outbound flows from open innovation have shaped and influenced innovation studies and other areas of social science research.

The papers in this special issue extend three themes that have been prominent in open innovation research. The first is new

⁵ Originally, the coupled mode was offered as a combination of inbound and outbound flows from one organization to another (Gassmann and Enkel, 2004). However, a second, interactive coupled mode of open innovation entails the cooperative efforts of two organizations (or other actors) that co-develop new knowledge, products or processes outside the boundaries of each (Piller and West, 2014).

⁶ Because these two articles were covering a similar topic and were being written simultaneously, we made a conscious effort to have separate authors develop the key themes for each chapter before circulating these articles for comment.

approaches for measuring open innovation process. The second is the interaction between open innovation strategies and firm choices for strong (or weak) appropriability. The final theme is the increasing integration of open innovation with established theories of innovation, management and economics. Other recent themes not represented in this volume include the importance of “coupled” and network forms of collaboration, application of open innovation to new contexts (such as nonprofit organizations or smaller firms), analyzing across multiple levels of analysis, and the challenges of organizing for open innovation.

Other issues of measurement or construct definition potentially cross multiple themes. Three of the articles consider firm decisions of openness not at the level of the firm, but for different choices made within a firm. Both an empirical study (Du et al., 2014) and a conceptual framework (Felin and Zenger, 2014) suggest that the appropriate level to understand firm decisions is at the level of a specific R&D or product development project, rather than aggregating across all such decisions made by a given firm. The third study (Belderbos et al., 2014) shows how a firm’s decision to collaborate in developing specific IP influences how that IP is subsequently used by that firm.

Three of the articles (Henkel et al., 2014; Laursen and Salter, 2014 and particularly Mina et al., 2014) draw distinctions between formal collaborations such as alliances, and informal collaborations (such as search, knowledge trading, common participation in associations). Formal collaborations are associated with greater knowledge transfers (often in both directions)—thus providing great potential for both risk and reward—but more work is needed here.

While open innovation research is highly cited and has influenced the direction of innovation studies, it has had a limited impact upon the broader disciplines of management and economics. With few exceptions (e.g., Laursen and Salter, 2006), open innovation research has not been found in general management journals. For example, of the 287 open innovation-related articles in 19 journals identified by West and Bogers (2014), only 45 are found in nine research journals used by the FT (2012) rankings, versus 38 articles in one journal (*Research Policy*) not on the *Financial Times* list.

As a relatively new field of research, open innovation provides rich possibilities for new, fundamental discoveries, including empirical and theoretical developments and corporate experiments in openness. If the first ten years of intellectual progress is a testimony to the future, it is possible to be fairly optimistic for a greater appreciation of the rich, diverse and even unexpected ways that the lens of open innovation can bring to understanding the innovation process in the next decade.

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