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Firms, Users, and Innovation

An Interactive Model of Coupled Open Innovation

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2.1 INTRODUCTION

Researchers on open innovation (OI) and user innovation (UI) share certain assumptions and precepts. Perhaps most importantly, they agree that knowledge relevant for innovation is widely dispersed outside the firm (Bogers & West, 2012). Henry Chesbrough (the father of open innovation) writes that “useful knowledge is generally believed to be widely distributed, and of generally high quality” (Chesbrough, 2006b: 9), while Eric von Hippel (the father of user innovation) concludes that “the information needed to innovate in important ways is widely distributed” (von Hippel, 2005: 14).

However, OI and UI are at best partly overlapping perspectives on this distributed model of innovation. While the two differ in their values and assumptions, an important factor in their limited commensurability is their tendency to study different phenomena. Open innovation is a firm-centric paradigm that is primarily concerned with leveraging external knowledge to improve internal innovation and thus the firm’s economic performance. User innovation is mainly about individuals using innovation to address their own (often unique) needs, without regard to firm success and often as part of a socially embedded community.

In this chapter, we focus on the overlap of these two perspectives: when individual users innovate in ways that improve the offerings of firms. In some cases, firms leverage existing innovations by users; in other cases, firms and users collaborate to create innovations that have both use or social value for users and commercial value for firms. We begin by reviewing the user and open innovation literature, and then contrast their overlapping and divergent assumptions. From this, we summarize and extend the research on the “coupled” process of open innovation suggested by Gassmann & Enkel (2004),

identifying three distinct dimensions of coupled processes: the nature of the external actor (individual vs. organizational), the topology of collaboration (dyadic vs. network), and the locus of innovation (whether collaboration between separate efforts or in a joint process of interactive co-creation).

Combining these streams, we focus specifically on the joint production of innovation by firms and individuals. We propose a four-phase model of interactive coupled open innovation that combines earlier conceptions of inbound open innovation with the collaboration tools and processes that make such production possible (West & Bogers, 2014; Diener & Piller, 2013). Our model connects the open and user innovation literature with the perspective of co-creation, a school of research from the marketing literature that has been largely unconnected to open innovation. We then discuss each of the stages of this model from the perspective of both open innovation and user innovation. We conclude with specific suggestions for future research.

2.2 CONTRASTING USER AND OPEN INNOVATION

Researchers in user and open innovation have overlapping but not entirely congruent perspectives on the process of innovation outside the firm, including how firms can harness the innovations of external individuals, such as users or consumers. Table 2.1 summarizes some of the key attributes of these two large bodies of research.¹

2.2.1 User Innovation: Learning from Lead Users

User innovation was proposed by von Hippel (1988, 2005, 2010) as an alternative model to the dominant view in management that innovation results from activities of producers and managers. In this model, users are not “consumers” of products created by “producer” firms, but instead are empowered (often as “self-manufacturers”) to create their own products and services. The users may be individuals or firms—either focused solely on their own needs, or collaborating in communities to share their creations. User innovation thus has three key premises: users have unique (“sticky”) information about their needs, when enabled they will create solutions to those needs, and they may freely reveal their results to others (von Hippel, 2010).

A large body of empirical work has shown that users have been the originators of many industrial and consumer products (Urban & von Hippel, 1988; von Hippel, Ogawa, & de Jong, 2012). Especially when markets are fast-paced or turbulent, so called lead users face specific needs ahead of the rest of the market. When they want something that is not available on the market,

users have an incentive to innovate from the direct use benefits they obtain from their innovation effort. Users are defined in this regard as individuals (or firms) that expect to benefit from using a design, a product, or a service

Table 2.1 Contrasting open and user innovation

	Open Innovation	User Innovation
<i>Core references</i>	<ul style="list-style-type: none"> • Chesbrough (2003, 2006) 	<ul style="list-style-type: none"> • Von Hippel (1988, 2005)
<i>Focal actor of study</i>	<ul style="list-style-type: none"> • Firm (R&D Lab) 	<ul style="list-style-type: none"> • Individual user
<i>Key principles</i>	<ul style="list-style-type: none"> • Knowledge is widely dispersed beyond any one firm • Innovations must be aligned to a firm's business model • Firms should embrace both internal and external alternatives 	<ul style="list-style-type: none"> • Users have unique “sticky” information • When enabled, they will solve their own needs • Many will freely reveal to others
<i>Focal object of transfer</i>	<ul style="list-style-type: none"> • Technological knowledge in form of IP or technologies 	<ul style="list-style-type: none"> • Information about needs and ideas how to transfer need into solution
<i>Typical institutional arrangement for knowledge transfer</i>	<ul style="list-style-type: none"> • Research contracts • In- and out-licensing; IP transfer agreements • Tournament-based crowdsourcing for technical solutions 	<ul style="list-style-type: none"> • Lead user method • User communities
<i>Representative IP practices</i>	<ul style="list-style-type: none"> • Patents • Licensing contracts 	<ul style="list-style-type: none"> • Free revealing • Open source or creative commons licenses
<i>Governance of innovation process</i>	<ul style="list-style-type: none"> • Private model 	<ul style="list-style-type: none"> • Collective or private-collective model
<i>Motivations of actors to engage in distributed innovation</i>	<ul style="list-style-type: none"> • Monetary incentives • Innovation is seen as a “money market” 	<ul style="list-style-type: none"> • Incentives of self-use • Social incentives • Innovation is seen as a “social market”
<i>Key managerial decision</i>	<ul style="list-style-type: none"> • Building absorptive capacity • Defining and defending IP • Internal organization for OI • Defining metrics for OI 	<ul style="list-style-type: none"> • Identifying lead users • Establishing bridging strategies to lead user innovation • Defining fair regimes of coordination • Opening- up IP
<i>Other streams of related research</i>	<ul style="list-style-type: none"> • R&D networks / strategic alliances • University-firm research contracts • Absorptive capacity theory 	<ul style="list-style-type: none"> • “Voice of the customer” methods of market research in innovation • Participatory design • Social production

(Baldwin & von Hippel, 2011). In contrast, producers expect to benefit from selling the innovation. These lead users are not “average customers,” who are rarely innovative (cf. Christensen, 1997); instead, they are “extreme users” who (1) face needs that will become general in a marketplace much earlier than the bulk of that marketplace encounters them; and (2) who are positioned to benefit significantly by obtaining a solution for those needs (von Hippel, 1988).

The early user innovation literature clearly focused on the lead user as the focal actor who is innovating autonomously to solve his/her own need (von Hippel, 1988). However, later research also found them to engage in strong knowledge sharing and co-development in communities of other user communities (Franke & Shah 2003; Füller et al., 2008). Within these communities, users have been shown to frequently reveal innovative ideas freely towards firms and other users (Harhoff et al., 2003), i.e. they share their ideas, knowledge, and inventions with other users without request or even expectation of compensation. These communities may operate independent of firms or even deal with firms’ products in an unauthorized manner (Flowers, 2008). For example, a study of four sports equipment communities found that one third of the community members improved or even designed their own equipment innovations, often driven by collaborations with other community members (Franke & Shah, 2003; see also Jeppesen & Frederiksen, 2006). Communities where innovating users collaborate to develop new products or services often build upon product-related discussion forums, where users exchange experiences and support each other in using a product (Sawhney & Prandelli, 2000; Füller et al., 2006).

Other recent research has studied collaboration processes between users² and producer firms who seek to commercialize the user innovations. First, such firms may engage in lead user research (Churchill, von Hippel, & Sonnack, 2009) or apply the lead user method (Lilien et al., 2001; Thomke & von Hippel, 2001), a systematic producer-driven search process to identify people with lead user characteristics, both from their own industry and from analogous markets, and engage in a collaborative problem-solving process using concept generation workshops. Second, some lead users create their own producer firms to commercialize their own innovations, a process Shah and Tripsas (2007) termed “user entrepreneurship.”

Finally, in other instances firms facilitate user creativity by creating dedicated platforms to innovate with users (Piller & Walcher, 2006). One example is toolkits for user innovation which provide a convenient user interface so that users can create their own designs by utilizing a library of basic modules and functionalities (von Hippel, 2001; Franke & Piller, 2004). A related method is the implementation of ideation platforms for continuous user input, like Dell’s Ideastorm (Bayus, 2013). Ideas generated on these platforms are often more radical (Poetz & Schreier, 2012) and also of higher commercial value (Nishikawa et al., 2012) compared to internally developed ideas, however also

more difficult to realize. Hence, firms could profit from a deeper collaboration with innovating users to also get input on the technical implementation of these ideas. Concluding, user innovation literature has developed from its pure focus on innovating users in the original publications towards a notion of interaction among users and firms. But research that examines in-depth the process of collaboration between users and firm is still rather scarce.

2.2.2 Open Innovation: Accessing Purposive Inflows

The original conception of open innovation identified two modes of knowledge flow: the inbound (or “inside-out”) and the outbound (or “outside-in”) flow (Chesbrough, 2003a; see also West & Gallagher, 2006; and Chapter 1). The outbound mode is not directly related to user innovation, and so is not discussed further in this chapter. The inbound mode of open innovation involves, as Chesbrough (2006b: 1) put it, “the use of purposive inflows... of knowledge to accelerate internal innovation.” Such a model combines externally and internally developed technologies to produce an offering that is commercialized by the focal firm. Key steps of this process include searching for external innovations, selecting and acquiring suitable innovations, integrating them into the firm’s R&D efforts, and bringing them to market (West & Bogers, 2014).

As originally inspired by Chesbrough’s (2003a) examination of large industrial firms such as IBM, Intel, and P&G, research on open innovation has tended to focus on organizational suppliers of such technology (Chesbrough, 2003b; West et al., 2006; see West & Bogers, 2014 for a review). The implicit (or sometimes explicit) assumption is that such organizational suppliers have economic motivations, whether firms seeking profit through outbound open innovation—such as the innovation merchants of Chesbrough (2003b)—or universities or non-profit research labs seeking to fund their R&D efforts (cf. Jensen & Thursby, 2001).

The majority of open innovation research has focused on corporations absorbing external knowledge stocks or Intellectual Property (IP) as an input for their innovation process, in exchange for monetary compensation. However, some researchers have gone beyond this focus and also investigated non-pecuniary exchanges and/or exchanges between individuals. A few studies have identified examples of why organizations might provide such innovations for non-pecuniary reasons (Chesbrough, 2003b; Dahlander & Gann, 2010). For example, the external partners may be individuals, or firms, they may be engaged individually or as part of broader communities, and their appropriation of the innovation may include personal use or rival commercialization (West et al., 2006; West & Lakhani, 2008).

A much smaller amount of work has identified the potential role of individuals as potential contributors to such firm efforts. These individuals may have economic, social, or some other combination of motives (West & Gallagher,

2006; Jeppesen & Lakhani, 2010; Dahlander & Gann, 2010). Although inspired and theoretically motivated by a different perspective, the research on firms commercializing user innovations or cooperating with user innovators is largely consistent with this open innovation perspective. However, inbound open innovation tends to focus on how firms benefit from such innovations without giving the motives of the suppliers too much attention, while user innovation tends to emphasize the utility motive of the individual inventor without paying much attention to the motives of individual contributors. An important exception is Dahlander & Wallin (2006), who contrast the motivations of individual and firm-sponsored contributors to an open source community

2.2.3 Contrasting User and Open Innovation

User innovation and open innovation have an overlapping interest in a distributed process of innovation. For example, when firms source innovative ideas from individuals—whether following the maxims of user innovation or open innovation—this requires firms to cooperate for the sourcing of technical knowledge across firm boundaries, in rejection of the traditional vertically integrated innovation model (cf. Bogers & West, 2012). However, there are essential differences. For example, open innovation continues the traditional view of the corporation as the locus of production, while user innovation anticipates (and often advocates) a decentralization of innovation from firms to individual users (cf. von Hippel, 2005; Baldwin & von Hippel, 2010; Füller, Schroll, & von Hippel, 2013). This parallels the thrust of the paradigm shifts respectively promulgated by Chesbrough (2003a) and von Hippel (2005)—one that advocates improved performance by making the boundaries of firms more permeable, while the other advocates supplanting firms by “democratizing” innovation.

In at least three ways the OI and UI perspectives are associated with a particular extreme on a continuum of alternatives: open innovation (consistent with its firm-centric outlook) continues the traditional role of the firm, while user innovation emphasizes independence from firm control. They include:

- (1) For *intellectual property*, the open innovation model—particularly that of outbound commercialization of internally developed technologies—has tended to emphasize strong appropriability and aggressive IP enforcement as a precondition for OI success (e.g., Chesbrough, 2003c; West, 2006). Firms are certainly amenable to weak IP if it provides a cheap source of inbound innovations, i.e. if the innovators are willing to develop or government agencies are willing to fund innovations at no cost (Chesbrough, 2003b; West et al., 2006; Dahlander & Gann, 2010).

User innovation research challenges this perspective with its emphasis on users “free revealing,” i.e. voluntary surrender of appropriability for their innovations (Harhoff, Henkel, & von Hippel, 2003; Henkel, 2006). Users are interested in using the innovation; they benefit when a firm (or other users) take up their ideas—ideally into a fully supported commercial product. Users may also freely reveal if the cost of obtaining IP protection is too high. Finally, users freely reveal as a sign of reciprocity as they also use other freely revealed information within their own innovation endeavors (Harhoff et al., 2003; Jeppesen & Frederiksen, 2006). Together, the practice of free revealing helps both individual and societal welfare (von Hippel, 2005).

To emphasize his differences from the IP policies in Chesbrough’s (2003a) definition of “open innovation,” von Hippel has since referred this collaborative IP model as “open distributed innovation” (von Hippel, 2005; von Hippel & de Jong, 2010) and “open user innovation” (von Hippel 2010; Baldwin & von Hippel, 2011). As Baldwin & von Hippel (2011: 1400) write:

An innovation is “open” in our terminology when all information related to the innovation is a public good—non-rivalrous and non-excludable....It differs fundamentally from the recent use of the term to refer to organizational permeability—an organization’s “openness” to the acquisition of new ideas, patents, products, etc., from outside its boundaries, often via licensing protected intellectual property (Chesbrough, 2003a).

- (2) The differences in the conceptions of IP directly lead to a second pair of choices, between the *private vs. collective models* of how innovation is funded, organized, and controlled (von Hippel & von Krogh, 2003; Gassmann, Enkel, & Chesbrough, 2010). In the private model, the private control of the innovation and its returns provides an economic incentive for a private actor (typically a firm) to invest in developing and deploying an innovation; such a model is implicit in open innovation studies. The early user innovation literature implicitly followed an individualistic private model, when lead users serve the private interest of solving their own need (von Hippel, 1988). However, the user innovation model later expanded to include user communities which entail a cooperative process between multiple (often individual) actors who collaborate in both creating innovations and in sharing their benefits. While research has emphasized these extremes, a few hybrid private-public models have been identified, particularly in open source software (von Hippel & von Krogh, 2003; West, 2003).
- (3) Finally, there is the distinction *between money markets and social markets* as incentives to organize participation (Piller, Vossen, & Ihl, 2012). Heyman & Ariely (2004) found that people expend more effort in exchange for no payment (a social market) than they expend when they

receive low payment (a monetary market). Much as Dahlander & Gann (2010) identified pecuniary and non-pecuniary motives for innovation sharing, here we apply the Heyman & Ariely typology of task motivation to suggest two types of markets for innovation:

- Money markets consist of markets for external innovation that are organized around economic (monetary) incentives exchanged for ideas and solutions (e.g. Terwisch & Xu, 2008; Jeppesen & Lakhani, 2010; Boudreau et al., 2011). This can lead to a Darwinian, zero-sum competition in which innovators compete among each other to get a maximum share of a limited award—as might be observed in an idea-contest where contributions are sought via “broadcast search.” In general, open innovation follows this view of money markets as the regime to award external contributors to a firm’s innovation process.
- Social markets rely on social-exchange relations, and are largely built upon the non-monetary incentives for participants such as enjoyment or task achievement (cf. von Hippel & von Krogh, 2003, 2006), for outcome expectations that enhance their own use experience or that of others (Harhoff et al., 2003), or through norms of mutual cooperation and reciprocity (Lakhani & von Hippel, 2003). This is the approach most often used in non-commercial distributed innovation, such as with user communities or lead user workshops. It dominates the original user innovation literature.

Of course, markets may be organized to combine both types of incentives, either across different members of the same community (Hars & Ou, 2002) or even with individuals who may have both economic and social motivations to contribute to innovation (Piller, Vossen & Ihl, 2012).³ Together, these three distinctions between OI and UI identify areas of tensions between the interests of firms and those of individual users when they collaborate. While firms seek to collaborate to enhance their innovation, they tend to do so in the context of privately-controlled IP and the motivations of private economic returns. Conversely, by starting from personal utility rather than economic gain, users often seek to share their creations through a process of collective action and social exchange.

2.3 AN INTERACTIVE APPROACH TO COUPLED OPEN INNOVATION

Building on the open and user innovation literature, we now focus on collaborations where firms and individuals jointly create new knowledge or other inputs for an innovation process. In the OI literature, this understanding

closely resembles the model of “coupled” OI, as identified by Gassmann & Enkel (2004). But our model differs from the formal interfirm alliances that were the primary interest of Gassmann and Enkel. We extend the coupled OI model by utilizing recent insights from open innovation, user innovation, and co-creation research. In particular, we propose an interactive model of coupled OI and offer a typology of different categories in this model. We then show how firms can manage interactive coupled open innovation with individual users.

2.3.1 Refining the Coupled Model of Open Innovation

Gassmann and Enkel (2004; Enkel et al., 2009) identified “coupled” as a third mode of open innovation, beyond the original inbound and outbound processes identified by Chesbrough (2003a). Defining this as “working in alliances with complementary partners,” they elaborated:

Companies that decide on the coupled process as a key process, combine the outside-in process (to gain external knowledge) with the inside-out process (to bring ideas to market). In order to do both, these companies co-operate with other companies in strategic networks (Gassmann & Enkel, 2004: 12).

As proposed by Gassmann and Enkel, the concept focused on the traditional perspective of firm alliances but has had limited theoretical development despite widespread potential application to open innovation research. In their review of 165 open innovation articles, West & Bogers (2014) found 70 articles (42%) that could be classified as relating to coupled open innovation (although many did not use that term). Here, we extend this broad conception of coupled processes by identifying four important dimensions (Table 2.2).

The first dimension is the *nature of the external actor*. The original emphasis for coupled open innovation was on firms as external partners; as with other open innovation collaborations, such firms may be suppliers, customers, complementors, or even rivals (West, 2006). However, the external partners for coupled processes may also include non-profit organizations (such as universities or research labs) or individuals; these potential partners differ in what and how they produce and commercialize innovation (West et al., 2006). Differences in actors may also lead to differences in incentives, coordination and governance of the collaboration between the two parties.

The second dimension is the *topology* of the relationship with the external actors. Dyadic collaboration with a single external partner corresponds to the long literature on strategic alliances (e.g. Gomes-Casseres, 1996). It is the most common form, accounting for about half of the research on the coupled process studied by West & Bogers (2014), who identify two additional topologies for coupled open innovation: networks of collaborators (e.g., Vanhaverbeke, 2006) and collaboration with voluntary communities (West & Lakhani, 2008).⁴

Table 2.2 Multiple dimensions of coupled open innovation processes

Dimension	Alternatives
<i>External actor</i>	<ul style="list-style-type: none"> • Firms: customer, supplier, complementor, rival • Other organizations: university, research lab, government, other non profit • Individual: customer, user, inventor, citizen
<i>Coupling topology</i>	<ul style="list-style-type: none"> • Dyadic: single partner • Network: multiple partners • Community: a new interorganizational entity
<i>Impetus for Collaboration</i>	<ul style="list-style-type: none"> • Top-down: initiated by upper management • Bottom-up: developed through employee or customer collaborations
<i>Locus of innovation</i>	<ul style="list-style-type: none"> • Bidirectional: innovation created within each organization • Interactive: innovation jointly created outside the organizations

The third dimension is the *impetus for collaboration*. Most of the open innovation literature—including that for networked alliances and other approaches to coupled OI—emphasizes the strategic intent of the firm to achieve certain objectives. For example, Lee et al. (2010) subdivided OI collaborations of small firms into three strategies: customer–provider, dyadic strategic alliances, and networked inter-firm alliances. Meanwhile, research on open source software (e.g. Henkel, 2009) has documented the role of individual employees in initiating, directing, and implementing collaboration with external communities. In this regard, the top-down vs. bottom-up distinction roughly parallels the Mintzberg (1978) distinction between intentional and emergent strategies.

The fourth dimension refers to the *locus of the innovation process*. Here we draw a distinction between two approaches, which we term “bidirectional” and “interactive.” In the bidirectional case, two actors (typically organizations) continue their separate efforts at creating innovation and other useful knowledge, but then share that knowledge; this most closely matches the Gassmann & Enkel (2004) definition of combining inbound and outbound flows. In some cases, the knowledge sharing parallels the reciprocity of user innovation sharing, but formalized through contracts or other legal instruments. In other cases, the reciprocal flows are explicitly monetized through licenses or other payment terms, as common, for example, for mobile phone standards (West, 2006; Bekkers & West, 2009).

However, we believe that there also is an interactive collaboration between two actors that is qualitatively and quantitatively different from the bidirectional form. Instead of using knowledge flows to augment the firm’s internal innovation creation (and commercialization) efforts, in the interactive approach the knowledge creation takes place outside one particular firm. Instead, innovative outputs are being created in a collaborative activity of all parties together. Such external joint creation of innovation differs from the bidirectional forms in where the innovation (or innovative knowledge) is

created, by whom, in how the process is governed and how the returns can be appropriated (Chesbrough, 2011). It is this latter understanding of coupled open innovation as an *interactive, collaborative process* of joint value creation that is the focus of the remainder of this chapter. We see this as a second form of coupled open innovation, distinct from the original bidirectional conception by Gassmann & Enkel (see Figure 2.1).

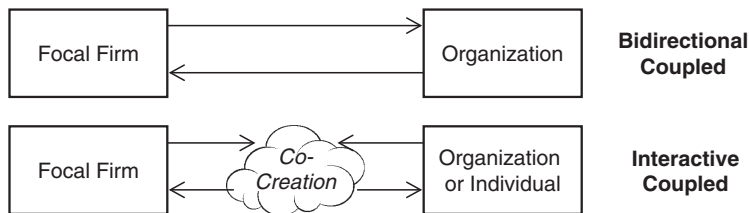


Figure 2.1 Two forms of coupled open innovation

This interactive process is similar to “co-creation,” a term that has been popularized in a series of books and papers by Venkat Ramaswamy and colleagues (Prahalad & Ramaswamy, 2004b; Ramaswamy & Gouillart, 2010), who define co-creation as “the practice of developing systems, products, or services [by a firm] through collaboration with customers, managers, employees, and other company stakeholders” (Ramaswamy & Gouillart, 2010: 5). Their starting point is the question how firms can leverage the input from external entities to create value across the value chain. Co-creation originated in an earlier debate in the strategic marketing literature by Normann & Ramirez (1993), Wikström (1996), or Vargo & Lusch (2004). In the innovation management literature, “co-creation” has almost exclusively been used for firms collaborating with their customers or other users—although not always for product innovation. Building on Roser et al. (2009: 9), we define co-creation as an active, creative, and collaborative process between a firm and individuals during a new product/service development process in which participants contribute to a task initiated and facilitated by the firm.

2.3.2 A Model of the Collaboration Process

Based on earlier research, we develop a process model for interactive coupled OI between firms and users. Our model combines the OI interaction model by Diener & Piller (2008, 2013) and the inbound OI models of West & Gallagher (2006) and West & Bogers (2014). In addition, we consider the recent literature on organizing contest-based crowdsourcing for ideation and technical problem solving (Spradlin, 2012; von Krogh et al., 2012). Together, these literatures suggest that firm-initiated co-creation efforts entail four major steps (Table 2.3):

Table 2.3 A process model for coupled open innovation projects

Process Stage	Key Activities
<i>Defining</i>	<ul style="list-style-type: none"> • Problem formulation • Institutions and rules: including contract terms, IP • Resource allocation and strategic commitment
<i>Finding Participants</i>	<ul style="list-style-type: none"> • Identifying participants with right characteristics • Motivating and retaining a critical mass of collaborators • Selecting the right participants
<i>Collaborating</i>	<ul style="list-style-type: none"> • Governance of the collaboration process: organizing, monitoring, policing • Interaction platform and other tools • Openness of firm attitudes, structure and processes
<i>Leveraging</i>	<ul style="list-style-type: none"> • Integrating external knowledge • Commercializing the knowledge through products and services

Adapted from West & Gallagher (2006), Diener & Piller (2008), West & Bogers (2014).

1. **Defining.** The firm needs to define the problem that it is seeking to address via engaging external partners in the co-creation effort (cf. von Krogh et al., 2012). It depends on institutions and rules of engagement, whether the rules of communities that it creates or might join (West & O'Mahony, 2008), or broader appropriability rules of the society or economy (cf. Teece, 1986; West, 2006). Finally, the firm needs to determine the resources that it is willing to provide and, more broadly, its level of strategic commitment to the collaboration process (cf. Lazzarotti & Manzini, 2009).
2. **Finding Participants.** A major theme of open innovation research has been on searching for suitable external partners with the right knowledge relevant for the firm's needs (see West & Bogers, 2014 for a summary). Both the search for and the acquisition of such knowledge will depend on understanding and strengthening the motivations of external partners to create and share their knowledge (West & Gallagher, 2006; Antikainen et al., 2010).
3. **Collaborating.** The key value creation process in our model is the interactive collaboration process that creates new innovations. Even after a decade, open innovation has a lot to learn from research on co-creation that has focused on how firms collaborate with external partners in a collaborative exchange of knowledge and benefit. This includes creating and implementing the processes for collaboration (Prahalad & Ramaswamy, 2004b) as well as providing suitable tools (such as IT-enabled platforms) that facilitate the collaboration process (Diener & Piller, 2013). Finally, firms face the daunting challenge of selecting the most promising ideas from dozens or thousands of potential contributors (Terwiesch & Xu, 2008). Such external

interactions assume that the firm is willing to open itself to the external partners: the risk of leakage of internal firm insights must be weighted against the new insights gained by empowering external collaborators (cf. Prahalad & Ramaswamy, 2004; Enkel et al., 2009).

4. **Exploiting.** Even if these collaborations are successful in creating new knowledge or innovations, there is no guarantee of firm success from such efforts. Internal co-creation advocates must overcome suspicion and other resistance to externally sourced ideas by their colleagues, whether an overt culture of “Not Invented Here,” or structural barriers impair collaboration (Chesbrough & Crowther, 2006; Dodgson et al., 2006; Schiele, 2010). In general, we know little about how (or how much) firms ultimately benefit from externally sourced innovations: do they use the same commercialization process as the internal ones, and are they more or less valuable than their traditional counterparts? (West & Bogers, 2014)

Here we apply the general model for the interactive process of coupled open innovation to the specific challenges of firms working with customers, users, and other external individuals. While our focus is on collaboration with external individuals, we believe that the model is also applicable to collaboration with firms or other organizations.

2.3.3 Defining Collaboration Tasks and Rules

To launch an interactive process of coupled OI, firms seeking external collaborators must define the tasks and rules for this collaboration and allocate sufficient internal resources to this endeavor.

Problem formulation: An interactive process of coupled open innovation starts with crafting the problem statement (Jeppesen & Lakhani, 2010; Siegel et al., 2010). The objective is to create a task description that can be used to attract external contributors, and also to think about the characteristics of such contributors. This signals external individuals about the opportunity for collaboration and asks interested individuals to submit either a solution proposal or just to indicate their interest in further collaboration. The formulation is aided by problem modularity that allows partitioning tasks between internal and external contributors (Langlois & Garzarelli, 2008).

The process of task formulation has been described well in the literature with regard to tournament-based crowdsourcing. Firms broadcast their problems, performance criteria, and contracting terms to an audience of potential solvers, usually in the form of a “request for proposals.” Writing such specifications entails many challenges, including defining the problem (and scope) precisely, using terminology that will be clear to potential solvers with knowledge from other fields, and preserving the confidentiality of the firm’s current and future technology needs (Afuah & Tucci, 2012; Spradlin, 2012; Lüttgens et al., 2014).

While a few researchers have started to study this activity of task formulation for contests seeking technical information (von Krogh et al., 2012; Lüttgens et al., 2014), we are unaware of research on problem formulation for other forms of coupled open innovation. User innovation research has only briefly identified the definition of a “search field” as the beginning of a lead user search process (Churchill, von Hippel, & Sonnack, 2009). Similarly, the co-creation literature has not covered this aspect beyond very brief references to its importance (in, e.g. Ramaswamy & Gouillart, 2010; O’Hern & Rindfleisch, 2010). But in either user or open innovation, defining the initial scope is crucial to initiate a coupled innovation process and avoid “garbage in, garbage out.”

Rules of cooperation: In dyadic open innovation—whether inbound or coupled—firms typically acquire rights to knowledge via a contract that assigns all necessary rights to the firm (e.g. Frenz & Ietto-Gillies, 2009; Jeppesen & Lakhani, 2010). However, in more complex collaboration contexts, other arrangements are necessary: the most-studied example is that of open source software communities. If firms tightly control the output of a community then they discourage participation by individual contributors; thus, firms use a variety of selective openness strategies—controlling the IP rights, creation process, and community governance—to maximize the alignment to firm goals while attracting outside participants (West, 2003; Shah, 2006; West & O’Mahony, 2008).

Resource allocation: A firm initiating a sustained process of collaborative innovation must also commit the organization and dedicated resources for this process, particularly for ongoing interactions with external participants as their contributions are developed and evaluated. An often neglected activity is providing feedback to contributors, which is crucial to motivate future contributions and (particularly with customers) avoid developing a negative firm reputation.⁵ Research has shown that companies often underestimate the effort required for these activities (Diener & Piller, 2008; Lüttgens et al., 2014). These resources must be supported by an internal structure that supports such external collaboration (Bianchi et al., 2011; Dahlander & Gann, 2010). Firms may be more successfully integrating external input if they have norms and explicit procedures for open innovation (Foss, Laursen, & Pedersen, 2011). At the same time, the firm needs internal guidelines for communication and exchange with external parties to improve cooperation by internal employees and units (Cordón-Pozo et al., 2006).

2.3.4 Finding Participants

The first step of any collaboration is *identifying participants* who have the relevant skills and interest to contribute to the firm’s goals for the collaboration. Some participants may initiate this identification by publicly proclaiming their

expertise (Droge et al., 2010) or even actively “pushing” their ideas to firms (Spaeth et al., 2010). In general, firms will actively engage in recruiting participants. We distinguish between three approaches for finding qualified participants (Diener & Piller, 2008, 2013):

- *Open Call*: In these cases, firms enable a broad range of participants and then select their ideas after they’ve been contributed (Piller, Ihl, & Vossen, 2011). This resembles the original understanding of “crowdsourcing” as an open call for participation to an undefined, large network of external actors, as defined by Howe (2006).
- *Selective Open Call*: Other firms identify the characteristics of suitable participants *a priori* (e.g. market segment, field of expertise, revenue potential by customers), and then limit their call for collaboration to that select list (Diener & Piller, 2008, 2013).
- *Open Search*: In other cases, firms engage in own search efforts to identify suitable actors within a large set of possible partners, and then explicitly invite them to join the co-creation activity. This is the typical approach in a lead user project (Poetz & Pruegel, 2010).

The *nature of participants* in a coupled OI initiative—identified by any of these three approaches—can span across a broad range of actors. Füller et al. (2009: 93) found that “potential task involvement of participants, their creativity, and experience in generating new product ideas” influenced their ability and willingness to participate in co-creation efforts. The typical individual participant is an expert for a specific domain or task, either because of her profession (i.e., industrial designers participating in ideation contests; a lab scientist participating in a technical contest), or her prior use knowledge in a similar situation. Experts are often motivated extrinsically, as discussed below. In the case of consumer products, participants may be either customers with lead user characteristics or “average” users with a high level of product involvement or a sense of belonging to a brand community.

Motivating external participants to engage in collaboration with the firm is an important task in coupled OI, emphasizing different participant incentives (Dahlander & Gann, 2010). Not surprisingly, theories of open innovation are explicitly about firm success, hence addressing the pecuniary monetary incentives. Because the supply of innovations to other firms corresponds to the out-bound mode of OI—which also assumes that firms are seeking to maximize economic returns to innovation—the initial work on open innovation assumed that firms would be selling, licensing, or otherwise providing innovations in exchange for payment. Open innovation research on the motives of individual collaborators is less common. External innovation contests are often organized around financial incentives to attract and engage external collaborators

to address a firm's needs (Jeppesen & Lakhani, 2010). At the same time, firms collaborating with external communities may find that individuals are more effectively motivated through non-economic (or indirect) incentives such as ego and career visibility (West & Gallagher, 2006; Boudreau & Lakhani, 2009).

Conversely, user innovation tends to consider non-pecuniary motivations. As noted earlier, the original user innovation work emphasized individuals utilizing their own unique "sticky information" to address their own unique and unsolved needs (von Hippel, 1988, 1994). However, more recent research has examined the social motives of users participating in collaborative communities (see von Hippel, 2005 for a summary). In his review of "social production," Benkler (2006) suggests that monetary incentives tend to crowd out intrinsic motives for contributing to communities, and thus social motives are most effective in motivating individuals to contribute when "pricing and contracting are difficult to achieve, or because the payment that can be offered is relatively low" (Benkler, 2006: 95).

However, this distinction between monetary and social motives is perhaps more sharp in theory than in real life. Later research on hybrid models of participation in communities like von Hippel and von Krogh's (2003, 2006) model of collective-private innovation suggest that some communities are driven by both social and monetary (private) motives. At the same time, users are increasingly able and willing to monetize their contributions when they create a new firm to commercialize their innovations; such innovation is often created through collaboration with a user community, and that collaboration continues after the formation of the new organizational entity (Shah & Tripsas, 2007). Also in many ideation contests with users, monetary incentives are clearly positioned as a complementary incentive next to social incentives ("helping others") or intrinsic motives ("having fun by co-creating"). In result, former "money markets" characterizing open innovation are becoming more "social," while former "social markets" characterizing user innovation are becoming more "monetary" (Piller, Vossen, & Ihl, 2012).

2.3.5 Collaborating with Participants

The heart of our model is the joint co-creation process of innovation by the firm and external actors. While open innovation has emphasized finding and obtaining external knowledge (West & Bogers, 2014), research on the joint creation process of such knowledge has been comparatively rare in the open innovation literature. Much of the prior research on this topic has focused on formal (contractual), long-term collaborations such as R&D alliances (e.g., Hoang & Rothaermel, 2005). Some open innovation research has considered collaboration *within* a firm as an enabler to connect with innovative knowledge from its periphery (Dahlander & Gann, 2010; Van de Vrande et al., 2010).

But little research has examined the structures and processes supporting collaborative knowledge creation with external actors (Blazevic & Lievens, 2008).

Similarly, the original UI literature on lead users did not look upon the collaboration stage, except (as noted earlier) for collaborations within communities of innovating users (e.g. Franke & Shah 2003; von Krogh, Spaeth, & Lakhani 2003). These studies largely ignored collaboration between users and firms. Here, we consider the gap of research on the collaboration stage of coupled open innovation in three important areas: governance of the collaboration process, tools and dedicated infrastructures facilitating this stage, and internal attitudes and capabilities of the focal firm supporting the collaboration.

Governance of the collaboration process. Unlike OI and UI, the co-creation literature covers more explicitly the activity of joint collaboration between firms and individuals, suggesting structures and processes that allow the firm to stir, monitor, and police its value creation through collaborative efforts with external partners (e.g. Prahalad & Ramaswamy, 2004b; Ramaswamy & Gouillart, 2010). A central point from the perspective of the firm is to define the span of control that the firm provides to the external co-creators (Diener & Piller, 2008; O'Hern & Rindfleisch, 2010; West & O'Mahony, 2008). Different regimes of co-creation provide different degrees of influence to the participants (Doan et al., 2011). Participants are engaged when given more control, freedom to operate and responsibility (Koch & Gates, 2010). Defining the span of control is a key firm decision when setting up interactive coupled OI. For example, in ideation contests a key decision is the extent participants can evaluate and rank contributions by other participants. If firms allow the final decision on the "best" contribution to be made by participants, then such empowerment may motivate contributors—but the firm gives up important control on the outcome of the contest (Gatzweiler et al., 2013).

Tools and collaboration infrastructures: Software tools play an important role enabling a broad collaboration with customers and other individuals at low transaction cost. For example, in ideation contests tools facilitate the search for participants, the collection and evaluation of ideas, user feedback, and clustering the submitted ideas (Piller & Walcher, 2006; Adamczyk et al., 2012). Social enterprise software facilitates a more general exchange within a participant community and between participants and the firm in form of web-forums, blogs, tweets, and the like (Sawhney, Verona, & Prandelli, 2005). This software can be seen as the backbone of modern co-creation activities (Piller, Vossen, & Ihl, 2012). Finally, toolkits for user innovation provide users a design space to create products meeting individual requirements, based upon libraries of modular or parametric components that can be modified and freely combined by users (von Hippel & Katz, 2002; Franke & Piller, 2004). These tools have been discussed extensively from a technology perspective in the information systems literature and, to a smaller extent, in the co-creation literature.

Rather than use the tools directly, some firms will utilize the services of specialized intermediaries and brokers for open innovation; these open innovation accelerators help clients by providing proprietary tools and methods, access to an established community of solvers or participants, and education and process consulting (Chesbrough, 2006a; Diener & Piller, 2008; Lopez-Vega, 2009; Mortara, 2010a). Intermediaries differ with regard to their task specialization, their software platform, and the characteristics of their participant community (Diener & Piller, 2013). Selecting the right intermediary to meet the contingencies of an innovation project is a key decision for firms who want to engage in an interactive model of coupled open innovation.

2.3.6 Leveraging the Collaboration Results

Once the firm has completed a collaborative effort, the challenge remains to realize the benefits of such efforts by *integrating the innovation* into the firm and then *commercializing the innovation at market*. In many cases, open innovation research assumes that commercializing external knowledge through products and services happens exactly the same as from knowledge created via internal sources of innovation (West & Bogers, 2014). But reality is more complex. Integration of the results will depend on the nature of the contribution and what part of the R&D pipeline is informed by that contribution. Some contributions will be in generating ideas for further internal development; some will come in the design of a product or service, while others will come in evaluating new offerings being tested prior to market (Füller & Matzler, 2007). One of the most common outcomes of co-creation is the incremental improvement of existing products that customers use and understand (Piller, Ihl & Vossen, 2011). It is more difficult to utilize co-creation to create radical innovations—whether new to the world or new to the firm—but it can be done if firms are able to use appropriate tools to help users to surface their unmet needs (Füller & Matzler, 2007).

Each type of integration may require interaction with different parts of the organization as well as different tools and processes. But all types of integration share a similar challenge: overcoming “not invented here” (Chesbrough, 2006c; Chesbrough & Crowther, 2006; Gassmann et al., 2010). Such an attitude is symptomatic of the cultural barriers that firms—particularly successful innovators—face in collaborating with external partners (West & Bogers, 2014). Additional challenges exist for integrating the results from co-creation, including the need to maintain transparency with partners, to adapt external ideas (of variable quality) to a firm’s high quality standards, and the additional time required for an interactive process (Prahalad & Ramaswamy, 2004b).

When considering the extent to which firms can profit from external distributed knowledge, one aspect frequently studied is absorptive capacity, i.e. a

firm's ability to recognize, assimilate, and apply external knowledge for innovation (e.g. Laursen & Salter, 2006; Foss et al., 2011). Incentive and reward systems have been shown to be instrumental for successful exploitation, reinforcing the use of external learning (Quigley et al., 2007). In addition, firms that emphasize external learning and absorption behavior as bases for appraisals and rewards will be more likely to acquire and utilize external knowledge via co-creation (van Wijk et al., 2008).

Another antecedent to integration is open-mindedness. Research has shown that mental models evolve with past successes and failures. They manifest expectations about action-outcome relationships in organizational routines, assumptions, and beliefs (Ringberg & Reihlen, 2008; Lin & McDonough, 2011). Hence, when employees are encouraged to use input from interactions with external users and other experts to think in new ways, knowledge generated in co-creation is more likely to be acquired and assimilated. Moreover, when engaging external experts and reflecting on own mental models at the same time, previously undetected technical connections can be recognized.

2.4 CONCLUSIONS AND OUTLOOK

Focusing on how firms collaborate with individuals, this chapter makes three contributions. First, it reviews and contrasts how such collaboration has been covered by user and open innovation. It identifies three important differences between these literatures: over the role of IP, the private vs. collective model of innovation, and the distinction between social and money markets to incentivize individual participation. Future research should examine further examples of hybrid models that combine the best of both approaches on these dimensions.

Second, the chapter expands the conception of “coupled” open innovation as proposed by Gassmann and Enkel (2004) with a multidimensional typology of different forms of coupled collaboration. The first dimension considers the nature of the external partner—whether individual, firm or non-profit organization—while the second identifies the topology of the collaboration process—either the dyadic collaboration commonly found in open inbound innovation research or the various forms of collaboration. Finally, the typology draws the distinction between the original coupled model bidirectional collaboration (where each actor pursues its own innovation) and a new, interactive coupled model, where the two parties jointly produce new innovation.

From this understanding we developed a four-phase process model of interactive coupled innovation: defining collaboration tasks and rules, identifying and engaging external partners, collaborating in the joint innovation process, and leveraging the results of that collaboration. This model links the user innovation,

co-creation, and other literatures to an area of emerging interest in open innovation. Demands for future research exist in each stage of our processes model.

With regard to defining a collaboration task we need more large scale (quantitative) research on the influence of task formulation on OI performance. In which situation, for example, is a broader-formulated task superior to a highly specific task? Are special incentive schemes for participants more effective for specific tasks? How can a firm balance the trade-off between revealing too much information in a task on the one hand side and providing the right detail of input for productive contributions on the other?

Similar research is required with regard to finding and selecting the right external individuals for participation (Hoffman, Kopalle, & Novak, 2010). While many firms prefer to carefully control participation, this may exclude individuals who can offer valuable input for the task at hand. Research is needed on the optimal selection and recruitment strategies of external participants for a given innovation task. Research is also needed on whether the increasing use of coupled OI is creating a scarcity of capable and willing collaborators, i.e. the “crowd”. Modeling the scarcity of “innovative external actors” could become a fascinating topic for future research. Related to this is a more nuanced examination of the interdependence of cooperative and competitive interactions within a crowd, as demonstrated by Boudreau & Lakhani (2013) in their recent study of 733 contributors to a TopCoder competition.

While research on the collaboration stage has focused on the tools and platforms, much less research exists on the rules and conditions that set the governance structure of using these tools. Which “optimal” rules and conditions of ideation contests both form a legal and an ethical point of view. When is an IP arrangement seen as “fair” from the perspective of potential participants? How do these conditions influence the willingness to participate by individuals? What is the right mix of monetary and social or intrinsic incentives for a given task?

We also still have little knowledge on what happens inside the firm that helps or hurts a firm’s ability to profit from coupled OI. 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 leverage the contributions of external individuals—and how that translates into successful commercialization outcomes.

Finally, we acknowledge that the reality of competitive versus collaborative modes of open and user innovation is more nuanced than our discussion may indicate. We purposefully focused on the extremes of dimensions which in reality are continuums with many shades of collaboration. Understanding these nuances and the contingencies that make one particular configuration more successful than another for a given innovation task can drive plenty of fascinating new research in the field.

NOTES

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1. A simple table cannot capture the depth and complexity of hundreds of articles in these two major streams of innovation research. For more in-depth summaries of user innovation, see von Hippel (2005) and Bogers et al. (2010); for open innovation, see West & Bogers (2013) and Chapter 1 of this volume.
2. Users may be organizations (aka “user firms”), and in fact process innovation is often driven by user firms (Lettl, Hienerth, & Gemuenden, 2008). However, most user innovation research focuses on individual users (Bogers et al., 2010).
3. Boudreau & Lakhani (2009) make a related distinction between competitive and cooperative communities as sources for technical solutions. These forms of communities differ, like social and money markets, in the form of incentives and norms that drive the interactions between community members.
4. Chapter 4 summarizes the similarities and differences between various network forms of organizing external open innovation collaboration, including communities, ecosystems and platforms.
5. While there are both coupled and non-coupled ideation contests, our focus is on how firms collaborate with individuals. We thus excluded those contests following the “inbound OI” mode where firms intentionally set up a one-way knowledge flow from participants, typical of intermediaries such as Innocentive and Nine Sigma (see Chesbrough, 2006a; Diener & Piller, 2013).