Tackling Societal Challenges with Open Innovation

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SUMMARY

Open innovation includes external knowledge sources and paths to market as complements to internal innovation processes. Open innovation has to date been driven largely by business objectives, but the imperative of social challenges has turned attention to the broader set of goals to which open innovation is relevant. This introduction discusses how open innovation can be deployed to address societal challenges—as well as the trade-offs and tensions that arise as a result. Against this background we introduce the articles published in this Special Section, which were originally presented at the sixth Annual World Open Innovation Conference.

KEYWORDS: open innovation, innovation, green business, social innovation, collaborative innovation

This introduction argues that ideas, concepts, theory, and practice on open innovation that were developed primarily for business are deeply relevant to address the grand challenges of social impact that now loom as the most important management problems of this century. Our perspective was developed during the sixth Annual World Open Innovation Conference (WOIC) held in Rome, Italy, in December 2019. The theme of the conference was "Opening up for Managing Business and Societal Challenges." Three papers from the conference constitute this Special Section on how open innovation can address both business and societal challenges

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simultaneously.[1] One of the authors of this introduction, Anita McGahan, delivered the keynote academic address to the conference in which she challenged scholars and practitioners to link their work on open innovation to broader societal challenges. We reiterate that call to action in this introductory essay.

The relevance of open innovation to meet societal needs has become painfully relevant as the coronavirus disease 2019 (COVID-19) pandemic swept the world only a few months later. When confronted with such developments, as open innovation scholars, we wonder: How might open innovation accelerate the coordination of business and other activities in the face of societal challenges? What can open innovation add to the conversation about the deployment of business capabilities, resources, and ideas in pursuit of the public interest? The bar is high, as critics and advocates have pointed to the challenges for corporations as pressure on profitability intensifies, and as the survival of organizations is threatened. Corporate managers must meet the needs of investors, employees, customers, suppliers, and communities—all while considering profoundly intractable challenges such as the pandemic, and other grand challenges such as climate change, poverty alleviation, trade wars, and nationalism. At the same time, leaders in non-governmental and governmental organizations strive to fulfill extended mandates with fewer resources.

In the remainder of this introduction, we point to several important ideas about open innovation in the context of societal challenges. We argue that business practitioners would be wise to focus their organizations toward pressing problems, not only in the interests of the sustainability of life on the planet, but also to enhance their own growth potential. We conclude by introducing the three special section articles and their main findings.

A Very Brief History of the Concept of Open Innovation

The original conceptualization of open innovation developed by Chesbrough in 2003[2] emphasized openness in companies as an alternative to vertical integration. The idea, which was radical at a time in which proprietary intellectual property (IP) rights were sacrosanct, emphasized that companies benefited by bringing in ideas from outside the organization's boundaries and, controversially, from disseminating ideas outside those boundaries. Vertical integration implied that a monopoly (the internal R&D division) would sell to a monopsony (the internal business unit). Openness introduces competition between these actors, as internal R&D is supplemented with external sources of knowledge, and external paths to market contend with the internal business units for the most valuable uses of the new knowledge. At its root, openness invites generativity, the emergent process to discover and deploy new combinations of knowledge, because "not all the smart people work for you."[3] Following Chesbrough and Bogers, "open innovation refers to a distributed innovation model that involves purposively managed inflows and outflows of knowledge across organizational boundaries, for pecuniary and non-pecuniary reasons, in line with the organization's business model."[4]

One of the most striking features of this definition is that the purpose of openness could be non-pecuniary. In other words, organizations might pursue open innovation not only because it benefited the firm financially, but also because it created opportunities that cannot be quantified financially at least in the short run.[5] This idea will be central to the argument we make about the importance of open innovation to address societal challenges.

After the publication of Chesbrough in 2003, paper after paper emerged developing the idea of open innovation and its implications for how companies operate most effectively.[6] Scholars studied the integration of ideas from suppliers and users as an alternative to vertical integration.[7] Organizations of all types (i.e., not only corporations) pursued the idea of open innovation.[8] Scholars sought to study neighborhoods and ecosystems of innovation collaborators that competed not with each other but with companies in alternative neighborhoods.[9] The duality in direction across organizational boundaries of ideas became a central topic in the field.[10] Partnerships and alliances within innovation ecosystems burgeoned as a topic of both research and practice.[11] It is hard to get a coffee in Silicon Valley now without hearing questions about whether you are in the Facebook, Apple, or Google ecosystem.

This growing body of work has generated important insights. Chief among them is the idea that open innovation is compelling scientifically and in practice. Interdependencies arise across and among actors in innovation ecosystems that are central to their success in totality as well as consequential for individual organizations actors within them. Much of the action arises from who is in and who is out of an ecosystem. The visible, formal structure of an organization may have little to do with how innovative ideas and practices traverse its boundaries. And organizational governance over decision-making and commitments matters to successful orchestration of systems of open innovation.[12]

Where We Are Now

As ideas about open innovation have evolved, so has its complexity. A number of paradoxes have arisen as a result. We have learned that open innovation is about both the process of innovation, such as in open-source software development,[13] and the outcomes of the process, such as when pharmaceutical companies commercialize drugs that are sourced from outside organizational boundaries.[14] Open innovation is about invention and commercialization; it is definitive and emergent; and it is both endogenously relationship-based and systemic. Above all, the concept of open innovation is theoretically nuanced and no longer exclusively the province of individual corporations. The idea of openness challenges us to think beyond conventional boundaries.

We now know that openness is profoundly social. Openness is a matter of degree rather than an on-off switch.[15] Barriers to openness arise backwards and forwards in the commercialization chain[16] and are associated with variation across actors in education, scientific rights, access, privilege, and infrastructure, inter alia.

Openness involves both collaboration and competition among partners that may be motivated by much more than only pecuniary returns.[17] The terms of openness may change and evolve over time as partners gain experience in sharing knowledge across boundaries. At the core, open innovation depends on relationships among actors who are asymmetric in ways that make the collaboration fruitful, but that also introduce competition, power, communication, and coordination challenges.[18] "Open" does not mean a level playing field.

So what are the most compelling reasons for sharing knowledge across organizational boundaries today? We are at the end of an era in which industrial ideas about productivity dominated conceptions of openness and innovation. During this era, the anchoring alternative to openness in innovation was vertical integration by large corporations seeking to keep important ideas, techniques, and knowledge proprietary. The evolution of concepts of open innovation over the past 20 years has been grounded in an approach to knowledge production that is primarily industrial—in which knowledge emerges through resource-intensive processes that are codifiable and parallel across projects, companies, and even industries.

This is changing fundamentally in two main ways. The first is that the industrial systems in which innovation has been embedded have generated terrifying social outcomes. Modern business systems have generated unacceptable levels of job insecurity and distributional inequality, both of which have been complicit in persistent poverty and migration crises around the world. Energy and transportation technologies have boosted economic activity for over a century, but have over time caused much harm to the environment. The pandemic, climate crisis, authoritarianism, and loss of privacy and security that characterize our era all emerge from industrialism at least in part—and often in great part. We need new ways of thinking to overcome these global challenges. We need to innovate innovation.

The second fundamental change creating a mandate for new ways of thinking about innovation arises from technical breakthroughs that we often categorize as artificial intelligence, machine learning, big data, and advanced analytics (hereafter we call the innovations in these domains collectively "artificial intelligence" or "AI"). Early achievements in the application of AI have enhanced the efficiency of many established industrial systems and which have often exacerbated global challenges. Consider, for example, the untenably dramatic growth in two major Pacific garbage patches, one more than twice the size of the U.S. state of Texas or three times the size of France. Much of this garbage is the detritus of consumer-packaged goods and industrial waste that was dumped into the ocean to save money. Instead of making those goods cheaper and marketing their consumption, AI could be deployed to direct the waste creatively and productively for recycling. Even more importantly, it could be used to redesign the way those goods are manufactured to prevent wasteful packaging in the first place—not to mention redirecting consumer attention away from sickening stuff and toward healthier options. Implementing AI without system change carries the potential to amp up

the efficiency of industrial systems that are generating unacceptable social outcomes. And yet, with effective governance and system change, AI and other breakthrough technologies can improve social outcomes at their core. The challenge for open innovation scholars is in discerning how to integrate a vision for massively scaled system change into our thinking to answer the question: How can business and social outcomes be radically improved fast enough to respond to the pandemic, climate emergency, and other grand challenges?

Open Innovation and System Change that Aligns Business and Social Outcomes

To make progress on the ambitious agenda of aligning business with the grand challenges that are shaping societies, our conceptualization of open innovation must be considered in this light and as such applied to system-level change. The research community is on the precipice of this shift in perspective. Even the definition by Chesbrough and Bogers[19] points a way forward: We must think about *purposive* management that *distributes* capacities for exchanging knowledge across organizational boundaries, and this must occur for reasons that are *not only financial*. Indeed, as the pandemic has made frighteningly clear, the survival of both people and organizations is at stake now.

How do we reconceptualize purpose? The United Nations' 17 Sustainable Development Goals (SDGs) constitute a well-vetted, deeply investigated, and widely used roadmap for organizational purpose not just over the next decade but for the next half-century. True value creation by organizations must be aligned with one or more of the SDGs, which include economic achievements (e.g., SDG 1 is "No poverty" and SDG 8 is "Good jobs and economic growth"), social-justice goals (e.g., SDG 5 is "Gender equality" and SDG 10 is "Reduced inequalities"), environmental responsibility (e.g., SDG 13 is "Protect the planet," SDG 7 is "Clean energy," and SDG 6 is "Clean water and sanitation), institutional development (e.g., SDG 3 is "Good health," SDG 4 is "Quality education," and SDG 11 is "Sustainable cities and communities"), and governance improvements (e.g., SDG 16 is "Peace and justice"). The 17 goals are each bolstered by detailed subgoals and specific, measurable targets for their achievement, all of which are available on the United Nations website.[20] As global challenges press upon us, the allocation of resources by organizations must be aligned with the SDGs for the organization to sustain stakeholder engagement and legitimacy.

There is another opportunity embedded in the SDGs, namely the ability to unlock new sources of growth for organizations. Moving from closed supply chains to circular economy webs, for example, creates many new areas for investment and profit. The American apparel company Patagonia is a case in point, focusing on fair trade, long-lasting apparel, and offering free repairs to keep customers away from replacing what they own until it is really needed. This focus on prolonging product lifetimes and reducing consumption is completely opposite to short-term profit-seeking and societally harmful business tactics such as planned

obsolescence. Nevertheless, Patagonia is a quickly growing and profitable company, with a very valuable brand. Greater sustainability turns out to be an effective investment strategy, as billions of dollars of capital are now being directed at so-called ESG (environmental, social, and governance) investments, expecting both financial returns and long-term positive impact on society. Ding et al.'s latest research even shows that ESG companies have maintained higher market value during the pandemic.[21] We believe that the search for growth coming out of the pandemic will lead many companies to examine how they might orchestrate one or more SDG initiatives in order to kindle new drivers of growth.

However, there are trade-offs that must be addressed in this process. Organizations that seek to create value aligned with social purpose must confront and resolve the trade-offs embedded in the SDGs.[22] These trade-offs are vast and deeply intractable, as President Emmanuel Macron quickly learned after he implemented a 12 cents per liter tax on petrol in France to reduce carbon emissions in the country, an action aligned with SDG 13 ("Protect the planet"). However, the ensuing yellow-vest protests demonstrated that this action was not aligned with SDG 10 ("Reduced inequalities") or SDG 8 ("Decent work and economic growth"). And the violence that erupted in the streets of Paris was out of step with SDG 16 ("Peace and Justice"). Trade-offs arise among many other of the goals as well, as we have discussed elsewhere[23]: economic growth is not always aligned with reduced consumption; investing in infrastructure[24] is not always aligned with sustainable cities; reducing inequalities is not always aligned with good jobs. Reducing these trade-offs must become part of the innovation agenda that organizations pursue to be relevant, justified, legitimate, and value-creating.

Open Innovation as a Source of and Solution to Tensions and Trade-offs

A relevant question at this point is to what extent open innovation can help to reduce these trade-offs, considering that open innovation itself is a source of a number of tensions and trade-offs.[25] On the firm level, open innovation may lead to a tension between sharing knowledge with partners while simultaneously protecting it from leaking widely.[26] Open innovation may also lead to a trade-off between keeping the control over the innovation processes and letting go of the control to allow others to define problems and solutions.[27] Sometimes, open innovation may involve competitors, creating a tension between collaboration and competition.[28] On the individual level, open innovation may create tensions related to not-invented-here and not-shared-here attitudes, possibly stifling both internal innovation processes and open innovation.[29] In more general terms, open innovation is commonly related to tensions between value creation and value capture.[30]

But it is not all bad news. While identifying some challenging tensions, the research on open innovation also tells us that when done right, open innovation can combine and integrate seemingly opposing goals, such as knowledge sharing

and protection. For example, IP rights and contracts can be used both to keep proprietary technologies safely protected within the boundaries of an integrated firm *and* to govern the collaboration and knowledge exchange across large ecosystems of actors trying to jointly address complex challenges.[31] Modular technology architectures can combine open innovation with proprietary innovation, such as the combination of open-source software and proprietary hardware.[32] Organizational setups involving separation and/or integration can mitigate tensions between competition and collaboration,[33] and behavioral approaches can complement all of these.[34] If properly managed, the inherent tensions related to open innovation can be mitigated, and open innovation can be a powerful, and necessary, tool to address the grand challenges, and the related trade-offs.

There is now ample evidence that organizations often turn to open innovation when trying to tackle grand challenges. For example, when Daimler and Volvo, two of the leading actors in the automotive industry, wanted to tackle the climate crisis and develop sustainable options to diesel combustion engines in heavy-duty vehicles, they decided to form a joint venture for fuel cell technology development, despite the fact that they considered each other main rivals. They did so in order to share the investment burden and to speed up the development.[35]

But despite the urgency of the climate crisis, it was not until the COVID-19 pandemic swept the world that we saw how a sense of urgency can truly fuel open innovation. Through initiatives like the Open Covid Pledge firms started to offer free licenses to their IP for the purpose of fighting the pandemic.[36] New and unforeseen collaborations across both organization and industry boundaries started to emerge, such as the ones between Ford, GE Healthcare, and 3M.[37] When challenges are grand, complex, and urgent, open innovation turns out to be necessary.

Open Innovation and Stakeholder Theory

Opening innovation to reduce trade-offs between the SDGs requires rethinking the purpose of organizations from fundamentals. Stakeholders across every sector in society—including large multinational corporations, small entrepreneurial organizations, state-owned enterprises, proprietorships, investment firms, hedge funds, currency funds, national governments, international agencies, state governments, cities, non-governmental organizations, religious organizations, educational institutions, and all others—must take stock of the resources and capabilities they have, and of how those resources and capabilities can be deployed to break trade-offs in the SDGs to address global challenges. Organizations are only tools for getting things done.[38] The objective of innovation should be to create value for society and to assure a sustainable distribution of that value across contributors to its creation—not the perpetuation of organizations that do not create value. The first step is to re-think which organizations are best suited to break critical trade-offs in the interests of creating social value,

and how those organizations can get access to the resources and capabilities necessary to accomplish the innovation.

Such conceptualization of open innovation makes the organization's relevance to the project part of the innovation agenda. The stakes are raised on entry into an innovation ecosystem: Organizations and other actors that are admitted into the innovation project must be committed to overcoming trade-offs in relevant SDGs through creative and generative deployment of resources and capabilities. An organization's claim on the value that is created is an artifact of its contribution to value creation rather than the other way around.

This way of thinking about open innovation—which we argue is centrally important for researchers and practitioners in this century—is highly aligned with new ways of thinking about stakeholder theory.[39] The argument in this theory is that stakeholders with valuable resources and capabilities must find organizational arrangements that make their collaboration maximally effective. Often this collaboration occurs across organizational boundaries, but it also may occur within organizations. Primacy is placed on enabling joint value creation by enabling and encouraging co-specialization and by enhancing knowledge exchange. The goal is not whether the organizations themselves survive, but rather whether value is created in the face of a compellingly important global challenge. The profits follow when the achievements are significant. But what is most important—most motivating—is collaboration among critical actors to get important things done. This approach involves openness on steroids.

This conceptualization has implications for issues such as leadership and inclusion. Scholars who pursue an open innovation agenda tuned to the grand challenges of this century must confront questions about how joint goals are established and how conflicts among contributors are resolved. Progress on these fronts was already visible at the 2019 WOIC in Rome. A session on moonshots, for example, dealt with the achievement of complex, long-term breakthroughs on wicked problems. And a different session on resolving stakeholder claims on value shed light on approaches for sustaining engagement of critical but disenfranchised parties with important knowledge relevant in an ecosystem.

About the Special Section

This Special Section of the *California Management Review* includes three articles on open innovation: Ward Ooms and Roel Piepenbrink, "Open Innovation for Wicked Problems: Using Proximity to Overcome Barriers"; Krithika Randhawa, Joel West, Katrina Skellern, and Emmanuel Josserand, "Evolving a Value Chain to an Open Innovation Ecosystem: Cognitive Engagement of Stakeholders"; Thuy Seran and Sea Matilda Bez, "Open Innovation's 'Multiunit Back-End Problem': How Corporations Can Overcome Business Unit Rivalry."

Much like the theme of this introduction, these special section articles highlight the important role open innovation can play to tackle societal and business challenges, but they also identify a number of problems that need to be

managed. For that purpose, they provide advice, frameworks, and guidelines that will help managers overcome the tensions and barriers of open innovation and better address the societal and business challenges before them.

To start with, Ooms and Piepenbrink[40] focuses on wicked problems—problems of extraordinarily complex and uncertain nature—such as societal challenges. Based on empirical cases involving healthcare service innovations, Ooms and Piepenbrink[40] develops a proximity framework with managerial remedies to open innovation barriers in complex problems.

Randhawa et al.[41] address complex challenges in the healthcare sector, and specifically a case of three-dimensional (3D)-printed medical implants. Moving from mass production to mass customization requires a business model change that involves multiple stakeholders throughout an ecosystem. Transforming an established ecosystem is a challenge in its own right. The authors provide a process framework for overcoming cognitive constraints in an ecosystem, and especially focus on the role of cognitive artifacts in working through these constraints.

Finally, Seran and Bez[42] identify and conceptualize the "multiunit backend problem" of open innovation and provide some solutions to it. This problem relates to the fact that, even when having a clear ambition to engage in open innovation with external actors, firms may struggle with misalignment in the internal organization involving rival business units. As the authors show, collaboration with outsiders may be severely inhibited when collaboration between insiders fails. Thus, a certain level of internal openness may be required in order to achieve positive results with external openness.

Taken together, these articles demonstrate both the promise and the challenge of orchestrating knowledge flows across organizational boundaries in the face of difficult problems and interdependent actors. Each of the articles is ultimately optimistic, acknowledging the significant challenges that inter-organizational collaboration involves, yet demonstrating actual examples of improved business outcomes that can result from this collaboration. As we lift our gaze to even more daunting societal problems, the lessons from these effective examples will help us move forward.

Conclusion

Gatherings such as the WOIC are a testament to the fact that inter-organizational collaborations have become an increasingly important part of innovation. Yet we cannot stop here. As we have argued in this article, open innovation can provide a framework for addressing some of the societal challenges that we face in this century—whether issues as sustainability, mobility, or health, or even the recent COVID-19 pandemic. Open innovation also aligns well with the growing stakeholder theory of the firm, and it mobilizes knowledge from these different entities toward useful and sometimes non-pecuniary objectives.

Realizing this potential requires that much more action among scholars and practitioners of open innovation. We hope that this article and the rest of the special section contribute to a new movement in which the open innovation community brings its best resources, capabilities, tools, insights, and knowledge to the most important problems of our time. It is crucial that we refocus away from sustaining the profitability and survival of organizations that contribute to the climate crises, inequalities, poverty, and disease. Researchers in business schools and other disciplines must become part of a new system in which we contribute to resolving the world's most pressing problems.

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Notes

1. In earlier special sections/issues related to World Open Innovation Conference (WOIC), we addressed related issues, such as a dynamic capabilities perspective on open innovation, the link between open innovation research, practices, and policies, and the role of open innovation in the digital age. See Marcel Bogers, Henry Chesbrough, and Carlos Moedas, "Open Innovation: Research, Practices, and Policies," *California Management Review*, 60/2 (Winter 2018): 5-16; Marcel Bogers, Henry Chesbrough, Sohvi Heaton, and David J. Teece, "Strategic Management of Open Innovation: A Dynamic Capabilities Perspective," *California Management Review*, 62/1 (Fall 2019): 77-94; Ellen Enkel, Marcel Bogers, and Henry Chesbrough, "Exploring Open Innovation in the Digital Age: A Maturity Model and Future Research Directions," *R&D Management*, 50/1 (January 2020): 161-168.
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