Open Innovation: A Theory-Based View

Article · January 2020

DOI: 10.1561/111.00000011

2 authors:

Teppo Felin
University of Oxford
105 PUBLICATIONS **6,857** CITATIONS

SEE PROFILE

Todd R. Zenger
University of Utah
138 PUBLICATIONS **13,054** CITATIONS

SEE PROFILE

Strategic Management Review, 2020, 1: 223–232

Open Innovation: A Theory-Based View

Teppo Felin[1] and Todd R. Zenger[2*]

[1] *Saïd Business School, University of Oxford, Park End Street, Oxford, OX1 1HP, UK; teppo.felin@sbs.ox.ac.uk*
[2] *David Eccles School of Business, University of Utah, 1655 East Campus Drive, Salt Lake City, UT 84112-9349, USA; todd.zenger@utah.edu*

ABSTRACT

In this short essay we argue that open innovation requires a point of view—a firm-specific theory. In competitive environments, openness is not a free and obvious resource: openness can be costly and requires a theory of *what* a firm should uniquely be open to. Openness is most effective when firms are not merely scanning or filtering the environment, but rather when they know what they are looking *for*—a critical distinction. Thus we argue that the commonly used funnel or filtering metaphor of open innovation—where the firm seeks to be more and more open to the environment—is misleading and problematic. Instead, openness should be conceived of as a directed activity: an activity directed by the theories, hypotheses, and problems of the firm. To use a metaphor, rather than increase the aperture, lens size, breadth, and overall capacity to be open to and absorb external factors (information, ideas, products, solutions), we argue that the best outcomes from openness emerge from a more targeted search- or flashlight approach. We conclude with a discussion of future directions building on this agenda.

Keywords: Strategy; open innovation; cognition; theory for the firm; governance

Introduction

Innovation provides the central path to sustained value creation for many, if not most organizations. Innovation within organizations is often characterized as

*Thanks to the organizers (Janet Bercovitz and Henry Chesbrough) and participants of the Open Innovation conference at UC Berkeley for helpful comments and feedback.

ISSN 2688-2612; DOI 10.1561/111.00000011

constructing an effective funnel (Wheelwright and Clark, 1992). Organizations seek to access large numbers of initial ideas from varied sources, progressively filtering them, and then developing a few to completion. Because the quantity and quality of outputs are shaped by the quantity and quality of inputs, the prescription in the open innovation literature is to open the funnel to draw in a wide array of inputs from outside the organization's boundaries (Chesbrough, 2006; West and Bogers, 2014). The central premise is that knowledge outside the organization is far greater than the knowledge within the organization (Kogut, 2000), and that all efforts to externally broaden the reach are therefore worthwhile. In short, the more open a firm is, the more likely it is to see valuable opportunities, technologies, and recombine valuable insights into breakthrough products and innovation.

In this essay, we argue that the implied advice of open innovation's metaphor of a broad and porous funnel is problematic, incomplete, and misleading. We discuss three ways in which the funnel misleads scholarship and practice. We then offer an alternative prescription, arguing that open innovation—by any specific firm—is only as effective as the theory, problem frame, and point of view that guides openness.

Dysfunctions of The Open Funnel

Perhaps the most widely recognized slogan in the open innovation literature is the famous quip by Sun Microsystem's Bill Joy that "most of the smartest people work for someone else." In other words, far greater knowledge lies outside the organization than within, and thus this outside knowledge is the most important knowledge to access. While Joy's statement is certainly a healthy rebuke to any adherent of "not invented here," it hardly generates the conclusion that a broad and porous funnel is the optimal path to accessing vast reservoirs of outside knowledge. Three central problems arise with this simplistic prescription of an open funnel.

The first problem is its generality and non-specificity. The prescription is to open the funnel—open it to external ideas, knowledge, and people from many varied sources. The implicit argument is that the more open the funnel is, the better. By doing so, firms open themselves up to more varied external inputs and constituents, who possess valuable ideas and knowledge, including crowds, users, communities, alliance partners, and the like. The open funnel is said to ensure that firms encounter a larger range of potential inputs, which they then may utilize in developing new products and innovation. Openness is seen as precipitating novel collisions and valuable recombinations unavailable without reaching outside—essentially a panacea when more myopic, internal ideas run out.

The problem is that the guidance to be more and more open does not feature any form of firm-specifity about *what* the firm should be *open to*. An organization's environment, outside its boundaries, offers a near infinite expanse of potential knowledge and inputs that indeed could be absorbed and gathered through the funnel. There is no shortage of things to see, nor any shortage of possible inputs. But the advice to be open fails to acknowledge what is arguably the more central first step of deciding what to *look for*, that is, what to be open to and why. External ideas and knowledge do not come prepackaged in a form where firms somehow automatically recognize their values. The key to effectively filling the funnel through open innovation is not the simple choice to be open to outside ideas. Instead, sound guidance is needed for what to search and look for within the vast expanse of environmental possibilities. In short, we suggest firms need a theory of what they are about (Felin and Zenger, 2016), and what they are looking for, rather than merely hoping to elevate chance encounters (cf. von Hippel and von Krogh, 2016).

Second, the funnel analogy of open innovation fails to recognize and acknowledge that much of what lies outside the firm carries a price tag. What exists outside the firm explicitly or implicitly rests within markets or strategic factor markets (Barney, 1986). Open resources are often the result of the hard work and development of others outside the firm. And in a world filled with open innovators, all looking about with their broad funnels, others, including direct competitors, are also likely to recognize value in external knowledge to be found through R&D partnerships, patents, and other external sources. Access to these assets and resources will come at a (often high) price. Furthermore, search for valuable assets will itself involve costly investment (Lippman and Rumelt, 2003).

Open innovation research however—often implicitly—assumes that openness somehow reveals free resources. But outside ideas and knowledge come at a price: price not only in the sense of the purchase price, but also the price of further development. Again, there is a market for value-generating, open relationships, and ideas—just like there is a market for any asset. A potentially valuable opportunity to collaborate with a university (or a particular scientist) could be seen as a source of potential advantage. *But the more obvious the external opportunity, the more likely competitors and others are to also be aware of it.* Thus the resource may easily be exhausted of any residual value. And importantly, the "open" assets themselves (or the assets' owners) are likely to understand their value and will bargain and seek to secure the best deal or price for their use. Therefore, the critical questions are when and where openness can generate access to valuable resources, beyond the prices paid and the costs of search.

The third problem is a failure to recognize the importance of firm boundaries and the greater value that can frequently be generated through the non-open

option. Innovation performed within the boundaries of the firm still plays an essential role in fueling the modern economy. Closed forms of organization offer governance features that are difficult to access through open forms. In particular, closed forms of governance help develop shared language and trust that facilitate extensive, repeated knowledge sharing, co-specialized investment, and complex coordination. The reverse is also true. Open forms of innovation offer governance features that are poorly provided by closed forms. In particular, open forms of governance provide greater access to a diverse array of externally situated knowledge. Accordingly, those who manage innovation must skillfully match the attributes of the problems they seek to solve to the unique governance features that closed and open forms of innovation, respectively, offer (Felin and Zenger, 2014; Lakhani *et al.*, 2013).

Firm-Specific Point of View Toward Openness

Prior to making any decision about being open (or closed), firms, divisions, and product development teams need a point of view—a theory of value or a compelling problem frame—to guide what to look for and be open to (Felin and Zenger, 2017). We claim that it is this theory of value that unlocks open innovation, and that absent this the choice to be open is of rather limited consequence, and may even be detrimental. The effectiveness of open innovation efforts is a direct reflection of the quality of the theories and problem frames with which open innovation search is undertaken.

To illustrate, it was not Steve Jobs' decision to simply be open to external sources of technology at Xerox or elsewhere that fueled Apple's great success. Rather, it was his novel theory—the unique set of problems that he aimed to solve—that allowed Jobs to see value at Xerox that others could not readily see. Specifically, Steve Jobs sought to make the use of computers easy and intuitive, and with that problem frame he identified value in the graphical user interface and related technologies that Xerox possessed. In other words, it is through the lens of this problem framing and theory of value that Jobs sees value in open innovation. For the most part, other market actors at the time were not similarly attuned to this problem, but rather were focused on developing computer technologies for scientific and office settings—solving problems regarding speed and storage capacity. Thus, while anyone could in principle have been "open" to the technologies at Xerox (in fact, many companies and executives took contemporaneous tours of the Xerox Parc facility), it was Jobs and his team who recognized the value of some of these technologies, given his point of view and problem formulation around easy-to-use, personal computers.

Intriguingly, it is therefore the nexus of this theory-based view coupled with an open approach to innovation that "solves" the factor markets problem

inherent to the field of strategy (Barney, 1986). The factor markets logic says that external assets cannot yield above normal value or economic profits, as obvious sources of value will quickly be picked up by others (Leiblein, 2011). Furthermore, competition for these external factors will bid up the prices of assets, to the point where there remains no value to be gained from acquiring them (Denrell *et al.*, 2003).

Economic actors do in fact often overpay for assets and overestimate their abilities to generate value from knowledge they source in markets. But having a firm-specific point of view and theory introduces much-needed heterogeneity into factor markets. Theories introduce varied points of view about which assets might be valuable or underpriced, and reveal value in places not readily evident or obvious to others (Felin and Zenger, 2017). A unique, firm-specific theory helps firms see their external environments differently from others. Theories guide the search of economic actors toward specific solutions, helping them spot undervalued or even unpriced assets. Value from external knowledge and assets, identified with these theories, only becomes obvious to others ex post. But theories reveal bargains to those that hold them ex ante, and thereby allow for the heterogeneous performance that the field of strategy seeks to explain.

Put differently, the theories and problem frames that open innovators develop and bring with them as they shop for new knowledge, allow them to, in some sense, "hack" seemingly efficient markets, spotting value in specific assets and resources not seen by others. This also means that open innovation is not so much an activity focused on increasing the range and diversity of things one might be open to, but rather a far more targeted search for specific solutions to specific problems, or what might be termed *guided or targeted openness.*

Perception and Directed Search in Environments

Our argument here about theories guiding observation and awareness builds on specific insights about perception and cognition in complex environments. Existing theories of cognition in economics and even strategy are heavily focused on factors such as boundedness and bias (e.g., Kahneman, 2003; Powell *et al.*, 2011), building on a longer tradition of work in behavioral science (e.g., Simon, 1956). This work is strongly oriented toward perceptually cataloguing the environment and the problems and biases that hamper us from absorbing what is right in front of us (cf. Chater, 2018). Others focus on the role that heuristics play in judgment and decision making in economic and strategy settings (e.g., Artinger *et al.*, 2015; Bingham and Eisenhardt, 2011; Gigerenzer and Gaissmaier, 2011).

While these approaches are not without merit, from our perspective they do not offer a proactive, forward-looking and unique view of perception in

the context of uncertainty, novelty, and the creation of new value (Felin and Zenger, 2017). Both the biases and heuristics-oriented literatures build on a view of perception that is passive, in the sense that perception is merely seen as an accurate (or blind and biased) representation of existing visual scenes and environments, whether based on natural assessments (the nature of stimuli: Kahneman, 2003; cf. Simons and Chabris, 1999) or based on cues (Gigerenzer and Gaissmaier, 2011). This approach, at a high level, then builds on the faulty assumption that recording external inputs, and correcting errors, will lead to better representations. However, the very task of trying to fully capture external stimuli is doomed to fail, as cognition and perception instead is a directed, theory-driven activity. This parallels the open funnel problem in the open innovation literature, where no mechanism for targeted search is provided.

The cognitive sciences also offer alternatives which are more conducive to accounting for novelty (cf. Chater, 2018), and particularly useful for the context of strategy and innovation. The theory-based view builds on recent insights in cognitive science that argue that perception is driven by hypotheses and theories (Felin and Zenger, 2017). Rather than trying to catalogue our environments—thus implicitly suggesting that we automatically recognize what is valuable or relevant—perception is driven by organism- or organization-specific factors that guide awareness toward specific and unique things in any visual scene or environment. The problem is that any visual scene, just like any environment, is teeming with potential things that we might attend to (just like we might be open to any number of outside ideas and possibilities). Absorbing or cataloguing all of this information simply is not useful or desirable (nor possible). Rather, perception is a function of mind and organism-specific factors, thus offering a fundamentally different, mind-to-world rather than world-to-mind, conception of awareness. And this conception has important implications whether we are talking about organisms or organizations in their environments.

The central insight originates from biology where the perception of organisms is shown to be a function of a species-specific "Suchbild" (German for search or seek image: Uexküll, 2010). To illustrate, many species of frog do not see or recognize a stationary food source (locust or fly) sitting right under their noses. But as soon as the prey moves, the frog snaps and eats it. Humans similarly have specific search images—in the form of theories, questions, and problems—that guide their awareness and attention in the presence of any number of stimuli that might be present right in front of them (Chater, 2018). Thus perception and cognition is not about cataloguing, capturing, or absorbing what is in front of us, rather it is driven by the questions and theories that we impose on environments. The role of Suchbilds has also been recognized by philosophers and scientists who point to the importance (and even necessity) of theory in guiding observation. As noted by Einstein,

"whether you can observe a thing or not depends on the theory which you use" (Polanyi, 1974: 604). Karl Popper similarly argues that "observation comes after expectation and hypothesis." Thus there is no all-purpose, camera-like, or theory-independent way to attend to visual scenes or environments. Hypotheses and theories provide us a much-needed mechanism, in the presence of overwhelming stimuli, for directing our attention toward certain factors. Furthermore, as put by Popper, "we learn only from our hypotheses what kind of observations we ought to make: whereto we ought to direct our attention: wherein to take interest" (1967: 346). We believe that this type of endogeneity with regard to organism search and organism–environment interactions has significant implications for thinking about firms and their interactions with their environments.

Implications for Strategy and Innovation

In the context of strategy and open innovation, we argue that a firm's point of view or theory can serve a targeted, Suchbild-like function, guiding economic actors to look for and attend to *certain, specific* things in their environments. Search and openness necessarily needs to be guided in this way. Thus the theory-based view—briefly outlined above—can offer the open innovation literature a different metaphor. Instead of a wide-lens camera or a wide funnel, we propose that a search- or flashlight metaphor more aptly captures how firms can selectively attend to their environments, being open to ideas, knowledge, and products based on the theories and problems that guide their (open or closed) innovation activities.

We believe theories most often emanate from carefully formulated problems. In fact, Simon suggests there is a "continuing two-way interaction between the gradual construction of [a problem] representation and the construction of the theory that [uses] it" (Simon, 1956, p. 379). Furthermore, different types of problems—in terms of their attributes—provide guidance for which types of open (or closed) governance forms a firm should engage in. Some problems are complex, with vast hidden knowledge required to solve them. Other problems are rather simple, with easily identified knowledge required to solve them. Openness also comes in a wide range of flavors that encompass everything from alliances and contracts to user communities and contests. As we have argued elsewhere (Felin and Zenger, 2014), different problem types should be matched to differing approaches to open and closed innovation in a discriminating way. For instance, a simple problem with hidden sources of knowledge may benefit from a wide funnel approach to innovation enabled by a contest or an appeal to a user community. By contrast, a complex problem with known sources of relevant outside knowledge may benefit from developing a narrow set of alliances with known partners. In other words, the specific approach

to openness a firm adopts should reflect the attributes of the problems being solved and the theories associated with them.

Admittedly, the theories that firms compose and the problems they choose to formulate are not likely to be static. In fact, successful efforts to solve one problem may enable the acquisition of valuable resources that highlight particularly valuable new problems to take up and solve. For instance, Walt Disney's initial theory and problem formulation focused on generating animated films, which led to a novel animation resource around which Disney composed a new theory of value (Zenger, 2016). Armed with the sight-giving capacity of this theory—one that leverages a specific resource—Disney is able to identify value in external resource markets that others either do not recognize or simply cannot access.

Now, the arguments briefly sketched out in this paper build on relatively new strands of research, suggesting a number of opportunities for future work at the nexus of strategy and innovation. As we've highlighted earlier, there is a productive tension between the open innovation problem (what to be open to) and the factor markets problem (how to find unique value). This tension might be addressed by paying more careful attention to how firm-specific theories and problem-formulation impact the search activities and value creation of firms. Firm-specific theories can offer unique guidance to firms on what to be open to, or put differently, what to look for in their environments. Thus, we suggest the metaphor of an open funnel might yield to a more targeted flashlight approach to creating and identifying value. Where these metaphorical flashlights come from, and the potential links they might offer for understanding firm-specific theories and their interaction with problem solving, deserve further attention. Some related, early work has been done, broadly connected to this space. Camuffo *et al.* (2019) study the role that theories and hypothesis development play in the startup context. They find that a more targeted articulation of a firm's hypotheses about value can yield better outcomes for startups. In fact, premature "openness" (for example, in the form of seeking validation from external audiences, like users or customers) might be detrimental for creating value.

Far more research is needed on how firms specify what they are looking for in the first place, and how they generate unique value. As discussed earlier, innovation and novelty have largely been relegated to openness and the environment, or to customers. For example, the popular lean startup approach argues that firms should quickly engage with customers and learn from their feedback (for direct links between the lean startup and open innovation literatures, see Chesbrough, 2019: 86–102). Conceptually, the lean and related arguments are highly similar to extant literatures on organizational learning and feedback, though these linkages have scarcely been recognized (Contigiani and Levinthal, 2019). But the larger issue with these literatures is that they feature no specific mechanisms for how firms might create *unique* value, in the

presence of competitors who also might seek to learn from customers or be open to their environments (Felin *et al.*, 2019).

Overall our essay can be seen as a call for more discriminating and nuanced research on firm-level strategy and open innovation. We have argued that the general advice—implied by the open innovation literature—to "be open" lacks specificity and is also likely to be detrimental and costly for firms. We believe increased attention to firm-specific theories and associated search will yield more powerful models of both strategy and innovation. To be effective, open innovation needs to be selective and targeted. It is precisely this selectivity and targeted approach that allows firms to recognize and create value with dormant resources that others are unable to see. Openness therefore needs to be motivated by a search *for* something specific, as guided by a theory and problem. Firms particularly adept at open innovation are therefore not defined by the scope or radius of their funnels relative to the outside environment, but rather by the quality and novelty of the theories and problems that illuminate parts of this environment and reveal assets, knowledge, and solutions highly useful to the firm, and largely unrecognized by others. It is this theory-informed searchlight that illuminates much-needed heterogeneity in markets and enables valuable returns from investments in open innovation.

References

Artinger, F., M. Petersen, G. Gigerenzer, and J. Weibler. 2015. "Heuristics as Adaptive Decision Strategies in Management". *Journal of Organizational Behavior* 36(S1).

Barney, J. B. 1986. "Strategic Factor Markets: Expectations, Luck, and Business Strategy". *Management Science* 32(10): 1231–41.

Bingham, C. B. and K. M. Eisenhardt. 2011. "Rational Heuristics: The 'Simple Rules' That Strategists Learn from Process Experience". *Strategic Management Journal* 32(13): 1437–64.

Camuffo, A., A. Cordova, A. Gambardella, and C. Spina. 2019. "A Scientific Approach to Entrepreneurial Decision Making: Evidence from A Randomized Control Trial". *Management Science*.

Chater, N. *et al.* 2018. "Mind, Rationality, and Cognition: An Interdisciplinary Debate". *Psychonomic Bulletin and Review* 25: 793–826.

Chesbrough, H. W. 2006. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business Press.

Chesbrough, H. W. 2019. *Open Innovation Results: Going Beyond The Hype and Getting Down to Business*. Oxford University Press.

Contigiani, A. and D. A. Levinthal. 2019. "Situating the Construct of Lean Startup: Adjacent Conversations and Possible Future Directions". *Industrial and Corporate Change* 28(3): 551–6.

Denrell, J., C. Fang, and S. G. Winter. 2003. "The Economics of Strategic Opportunity". *Strategic Management Journal* 24(10): 977–90.

Felin, T., A. Gambardella, S. Stern, and T. Zenger. 2019. "Lean Startup and the Business Model: Experimentation Revisited". *Long Range Planning*.

Felin, T. and T. R. Zenger. 2014. "Closed or Open Innovation? Problem Solving and The Governance Choice". *Research Policy* 43(5): 914–25.

Felin, T. and T. R. Zenger. 2016. "Strategy, Problems, and Theory for The Firm". *Organization Science* 27(1): 222–31.

Felin, T. and T. R. Zenger. 2017. "The Theory-Based View: Economic Actors as Theorists". *Strategy Science* 2(4): 258–71.

Gigerenzer, G. and W. Gaissmaier. 2011. "Heuristic Decision Making". *Annual Review of Psychology* 62(1): 451–82.

Kahneman, D. 2003. "Maps of Bounded Rationality: Psychology for Behavioral Economics". *American Economic Review* 93(5): 1449–75.

Lakhani, K. R., H. Lifshitz-Assaf, and M. Tushman. 2013. "Open Innovation and Organizational Boundaries: Task Decomposition, Knowledge Distribution and the Locus of Innovation". *Handbook of Economic Organization: Integrating Economic and Organizational Theory*: 355–82.

Leiblein, M. 2011. "What Do Resource- and Capability-Based Theories Propose?" *Journal of Management* 37(4): 909–32.

Lippman, S. A. and R. P. Rumelt. 2003. "A Bargaining Perspective on Resource Advantage". *Strategic Management Journal* 24(11): 1069–86.

Polanyi, M. 1974. "Genius in Science". In: *Methodological and Historical Essays in the Natural and Social Sciences*. Ed. R.S. Cohen and M.W. Wartofsky. Springer: Dordrecht, 57–71.

Popper, K. R. 1967. *Objective Knowledge: An Evolutionary Approach*. Clarendon Press.

Powell, T. C., D. Lovallo, and C. R. Fox. 2011. "Behavioral Strategy". *Strategic Management Journal* 32(13): 1369–86.

Simon, H. 1956. "Rational Choice and The Structure of The Environment". *Psychological Review* 63: 129–38.

Simons, D. J. and C. F. Chabris. 1999. "Gorillas in Our Midst: Sustained Inattentional Blindness for Dynamic Events". *Perception* 28(9): 1059–74.

Uexküll, J. 2010. *A Foray into The World of Animals and Humans*. University of Minnesota Press.

West, J. and M. Bogers. 2014. "Leveraging External Sources of Innovation: A Review of Research on Open Innovation". *Journal of Product Innovation Management* 31(4): 814–31.

Wheelwright, S. C. and K. B. Clark. 1992. *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency, and Quality*. Simon and Schuster.

Zenger, T. R. 2016. *Beyond Competitive Advantage*. Harvard Business Review Press.