

## Perspective

# Value Creation and Value Capture in Open Innovation

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*Open innovation has attracted a significant amount of attention from scholars and practitioners. Prior research on open innovation has mainly focused on collaborative inventing. However, understanding the processes and outcomes of joint inventing is not sufficient for understanding sustained open-innovation activities and the competitive advantages of the actors involved in open innovation. Instead, an understanding of value creation and value capture is paramount for advancing our understanding of sustained open-innovation activities. Open innovation requires collaboration among distributed but interdependent actors who rely on each other's capabilities for value creation and capture. Value in open innovation is driven not only by actors' value creation but also by their ability to capture value. While value creation and value capture are discussed in the open-innovation literature, the advancement of this stream of research is hindered by conceptual ambiguity, especially in relation to the concept of value capture. This article adopts a value perspective on open innovation, offers consistent conceptualizations of value creation and value capture, and outlines potential avenues for further research at the interface of open innovation, value creation, and value capture.*

## Practitioner Points

- Managers need to consider both value-in-exchange and value-in-use to ensure a comprehensive understanding of value in open innovation.
- Managers need to work toward the development of an open-innovation capability, which comprises four value processes: value provision, value negotiation, value realization, and value partake.

## Introduction

Open innovation has received a significant amount of attention from scholars and practitioners over the past decade, but its definition derives from a long stream of economics literature on the spillovers that can arise from R&D activities. Nelson (1959) observed that basic research generated many such spillovers and that firms funding that research had only a limited ability to appropriate value from those spillovers. Arrow (1962) also took note of this spillover problem, recognizing that these

spillovers meant that the social return on R&D investments exceeded the private return enjoyed by the firm undertaking those investments. Cohen and Levinthal (1990) wrote about the importance of investing in internal research in order to be able to utilize external technologies, an ability they termed “absorptive capacity.” Rosenberg (1990) asked why firms conduct basic research with their own money. He found that this research enhanced the firm’s ability to use external knowledge.

Throughout this literature, spillovers are viewed as the focal firm’s cost for undertaking R&D and they are essentially judged as unmanageable. This is the critical conceptual distinction from the open-innovation concept, which proposes that R&D spillovers can be transformed into inflows and outflows of knowledge that can be purposefully managed. Firms can develop processes to seek out and transfer external knowledge into their own innovation activities. They can also create channels to move unutilized internal knowledge to other organizations in the surrounding environment. In other words, what previous theories of innovation deemed unspecified and unmanageable can be specified and managed in the open-innovation model. The core tenet of open-innovation research is the wide distribution

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of useful knowledge, such that no individual or organization has a monopoly on useful knowledge. This, together with environmental uncertainty and the complexities of innovation, requires more permeable organizational boundaries that enable combinations of resources beyond an individual actor's resource endowment. Thus, companies need to openly interact with their stakeholders throughout the innovation process (Chesbrough, 2003b).

In line with the scholarly work that has followed the original open-innovation definition, (Chesbrough, 2003a, 2006; Dahlander and Gann, 2010; Gassmann, Enkel, and Chesbrough, 2010; West and Bogers, 2014), Chesbrough and Bogers (2014) 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." The link to an organization's business model highlights the fact that open-innovation activities must create value to sustain their purpose. As such, it is important to understand open innovation from a value perspective.

The literature has thus far mainly looked into collaborative value creation processes in the outside-in branch of open innovation (e.g., Boudreau and Lakhani, 2009; von Hippel, 2005; West and Bogers, 2014) in which new ideas and market offerings are co-developed. However, the focus on collaborative value creation is too limited to allow for an understanding of sustained open-innovation activities and their impact on competitive advantage, and the

inside-out branch of open innovation is omitted. Therefore, we need to investigate value as the motivating factor for participation in both outside-in and inside-out open-innovation projects. We argue that, for a participant, value is not only driven by the value created through the collaborative exchange process but also by the participant's ability to capture the value of other actors' value creation efforts in subsequent phases of the innovation process. Thus, we stress the complementarity between the invention and commercialization processes (e.g., Chesbrough and Rosenbloom, 2002; Jacobides, Knudsen, and Augier, 2006; Teece, 1986). We also highlight a potential value capture challenge—the actors that contribute the most in the invention process may not necessarily be those that benefit the most in terms of profits (Teece, 1986).

The complexities that arise from applying a value perspective to open innovation are insufficiently addressed in the open-innovation literature, as this stream of research has focused on the creation of an innovative solution to a problem and not on value in its totality. As such, an important part of our understanding of open-innovation systems is in the infant stage. This paper advances the value perspective on open innovation by addressing conceptual ambiguities and developing a set of research questions for further advancement of open-innovation research.

If we fail to consider value creation and value capture, our understanding of open innovation and its impact on firm performance or industry evolution will be limited (Chesbrough and Appleyard, 2007), especially as open innovation induces certain tensions between value creation and value capture. For example, value creation in open innovation requires firms to be open in order to leverage the knowledge of diverse contributors, while value capture necessitates a tighter, more protective process. This tension has been referred to as the "paradox of openness" (Laursen and Salter, 2014). Moreover, there are reversions from open to closed innovation, which can only be comprehended given a deeper understanding of value creation and capture (Appleyard and Chesbrough, 2017).

The aim of this article is to inspire research at the interface of open innovation, value creation, and value capture. To do so, we draw on recent advances in the strategy and industrial marketing literature. This literature has a long tradition of exploring value creation and value capture, but it has largely been ignored in open-innovation studies.

#### BIOGRAPHICAL SKETCHES

**Dr. Henry Chesbrough** is a professor at the Haas Business School, UC Berkeley, and executive director for The Center for Open Innovation. He created the theory and coined the term "open innovation." An internationally acclaimed author, he recently launched and actively contributes to [www.openinnovation.net](http://www.openinnovation.net), a portal where innovators meet for the latest news, research, discussions, and applications of open innovation.

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The remainder of our paper is organized as follows. After discussing value from the value-in-use and value-in-exchange perspectives, we offer definitions of value creation and value capture. The four value processes that emerge serve as the basis for future research opportunities.

## Conceptualizing Value Creation and Value Capture

### *Value*

In the strategy and marketing literature, the value of a market offering is ultimately determined by the customer, and is conceptualized as a customer's willingness to pay (e.g., Andersen and Narus, 1998; Brandenburger and Stuart, 1996) or the benefit the consumer experiences (Priem, 2007). This view has recently been developed in the strategy literature as the demand-side perspective of strategy (Priem, Li, and Carr, 2012). Accordingly, Anderson, Narus, and Van Rossum, 2006, p. 24) define value as “the worth in monetary terms of the technical, economic, service, and social benefits a customer receives in exchange for the price it pays for a market offering.” Similarly, Macdonald, Kleinaltenkamp, and Wilson (2016, p. 97) define value as “all customer-perceived consequences arising from a solution that facilitate or hinder achievement of the customer's goals.” Correspondingly, for multi-actor open-innovation settings, we define value as all actor-perceived consequences arising from the deployment of a resource in a process.

Notably, many contributions have highlighted the different dimensions and aspects of actor-perceived consequences beyond pure monetary evaluations (e.g., Lepak, Smith, and Taylor, 2007; Mizik and Jacobson, 2003; Ritter and Walter, 2012; Teece, 1986). Extensive prior research has identified the benefits that actors may derive from contributing to an open-innovation project (e.g., Harhoff, Henkel, and von Hippel, 2003; Lakhani and Wolf, 2005). These benefits can include intrinsic rewards (e.g., fun, enjoyment of intellectual challenges), prosocial rewards (e.g., identification with the project or the community, a sense of belonging, good citizenship, being part of something important), nonpecuniary extrinsic rewards (e.g., learning, reputation gains, acknowledgement/symbolic rewards, faster diffusion of ideas, signal of excellence), and pecuniary extrinsic rewards (e.g., monetary awards).

### *Value-in-Use Versus Value-in-Exchange*

A fundamental discussion in the value literature focuses on the point in time at which value is created. Two different points of time are considered (e.g., Eggert, Ulaga, Frow, and Payne, 2018): the time at which resources are used and the time at which resources are exchanged. Consequently, two value perspectives co-exist in the literature: value-in-use and value-in-exchange (e.g., Eggert et al., 2018). The value-in-use perspective views value as an outcome (e.g., a new product or service) of a process (e.g., contributing to an open-innovation project) that consumes resources (e.g., human resources). The applied (“used”) resources constitute the sacrifices and the achieved outcomes are the benefits. In terms of innovation, value is created through the processes of inventing, developing, producing, and delivering new market offerings that create turnover (e.g., Mizik and Jacobson, 2003; Lepak et al., 2007). The value-in-use perspective argues that value is bound to an actor applying resources in a process aimed at moving toward a valued goal.

The alternative perspective on value, value-in-exchange, regards value as encapsulated in the (exchanged) resources and, as such, a resource has a sacrifice (e.g., its purchasing costs) and an estimated benefit (related to the later utilization of the resource). Therefore, receivers define value based on their perceptions of the potential usefulness of the exchanged resource for addressing their needs (Bowman and Ambrosini, 2000).

Both perspectives are relevant and applicable to open innovation. Open innovation, defined as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and nonpecuniary mechanisms in line with the organization's business model” (Chesbrough and Bogers, 2014), is a multi-actor exchange process in which various actors exchange resources (e.g., ideas, knowledge, materials) that have potential value-in-use for other actors. In other words, an actor accesses resources through an open-innovation project (value-in-exchange). However, that actor must also be able to use those resources in subsequent processes to “unlock” the embedded value potential (value-in-use). Failure to gain access to resources or to effectively utilize them will leave an actor with a negative value. In that case,

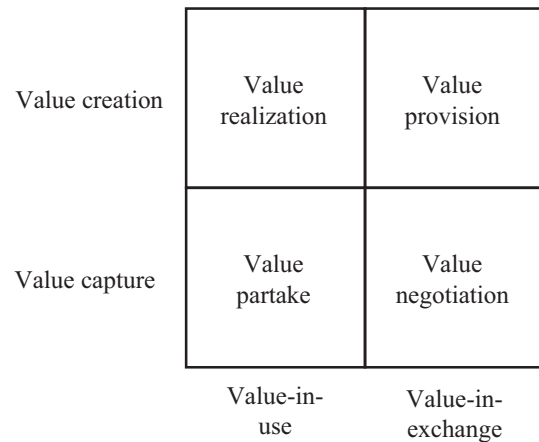
the actor is unlikely to engage in open innovation in the future.

In the innovation literature, these different perspectives coincide, as research on user innovation (e.g., Baldwin and von Hippel, 2011) implicitly focuses on value-in-use. In other words, concepts of user innovation consider the case in which the user is the innovating actor—value arises solely from use of resources in innovative ways. In contrast, research on open innovation (e.g., Chesbrough, 2006; West, Salter, Vonhaverbeke, and Chesbrough, 2014) implicitly assumes value-in-exchange. The distinction between value-in-use and value-in-exchange also relates to the inside-out branch of open innovation. Here one finds the special case of “squatters” or hoarders of intellectual property (e.g., “patent trolls”), who exchange the innovation but do not use it.

### *Value Creation Versus Value Capture*

Based on the definition of value, we can now define the processes that provide an actor with value. There is some consensus in the literature that there is a distinction between value creation and value capture (Jacobides et al., 2006; Lepak et al., 2007; Mizik and Jacobson, 2003). We define value creation as an actor's attempt to increase value. In other words, an actor is engaging in a resource-deployment process and the perceived benefits of that process outweigh the perceived sacrifices. With regard to the two value perspectives, value-in-exchange and value-in-use, two different reference points apply: while value-in-use focuses on the value that an actor creates through a use process for itself, the value-in-exchange perspective views value creation as a process of exchanging resources between actors. This leads to conceptual ambiguity in the use of the term value creation, as researchers often fail to specifically answer the value-for-whom question. Therefore, we suggest explicitly qualifying the type of value creation that is in focus: value realization or value provision (Figure 1).

A similar conceptual problem exists for value capture, which is defined as the process of securing financial or nonfinancial return from value creation. Value capture in the value-in-use perspective is a process of securing a share of the value created by another actor at the time of resource utilization. As such, value capture in this configuration is concerned about partaking in another actor's value creation. In contrast, in the value-in-exchange perspective, value



**Figure 1. Four Value Processes**

capture implies receiving resources in exchange for resources provided to another actor. Here, value capture is the process of negotiating reciprocal resource exchange at the time of an exchange.

### *Four Value Processes*

We construct a two-by-two matrix to consider the abovementioned conceptual differences. One dimension of our matrix considers how value is received. Value can be received directly through the innovating actor's use of the innovation (value-in-use), or through the exchange of knowledge with one or more other parties in return for compensation (value-in-exchange). The other dimension of our matrix reflects whether value is being created or captured.

The interactions of these two dimensions yield our matrix. We suggest four distinct terms to address the different interpretations and, thus, create conceptual clarity (Figure 1). In the following, we discuss the four quadrants in relation to open innovation.

Broadly speaking, the “free and user innovation” research often focuses on value creation and the value-in-use quadrant. Value creation in the value-in-use perspective is defined as the actual deployment of resources to achieve a goal. The receiver of the value is the actor performing the process. In this process, the value potential that is embedded in resources is realized. This process is highly idiosyncratic, and it can only be understood individually or on a user segment level. We term this the Value Realization quadrant.

Correspondingly, open-innovation research typically focuses on the value creation and



value-in-exchange quadrant. Value creation in the value-in-exchange perspective is defined as the provision of resources to an exchange partner who values the resource based on later potential use. While there is an intent to commercialize the exchanged resource at a later stage, the current exchange only offers a potential for later value realization. Therefore, we term this the Value Provision quadrant. We note that the resources exchanged in this quadrant may not yet have an identified use or an identified business model. As such, the valuation of those resources can be difficult and rather uncertain.

Value capture in the value-in-exchange perspective is defined as the process of negotiating access to and/or ownership over resources in return for the provision of value to an exchange partner. Based on the provision of resources, actors attempt to ensure suitable return in exchange—and these exchanges need to be negotiated. Therefore, we term this the Value Negotiation quadrant. This process has also been termed “appropriability” in the innovation literature, beginning with Teece (1986).

The final quadrant is the one in which value is captured through the value-in-use of the user. This means that the provider of the resource is dependent upon the user applying the resource and finding a mechanism for partaking in the other actor’s value creation. We term this the Value Partaking quadrant. With value partaking (value capture in the value-in-use perspective), the process of value capture involves appropriating a share of the value that another actor aims to realize. For a focal firm, this means monetizing the value realization of other actors. For the other actors, it means that someone else is leveraging their value realization for monetization purposes.

## Research Agenda: Value Creation and Value Capture in Open Innovation

The above discussion on value creation and value capture in open innovation, and the definition of four distinct yet interrelated value processes offer a foundation for a research agenda aimed at further developing our understanding of open innovation. After developing a capability-based research agenda, we re-visit the four processes and define potential research questions.

### *Open-Innovation Capability*

While substantial knowledge about open-innovation projects has been developed, our current understanding of a firm’s processes for participating in open-innovation projects is scattered and limited. The proposed four quadrants may serve as a foundation for organizing existing knowledge on processes that enable successful open innovations. The four quadrants may also serve as the basis for developing research on a firm’s open innovation capability, defined as processes that enable a firm to optimize value from open innovation. We propose that a focal firm needs to master all four processes in order to optimize its performance. A focal firm needs to provide resources to others and must use resources to realize its own value. It also needs to negotiate appropriate returns, to realize its own value (based on returns), and partake in later value creation by partners. We deliberately use the notion of optimization rather than maximization, as a focal firm needs to balance its own interests with partners’ interests in the open-innovation ecosystem.

We argue that an open-innovation capability is a dynamic capability, as it changes the resource base of the firm. A dynamic capability is a “firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano, and Shuen, 1997, p. 516) and “are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die” (Eisenhardt and Martin, 2000, p. 1107). The open-innovation capability supplements new product development and alliance management, which are regarded as dynamic capabilities (Schilke, 2014). Specifying open-innovation value processes, operationalizing and measuring those processes, and mapping them in organizations are challenging research opportunities.

### *Value Realization*

Value realization captures resource-application and resource-utilization processes. Such processes are outside the scope of many open-innovation studies because they occur after the open-innovation project investigated. However, if organizations fail to realize the value of the acquired resources, the derived value may be low or even negative. Therewith, failure

in value realization limits the application of open innovation in practice.

It is reasonable to assume differences in value realization between contributors. In this regard, we see high potential in researching the role of fairness in open innovation. Ample evidence and theorizing from the field of psychology indicate that actors *compare* their derived value with the value derived by other actors in the same system (Barclay, Bashshur, and Fortin, 2017). This comparison forms the basis of fairness perceptions, which have affective, cognitive, and behavioral consequences (Barclay et al., 2017). Actors who perceive that a given open-innovation project has resulted in “unfair” value realizations across contributors are likely to exit that project or refrain from engaging in future projects. Therefore, fairness is a fundamental concept when looking at open-innovation systems from a value perspective (e.g., Franke, Keinz, and Klausberger, 2013; Nambisan and Baron, 2010; Terwiesch and Xu, 2008).

When researching open-innovation systems, different forms of fairness may be distinguished (see Colquitt, Greenberg, and Zapata-Phelan, 2005, for a historical review on organizational justice). In open-innovation systems, transparency with respect to selection criteria, the development process, and the commercialization process are important (Franke et al., 2013), as are the provision of appropriate feedback to contributors and the management of disappointments (Piezunka and Dahlander, 2018). Anecdotal evidence suggests that failing to treat innovative users with respect and dignity can result in user-producer wars, as the resulting conflicts can quickly escalate and expand via social media (Gebauer, Fuller, and Pezzei, 2013).

Finally, researchers might investigate how instances of reversion from open to closed innovation (Appleyard and Chesbrough, 2017) affect perceptions of fairness in the community supporting the open project. Moreover, how does the community respond to reversion (for the project in particular and for the orchestrating firm in general)?

### *Value Provision*

Although value provision is a focus area in open-innovation research, it also warrants further study. In order to optimize the exchange of resources, many firms build platforms for community involvement in innovation processes. Here, promising research

questions include: How do technologies and artifacts need to be designed to enable optimal value provision by different users? How do platforms need to be designed to allow different users performing different roles to provide optimal value? What (new) organizational forms (e.g., collaborative communities) are best suited for accelerating value provision for a given technology (e.g., Fjeldstad, Snow, Miles, and Lettl, 2012)? How may the strategic behavior of contestants (e.g., sabotage or self-promotion) in crowdsourcing tournaments affect the value provision of the victims of such behavior?

### *Value Partaking*

One promising research avenue is to consider actors' self-selection processes for an open-innovation projects. Prior research on open innovation has mainly looked at actors who do participate in open-innovation activities, while it has largely ignored nonparticipants. Therefore, we know relatively little about those actors that choose not to participate. Actors may not participate in an open-innovation project if the anticipated benefits of participation are smaller than the anticipated sacrifices. This is particularly challenging for actors who have high opportunity costs when participating in open innovation. Such opportunity costs may stem, for example, from the high market value that such actors have due to their superior skills and knowledge in a given domain. Such actors can only be motivated when they see a realistic opportunity for value partaking (i.e., gaining benefits related to later value-in-use), which can make their value assessment positive. In order to address this aspect, research designs are needed that study the actors' participation decisions based on ex-ante considerations of value partaking as well as actors' ex-post behaviors.

Another promising research opportunity is to analyze the role of trust in value partaking. Even though there are many different definitions of trust in the literature, Rousseau, Sitkin, Burt, and Camerer (1998, p. 395) suggest that there is widespread consensus that “trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another.” Trust has been emphasized as a crucial construct in the open-innovation context (e.g., El-Ella, Bessant, and Pinkwart, 2014). It is essential in open-innovation systems, as it is impossible to cover all uncertainties

and risks in the exchange phase. However, trust is also important in the value-partaking process, as the partners have to trust each other to fulfill earlier commitments. As not everything can or should be controlled in open innovation, trust becomes crucial as a substitute for control (Rousseau et al., 1998).

The role of trust has been studied extensively in the context of interorganizational networks (Zhong, Su, Peng, and Yang, 2017). However, many manifestations of open innovation differ from the interorganizational networks studied in the extant research. Open innovation often involves collaboration among a large number of loosely coupled actors who rarely meet in person and often do not continue working together. Therefore, research that investigates the antecedents and consequences of trust and distrust in such settings is needed.

### *Value Negotiation*

With regard to value negotiation, we suggest the concept of selective revealing as a promising avenue for further research. For example, how do actors constrain their knowledge flows in order to achieve a favorable negotiation position? These issues are closely related to the paradox of openness (Laursen and Salter, 2014), as actors need to share knowledge in order to maximize the value created and they need to protect knowledge in order to be able to extract profit from it (Alexy, George, and Salter, 2013; Henkel, 2006; Henkel, Schöberl, and Alexy, 2014). Alexy et al. (2013, p. 272) define selective revealing “as the voluntary, purposeful, and irrevocable disclosure of specifically selected resources, usually knowledge based, which the firm could have otherwise kept proprietary, so that they become available to a large share or even all of the general public, including competitors.” In the absence of potential value conflict, actors can freely reveal their knowledge to each other. However, if there is uncertainty surrounding value conflict, actors may selectively reveal in order to keep important resources to themselves and to avoid becoming vulnerable.

According to Alexy et al. (2013), knowledge-based resources that a firm may selectively reveal can be problems or solutions. With respect to the selective revealing of problems for the purpose of spurring outside-in open innovation, research needs to examine how problems should be framed so that the “right” collaborators buy into a given project. The selective revealing of problems also implies that the

focal actor is unable to solve a particular problem in-house. Therefore, research should examine reputational effects in this regard and how an actor can avoid negative effects on its reputation from exposing weaknesses in internal problem-solving. In terms of the selective revealing of solutions for inside-out open innovation, research into how solutions should be presented in order to attract the “right” commercializing collaborators is needed. Moreover, examinations of the role of complementary assets as isolating mechanisms for value capture are required (Teece, 1986). For instance, under which conditions does the possession of complementary assets related to an innovative project make a focal firm more willing to selectively reveal solution-related knowledge? Under which conditions does the possession of such assets hinder such revelations?<sup>1</sup>

### **Conclusion**

While the ultimate goal of economic activities is generating value, the definitions of value creation and value capture have not been sufficiently clarified in the open-innovation literature. Rather, the focus has mainly been on the existence and operation of open-innovation systems. However, open innovation can only be maintained over time if value is generated for all involved either during the invention process or at a later point in time. As such, research that focuses on the four value processes is needed to further develop the open-innovation literature.

This paper makes three contributions. First, we draw from the strategy and marketing literature to discuss the definitions of value, value creation, and value capture. We arrive at four value processes which need to be understood and managed. Second, the four value processes presented here offer a platform for developing an understanding of open-innovation capability. Third, we highlight several avenues for future research.

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<sup>1</sup>The recent paper by Zobel, Balsmeier, and Chesbrough (2016) examines the impact of obtaining an initial patent on the subsequent collaborative behavior of U.S. firms in the solar-panel industry. While patents are sometimes viewed as inhibiting open sharing, these authors report that a patent provides a signal of the quality of that firm's technology and serves as an isolating mechanism for capturing some value from that technology.

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