The Future of Open Innovation

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To cite this article: Henry Chesbrough (2017) The Future of Open Innovation, Research-Technology Management, 60:6, 29-35, DOI: 10.1080/08956308.2017.1373048

To link to this article: https://doi.org/10.1080/08956308.2017.1373048

Published online: 31 Oct 2017.

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IRI Medal Address

The future of open innovation will be more extensive, more collaborative, and more engaged with a wider variety of participants.

Henry Chesbrough

OVERVIEW: The future of open innovation will be more extensive, more collaborative, and more engaged with a wider variety of participants. It will extend beyond technology to business models, and it will embrace both product and service innovation. Just as no man is an island, no firm that restricts itself to the confines of its own R&D lab will survive in an open innovation world.

KEYWORDS: Open innovation, IRI Medal

My first book, Open Innovation, came out in April of 2003. I did a Google search on the term open innovation right after the book came out, and I got back a couple hundred links. I went through the links, to see what was going on in the space. In those 200 links, what came back were mostly press releases announcing a company’s opening of an innovation office in some location. Ten years later, I did the same search on the same search engine, and I got back more than 400 million links. In just a decade, the term had become widespread in its use, though not always with my intended meaning.

I want to discuss what I think open innovation has come to mean. I would also like to talk about some of the new directions that are developing in open innovation, and what they might mean for the future. I’ll end with some observations about business schools and some reflection on the role business schools should play in bridging the gap between academia and practice.

Defining Open Innovation

On the one hand, the rapid development of open innovation as a concept is phenomenal. On the other hand, it has created quite a bit of confusion and distortion. When there are 400 million articles on a topic, they won’t all use a term in exactly the same way. I have observed that many of the discussions seem to substitute a piece of the field for the whole. For some people, open innovation is just about crowdsourcing. That’s certainly a piece of it—crowdsourcing fits under the umbrella of open innovation—but there’s a lot more than crowdsourcing to open innovation. For others, open innovation is like open-source software, and there’s a piece of that in open innovation as well, but there’s still a lot more. Others think of open innovation as outsourcing R&D; there’s certainly a lot more to it than that.

So what is open innovation? Those of you who have followed my work know that my initial presentation used a funnel diagram. The idea was to take the traditional innovation process and open it up at all stages as an innovation flows from the laboratory to the market. There are two key flows to keep in mind: outside in and inside out. But there’s a second pathway that a lot of people tend to overlook—inside-out flows—and there’s value to be had there as well. We all start a lot more projects in our innovation portfolio than we actually finish. Traditionally, there has really been no path forward for the projects we discontinue. In my original work, I called these “false-negative projects”—projects that were not evaluated positively within the company’s innovation process, but

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DOI: 10.1080/08956308.2017.1373048
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I’ve been trying to clarify some of this in my own work. In our most recent book, *New Frontiers on Open Innovation*, my coauthors and I explicitly changed our definition to try to embrace this wider view.¹ We now 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.” For those of us who remember spillovers in economics, the concept is similar. Those were unintended flows of knowledge, however; in the open innovation model, we purposively harness flows across organizational boundaries. The business model governs how and where that happens.

**Open Services Innovation**

Services are becoming an increasingly important part of the business model for a lot of companies. For many companies, including our friends at Xerox, more and more corporate revenues are coming not from products, not from technologies—at least not directly—but rather from services that embody those products and technologies. We need to talk about open innovation in those contexts as well.

Michael Porter, in his 1985 book, *Competitive Advantage*, a tremendously important and influential work, offered as a central construct the value chain. The value chain is a tremendously useful idea. Like my funnel, it captures a flow from the input side to the output side, with some overhead organizations in between. But notice how services are interpreted in this model. In the value chain, they are the last thing we do before the product goes out to the market. Of course, this thinking has changed. One of the things we learned in the quality revolution is that you can’t inspect the product at the end of the process if you expect to achieve consistent high quality. You have to bring quality in early, to design it in from the beginning, to really get to high-quality, highly reliable products.

I once ran a services organization that thought about services in this old way. I was working at Quantum, which was a hard-drive company, back when that was a good industry to be in. The first product we shipped was a 10-megabyte hard disk drive that held 36 floppy disk drives—a lot of capacity at that time. Our job in services, our goal, was to get you to keep the product you bought, to not return it. If you did return it, we tried to fix it or we’d swap it; the reason we did that was so we could book gross margin from the product. That’s how we made our money—on gross margin. Even though we had a lot of people in our small services organization, we were a true cost center—zero revenue. We were thinking about services in the same way you see in Porter’s value chain.

Where is the customer in this value chain? The customer is offstage, at the receiving end of all of this. If you did a good job in your marketing, the customer gave you inputs

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at the beginning to help you get the specifications and requirements for what you were going to build. At the other end, the customer was out past the services step, beyond the end of the value chain. The value chain construct, in practice, puts the customer offstage. This is something that has to be revisited when we think about services innovation—or innovation at all, for that matter. I would suggest a construct to replace the value chain that looks more like a web (Figure 2). At the center of your work is trying to deliver a better customer experience; that's what everything that you're doing is about, and that requires a number of activities with the customer, in each of which you try to elicit the knowledge you need to do an effective job. You need to design moments of truth, or experience points, where you and the customer interact, to assure that the product or service you’re designing is, in fact, what the customer wants or needs. And not all of this goes on inside your own four walls. A lot of it sits outside the boundary of any particular firm, out in an ecosystem or a value network, with partners, complementary third parties, even investors.

This is a different way to think about services innovation, one that emphasizes its connection to open innovation. I suggest that you start by thinking about utility and jobs to be done. Engage in some inside-out thinking, considering the customer’s issues and needs. Focus on your customer’s experience. This opens up some interesting opportunities for open innovation.

I realize that I am not making an entirely new point here, but we need to reemphasize it. Peter Drucker, writing after *Competitive Advantage* came out, made a very useful point: he argued that when you buy a product you’re really not buying the product; you’re buying its utility, or what it does for you (Drucker 1993). These days, we use language like “jobs to be done,” but it goes all the way back to our introductory macroeconomics classes, where consumer preferences were captured in “utility functions.” Another way to think about this idea of a utility focus was offered by a colleague of Porter’s at Harvard, Ted Levitt (1960), who said that when you buy a quarter-inch drill bit, you’re really buying that quarter-inch hole in the wall. The hole in the wall is the utility; the drill is just the means to get there.

Taking the utility idea more seriously leads to some surprising—and surprisingly valuable—places. To take one example, consider your car. I drive my car about 12,000 miles a year; with a mix of city and highway driving, let’s say I average about 30 miles an hour. Simple math says I’m operating my vehicle about 400 hours a year. Note that I’ve paid 100 percent of the cost to acquire my vehicle; I pay 100 percent of the cost to insure it and to service it every year. In California, I have to pay a heck of a lot for parking. All these costs, with the exceptions of fuel and parking, are fixed. No matter how little or how much I use the car, I pay 100 percent of the cost to insure it and to service it every year. In California, I have to pay a heck of a lot for parking. All these costs, with the exceptions of fuel and parking, are fixed. No matter how little or how much I use the car, I pay 100 percent of the costs, and if I’m driving it 400 hours a year, I’m using it less than 5 percent of the time.

What if you could boost the utilization of that high-cost, fixed
asset and spread that cost over more activity? The car owner’s cost—my cost—would go down, and I would unlock a new source of revenue. This is what companies like Daimler and many others are doing. Daimler offers a car2go service, but there are a number of such services: Zipcar is another. You don’t need a reservation; you don’t have to pay a security deposit. You simply locate the car, present your credentials—in the form of some kind of card key or cellphone connection that the system recognizes—and the system gives you access to the vehicle. You can use the car for whatever you need it for. Once you’re done with the car, you leave it at a designated point in the city. The system knows when you’re out of the vehicle and makes it available for the next person to use. That same system keeps track of when the car needs servicing or fuel. The economics of these services are about boosting utilization by pooling access and thus reducing the need for high fixed-cost assets for individual consumers. Uber, Airbnb, and others are doing the same thing with other kinds of assets. In their case, they don’t even own the asset, which is even more clever; they enable others to increase utilization of their assets.

There’s another company that’s been incredibly innovative in thinking about services, both outside-in and inside-out—Amazon. Amazon is best known for its retailing operation; you can buy pretty much anything on Amazon. But Amazon doesn’t actually supply everything you can buy on its site. Rather, it has invited third-party sellers to use its website as a platform for their sales. It does this through its webstore for third-party merchants. The webstore gives these third-party sellers access to Amazon’s design tools and webpage templates, so their pages look just like the pages Amazon itself uses when they’re selling you things directly.

The webstore (and access to Amazon’s platform) are services that Amazon provides, but they also have a payoff for Amazon. Providing these tools for sellers ensures that consumers have a consistent user experience everywhere on the Amazon platform, no matter who they’re buying from. For consumers, this is true one-stop shopping. For Amazon (and its sellers), it creates a true virtuous cycle. Consumers learn to trust their experience of Amazon, so they buy more and more from Amazon. That growth makes selling on Amazon even more attractive for third-party merchants, who want to make sure their stuff is there because that’s where more and more people are going to shop.

This is not a new idea. We’ve known for more than 100 years that customers love having everything under one roof—think about those giant catalogues from Sears or Montgomery Ward. The new part here is that a lot of the merchandise you can buy from Amazon is from these third-party merchants. That’s new; we get one-stop shopping, but Amazon doesn’t have to own the inventory to provide it. It’s a much lighter-weight, asset-efficient way to do business. And Amazon can sell it as a service.

Amazon’s work with third-party sellers is outside-in—it brings other merchants in under the Amazon umbrella. Now, let’s talk about the inside-out part of Amazon’s model. The servers Amazon uses to manage its inbound traffic are also available to others. The company lets other people and companies rent space on its server infrastructure. What would Michael Porter have thought of this? When you’re thinking about keeping your competitors out and creating barriers to competitors, the idea of opening up your infrastructure to your competitors is kind of crazy, but it’s crazy like a fox. Those servers are fixed assets, like my car. Boosting their utilization and spreading the cost over more volume lowers the internal cost per unit of activity. Plus, there’s a little extra bonus when it comes to servers, because adding capacity is actually cheaper on a cost-per-megabyte basis; thanks to Moore’s Law, each new server is more energy-efficient and faster than the previous generation. So, as you add capacity, the capacity gets cheaper. And Amazon has taken outside-in openness even further, by publishing lots of APIs that allow third parties to embed Amazon access into their applications. It’s another way Amazon encourages others to build on its infrastructure.

The Dynamics of Openness

Scholars have taken extensive notice of open-source development methods, and scholars like Michael Porter have argued for proprietary development methods. Both take the view that, whether you are open or proprietary, these are once-and-for-all decisions. But there are a growing number of exceptions to this idea, where parties started in one domain and then chose to switch. This suggests that we need to examine the dynamics of when to remain open, or when to remain proprietary, and when to change.

A number of products have started in the closed domain but then opened up, either intentionally or unintentionally. IBM, for instance, wanted the IBM PC to be an IBM architecture, but by the time Microsoft and Intel were done, it was much more open than IBM had intended. The Mozilla browser and Cisco’s Open Daylight project are both being deliberately taken from the closed domain into the open domain. These companies are probably doing this to try to boost adoption, to create more generative activity around their platforms, which is one of the great values of being open. It seems counterintuitive that profit-seeking companies would voluntarily open up their architectures and their technologies for others to use, but that’s exactly what is happening.

What we haven’t thought as much about is things that started in the open domain but have been forked into a
proprietary activity. This, of course, runs a little bit counter to the narrative I have been telling, which is the story of things opening up, but, there are a number of projects that fit this description. I’ll single out Google and its apps for its Android mobile operating system, but there are others, too: projects that started in the open domain but didn’t stay there. At some point, the open project was abandoned and further iterations were developed internally. This is an interesting case to understand.

The question for companies is, when do you stay open, when do you shift from closed to open, and when do you actually close what you’re doing?

For Google, the challenge that is driving Android to be more closed is Apple. Apple’s more closed offering is very tightly integrated and, as a result, the user experience that Apple delivers is really outstanding. Google doesn’t have the same level of control in its open-source projects as Apple has with its architecture. Android developers can’t be sure which version of Android users are using. What the aspect ratio on the screen is, and what the user is actually going to see when they click on the various functions. It’s much more loosely coupled, in comparison with the tightly integrated iOS. This is one of the motivations for Google to close things more: they’re trying to create a better experience for the customer.

Just as opening up an architecture can increase adoption and virality, closing an architecture can increase control and improve integration. This suggests that openness is a strategy, not a religion. Companies need to become adept at using openness as part of their approach to the market and need to know when it works best and when a more closed approach might work better.

Open Innovation in the Public and Nonprofit Sectors

Open innovation is also moving from the for-profit sector into the public and nonprofit sectors. There’s even some work now on public policy to support open innovation. Last December in Barcelona, at the third World Open Innovation Conference, the head of the European Union’s Directorate for Science, Technology, and Innovation, Carlos Moedas, gave a talk. He sits on top of the Horizon 2020 funding projects, which include about €70 billion over eight years. He spoke about the “three opens” driving European science investment: open science, open innovation, and open to the world.

My last example of the different forms open innovation may take illustrates this evolution. It is the story of Mori, a rural village in the State of Andhra Pradesh in India, and it exemplifies two trends I see in open innovation: the increasing interest it is attracting in not-for-profit and government circles, and the move from bilateral cooperation—two companies working together—to innovation communities and ecosystems. This has also been an emphasis of the Open Innovation 2.0 movement in the European Commission.2

Cities have a lot of opportunities to incorporate technology and innovation to create better lives for their citizens. But smaller places, villages, are often left out of this wave of innovation. Cities like Barcelona or Amsterdam have many millions of euros to invest in technology solutions and experimental approaches. Mori village, in the state of Andhra Pradesh in India, on the other hand, has only about 8,000 residents and a little over 1,000 dwellings. Its primary economic activities are in agriculture and light industry. The village has an annual budget on the order of $6,000 for the whole village. We’re not going to be deploying a great deal of cutting-edge IT into that village through their IT budget. It’s going to have to come in some other way.

Open innovation can provide that way. My colleague Solomon Darwin and I hypothesized that we could build a bridge between Mori and corporations. The companies would participate—not as providers of charitable donations but as research and business development partners—to find out what rural villagers want and are willing to pay for. Then, once the companies figure out how to deliver solutions for those needs, they can scale those solutions to many other villages. The Mori village provides the initial proof of concept, and the companies have the potential for a profitable exit by extending their learnings from that village to hundreds and eventually thousands of other villages. That’s what we have been trying to build in this experiment.

We got several companies to invest in the project, some very large international companies and some Indian companies. They worked with the chief minister of the state, who was really the open innovator here, to develop projects for the village. Let me give you just one example of something that’s happened here, in the village’s farming industry. Farmers, of course, want better yields and lower effort and cost, as well as less loss to disease. One project sought to help farmers understand more clearly their crops’ needs for water, for pesticides, and for fertilizer, to optimize yields and minimize costs, by introducing a version of what’s called precision farming.

IBM’s Watson project provided some of the tools to address some of these opportunities. IBM gets some revenue from this project, but more importantly, the company gets the data on what works and what doesn’t. The data is at least as valuable to IBM as the money, because the data will help Watson to develop better algorithms for precision farming and approaches that can be scaled to other villages.

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The project has had real results for the village’s farmers, too. In the case of shrimp farming, margins have been increased from around 10 percent to about 35 percent. Other projects have allowed textile entrepreneurs in the village to develop products and take them directly to customers, avoiding the middlemen and brokers who take up a lot of the margin. Mori was not very well connected when we started; now villagers can go directly to markets with products like saris and scarves.

The Mori project has been such a success that it is being expanded to more than 300 villages in the state of Andhra Pradesh. That larger experiment is under way now; the goal, if the results in the 300 villages reflect what we saw in Mori, is to take it out to all 55,000 villages in the state in 2018. This is what I think the corporate partners are hoping for. For them, the experiment is a way to invest in business research to unlock a market that’s not really been open to them. It’s too early to claim success, but the path is there. And, again, this is not charity; it’s all based on trying to define the needs of villagers, identify what they’re able and willing to pay for, and then find ways to deliver products and services to the villages profitably and scalably.

Understanding Open Innovation
As the examples above demonstrate, open innovation goes well beyond crowdsourcing technology or products. If you get into the guts of it, you understand that it’s much more than that: it’s a different mindset, a focus on how you get the most out of the assets and knowledge you have and how you can benefit from the assets and knowledge others have. It’s a much more open, distributed mindset.

Even with all the research on open innovation, however, we don’t yet know enough about how it really works—or doesn’t work. The research documents a lot of individual success cases and some academic research with larger samples that shows that open innovation actually gets good results (see, for instance, Laursen and Salter 2006; Chesbrough and Brunswicker 2014). What we don’t yet have is a good understanding of the boundary conditions for open innovation. Under what conditions will it be successful? When might it not be successful? When does it fail? We need more failure cases, more stories and studies about when the stuff doesn’t work, to help us understand how to manage it effectively.

One boundary condition that I’m struck by in many of the examples I’ve documented is the role of leadership. For a lot of companies, the move to open innovation emerged out of some kind of crisis, a moment when the company realized that business as usual was no longer going to work. In that moment, these companies felt a need to try something different, and that impulse led to the adoption of some of these open approaches, often with great success. Some of those companies were celebrated as examples of effective open innovation.

But lately many of them—even Procter & Gamble, whose Connect+Develop program is often held up as a prime example of successful open innovation—seem to have lost their way, lost their mojo a little bit. Many of these companies have experienced turnover in top management and in the CEO role. Top management support seems to be a boundary condition for success, and even successful programs can falter with a change in leadership. This is just one example of a boundary condition, though. We really need to work to identify more of the conditions that lead to success, or failure, in open innovation.

Why Business Schools Should Be More Like Medical Schools
This gap in the open innovation literature speaks to a larger gap in our business schools today. The lack of clear studies about the boundary conditions necessary for open innovation to succeed suggests a failure in the feedback loop between research and practice. That gap is a function of the structure of business schools. Business schools today are largely run on the model of physics departments. If you look at how they’re structured, how they hire, how they promote, and what they recognize, the focus is on academic research. I’d argue that business schools need to be run more like medical schools.

Why medical schools? Because medical schools maintain a dual focus. They have excellent researchers who do very carefully designed academic research, which is very attentive to causality and proper research design; they do research at the cellular, the molecular, and the genetic level. But they also have a second group of people whose job it is to translate research breakthroughs into therapies that can help people. These are the clinical faculty.

The clinical faculty sit in the same facilities and read more or less the same journals and go to many of the same meetings as the research faculty. They interact and share information. But their work is focused on the real world, where the careful controls that were in place for the research are gone. They have a lot of knowledge about how to design effective tests and experiments and clinical trials in the real world and how to do these trials safely and well.

In business schools, we don’t really have those folks; we outsource the translational work, the clinical work, to the consulting profession. As a result, we don’t have the feedback loop from the clinical world telling us when the research we’re doing is failing to translate well into better outcomes. And maybe, more fundamentally, when we don’t have good feedback loops from the world of practice back to the theoretical work of academia, the research that gets done is taken in directions that may be less and less connected to real problems.
I will take as an example the work of Michael Jensen in promoting stronger incentives for executives. Jensen, in an article called “The Eclipse of the Public Corporation” (1989), argued that the public corporation as we know it is on its way out because managers aren’t getting paid enough relative to the value that they contribute to companies. What was needed, Jensen argued, were new systems to create more incentive intensity, to reward managers when they were doing a good job and to take away those rewards when they were not doing a good job.

When these ideas were translated into practice, a lot of boards of directors and compensation committees issued lots and lots of stock options. Unfortunately, there is not a lot of evidence that the economy and public corporations are much better off for this shift. It is, however, undeniable that the gap between the average workers’ wages and the incentives of top management has gone through the roof. Jensen is not solely responsible for this, of course, but his ideas, once translated, were expanded, and they have been a powerful influence. This divergence between the theory about incentives and the evidence indicates to me that we need some feedback loop on the theory about how to reward managers for doing well.

IRI is an organization that has thought a lot about bridging this gap, and it does a lot of things to try to keep research more connected to the needs of companies. I’m thinking in particular of the Research-on-Research committees that IRI has sponsored over the years, which create the opportunity for academics and industry to work together to tighten the feedback loop. We need more of that, which is one reason I’ve organized the World Open Innovation Conference. Half of our attendees come from academia and half come from industry. Over a two-day period, we try to mix these two groups together—to get the academics more closely aligned with what’s going on in industry and the industry people more aware of some of the things that are coming out of academia that might be useful to them in the future.

Conclusion
In closing, let me thank the IRI for its recognition of my work in industrial innovation. It encourages me to keep going, to stay engaged with thoughtful managers who are trying to achieve greater success with their innovation activities. It similarly prompts me to continue the intellectual conversation with my academic colleagues, to confront theory with practice, and look for deeper patterns that can point the way forward. I hope to keep in touch with many of you, whether that be through future IRI meetings or at other academic or industry gatherings. Together, let’s work to improve that feedback loop between theory and practice with regards to innovation. Thank you!

References

See http://woic.corporateinnovation.berkeley.edu/.