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Creation nets: Getting the most from open innovation

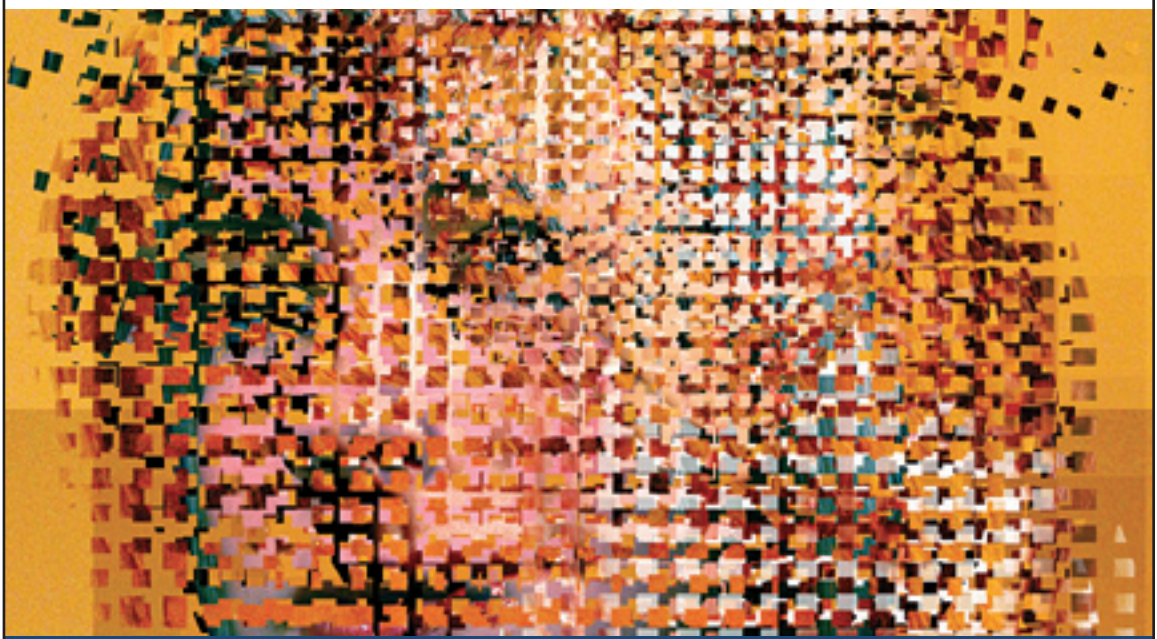
Article at a glance

Most executives are by now familiar with open innovation: the idea that companies, by looking outside their own boundaries, can gain better access to ideas, knowledge, and technology than they would have if they relied solely on their own resources.

Despite the attractions of open innovation—and its successes in areas such as open-source software development—few companies believe that they know the best way of creating value with the open model of innovation.

Companies must go to the peripheries of today's commercial and scientific endeavors, where hundreds and even thousands of collaborators from diverse institutional settings are participating in innovative "networks of creation."

Managers can use the principles and mechanisms of "creation nets" to profit from open innovation and to create more value than would be possible with the closed model of innovation.



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Creation nets: Getting the most from open innovation

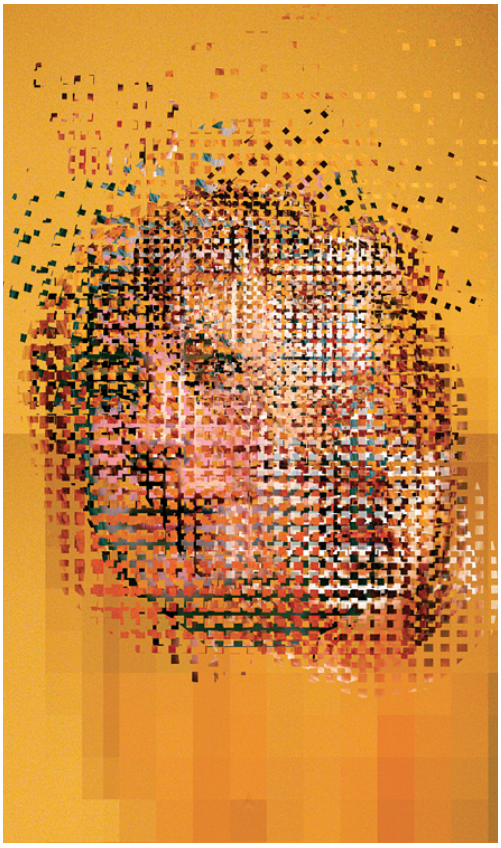
A typical large company can no longer rely solely on its own resources. Creation networks are a promising way to move beyond them.

John Seely Brown and John Hagel III

Thanks to the many books on open innovation[1] and to the prominence of open-source software projects such as Linux, most executives have at least a passing familiarity with the subject. Its central idea is that when companies look outside their own boundaries, they can gain better access to ideas, knowledge, and technology than they would have if they relied solely on their own resources.

Some executives may even be familiar with the many variants of open innovation, a number of which stray a considerable distance from traditional "closed" models of innovation management. Despite the familiarity of these ideas, persistent doubts and misunderstandings often make it hard to generate value from them. At one extreme, many people ask whether distributed models of innovation aren't notoriously hard to control, manage, and commercialize. At the other extreme, open innovation may seem to be mostly about narrowly defined joint ventures or transactions to acquire intellectual property created by others. If so, what's all the fuss about?

[1] See, for example, Henry William Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Boston: Harvard Business School Press, 2003; and Ron Goldman and Richard P. Gabriel, *Innovation Happens Elsewhere: Open Source As Business Strategy*, San Francisco: Morgan Kaufmann, 2005.



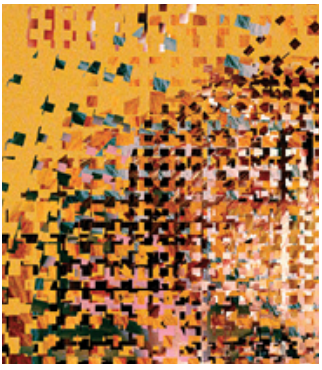
Kari Altmann

In truth, except for narrowly scoped forays (such as the licensing of technology) outside the confines of the enterprise, few top executives believe that they understand how best to create value with the open model of innovation. This uncertainty prevents many of them from taking advantage of the very real opportunities it presents.

The lack of confidence is understandable: although the roots of open innovation go back at least as far as the Italian Renaissance—when networks of apparel businesses in Piedmont and Tuscany were responsible for rapid innovation in techniques for producing silk and cotton fabric—today's variants on the model are anything but mainstream. That's why companies must visit the peripheries of today's commercial and scientific worlds to recognize the patterns that emerge across very diverse domains.

Such patterns reveal intriguingly promising "networks of creation" (or "creation nets"), where hundreds and even thousands of participants from diverse institutional settings collaborate to create new knowledge, to learn from one another, and to appropriate and build on one another's work—all under the guidance of a network organizer. These diverse participants often work in parallel and then fight and learn among themselves when the time comes to integrate their individual efforts into a broader offering. The most widely publicized example may be the development of the Linux kernel by the open-source software movement. But creation nets are also visible in more unexpected fields and places, from the development of motorcycles in China and of consumer electronics products in Taiwan to the world's big-wave surfing beaches, where networks of sports enthusiasts push the technology and techniques required to ride 60-foot-plus waves, and the places around the globe where thousands of amateur astronomers operate telescopes tied together by the Internet to find and monitor celestial events.

These examples of open innovation are not undiscovered.[2] Yet few if any observers have pulled back from individual examples or stories to analyze the broader principles and mechanisms underlying the success of creation networks. Those principles and mechanisms, once understood, suggest specific moves that companies can make to profit from this ambitious form of open innovation and to create greater value than more conventional models of innovation can.



Why creation nets matter

The case for creation nets has its foundation in the speed of change in today's global economy.[3] In times of relative stability, a given stock of knowledge can create value indefinitely. If others acquire that stock, they can put it to work competing with its creators. During times of accelerating change, by contrast, the lifetime value of knowledge shrinks rapidly because it becomes obsolete more quickly. Now the game is using it to connect more rapidly and effectively with others in the creation of new knowledge. Rather than jealously protecting existing stocks of knowledge, institutions should offer them to others as a way of gaining access to broader knowledge flows.

Of course, knowledge doesn't really flow—it tends to be "sticky." Unlike information, which can be codified and disseminated more readily, knowledge tends to reside in individuals and is very context specific. You need close relationships with diverse sets of people and institutions when you want to create new knowledge jointly and deliver innovations to the market.

Narrower approaches to open innovation typically fail to create and encourage these rich, sustained interactions and collaborations. Joint ventures, for instance, typically involve a limited number of participants, but creation nets mobilize hundreds or thousands. The licensing of technology involves arm's-length transactions, but creation nets rely on long-

[2] See, for example, John Hagel III and John Seely Brown, *The Only Sustainable Edge: Why Business Strategy Depends on Productive Friction and Dynamic Specialization*, Boston: Harvard Business School Press, 2005; Timothy Ferris, *Seeing in the Dark: How Amateur Astronomers Are Discovering the Wonders of the Universe*, New York: Simon & Schuster, 2002; Steven Weber, *The Success of Open Source*, Boston: Harvard University Press, 2004; and the wonderful documentary *Riding Giants*, DVD, directed by Stacy Peralta (2004; Culver City, CA: Sony Pictures, 2005), describing the global innovations of big-wave surfers.

[3] See, for instance, Martin Wolf, "The world must get to grips with seismic economic shifts," *Financial Express*, February 7, 2006 (www.financialexpress-bd.com).

term relationships. Some open-innovation initiatives focus on collaboration with lead customers; creation nets involve a broader range of participants, such as specialized technology providers, talented amateurs, suppliers, and customers.

The need for closer relationships with a broader set of participants brings with it a number of practical difficulties, however. Trust—in many ways the system's lubricant—can be hard to establish. What's more, large, distributed groups of people and institutions create their own difficulties. As Mancur Olson points out in *The Logic of Collective Action*,[4] large groups of people don't work together easily toward a common goal. They may have different preferences and different tolerances for costs and effort. Some want a free ride. Others find it hard to determine who has made which valuable (or not so valuable) contribution.[5] These problems, which arise even in narrowly scoped corporate alliances, multiply as the number and type of participants increase. In fact, the more diverse the participants, the thornier the issues.

*Creation nets **thrive** in today's global economy, but they may not be fully visible to casual observers*

As we shall see, the institutional mechanisms of creation nets help overcome these very real difficulties and provide for the diverse kinds of collaboration needed to support sustained innovation in a world of far-flung knowledge and talent.

How creation nets work

Although creation nets thrive in many different parts of today's global economy, they may not be fully visible to casual observers. Many Western executives, for example, go to original-design manufacturers (ODMs) such as Lite-On Technology and Compal Electronics, which are based in Taiwan but have expanding operations in mainland China, to source designs for a wide range of consumer electronics and high-tech products. From the perspective of these executives, they are dealing with a single outsourcing provider. Yet behind the scenes, the ODMs are mobilizing large creation nets to push the performance envelope of the products they design.

Executives stand in awe of Apple Computer's brilliant design for the iPod, for example, but overlook the important role that another company,

[4] Mancur Olson Jr., *The Logic of Collective Action: Public Goods and the Theory of Groups*, revised edition, Boston: Harvard University Press, 1971.

[5] This part of the discussion draws on Steven Weber's first-rate examination of the open-source movement: *The Success of Open Source*, Boston: Harvard University Press, 2004.

PortalPlayer, performed behind the scenes. Before being approached by Apple CEO Steve Jobs, PortalPlayer had already mobilized a broad network of specialized technology providers to solve the challenging problems of delivering high-quality audio in relatively inexpensive small devices.

Creation nets work by mobilizing hundreds or thousands of independent entities in the pursuit of distributed, collaborative, and cumulative innovation. The creation nets orchestrated by ODMs, for example, can bring together myriad highly specialized component and subsystem vendors from different business ecosystems, including disk drive manufacturers in Singapore, lens designers in Japan, semiconductor designers in Taiwan, and software engineers in Bangalore.

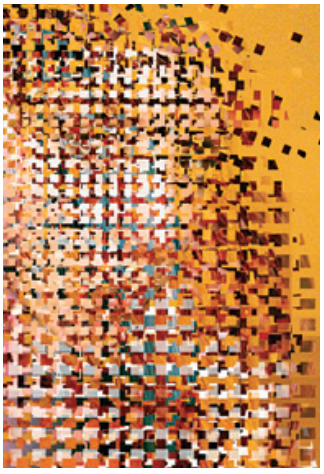
Mobilizing such a range of participants requires a precise set of institutional mechanisms to make clear who assembles the network, who can participate in it, how disputes will be resolved, and how performance will be measured. Creation nets thus begin with a network organizer, in the role of gatekeeper, which decides who participates in the network. ODMs, for instance, rigorously scrutinize not only the technological capabilities of prospective participants but also whether their corporate culture promotes collaboration and risk taking. The network organizer could be an individual, a small core team (as in the case of many open-source software initiatives), or a corporation or some other kind of large institution. Whatever it may be, it defines simple and informal participation protocols, such as how to resolve disputes and measure performance. An ODM, for example, will define clear performance milestones during the design process but allow participants to devise creative new ways of delivering the level of performance the client desires.

>>> *For more on the relation between modularity and innovation, see "Innovation blowback: Disruptive management practices from Asia" (www.mckinseyquarterly.com/links/21170).*

Creation nets typically organize their activities into modular processes, which make it easier to incorporate large numbers of participants and to give them the freedom to innovate within their own module of activity. Well-defined interfaces make it easier to coordinate activity across modules. The modularity of creation nets thus allows many participants to innovate in parallel and to pursue, simultaneously, a variety of ways of meeting a project's requirements.

While creation nets are loose in one dimension—the freedom to innovate—they are remarkably tight in another: defining clear "action points" when participants must come together and deliver outputs. Where inconsistencies

or incompatibilities exist, participants must make clear choices to produce an integrated product or offer for use by others. If the design of the electronics in a digital still camera's sensor depends on the auto-focus functionality of the lens, for example, the two subsystem designers need to resolve any issues together.



Creation nets also rely on long-term incentives to motivate and align participants. To be sure, many creation nets are explicitly commercial, rewarding them with short-term cash or contracts for delivering successful innovations. But participants find that the real reward of even a commercial creation net comes in the longer term: by joining it, they can get better faster by working with others rather than alone.[6] For this reason, participants are motivated to do the right thing in the near term rather than pursue opportunistic short-term profits—a cooperative mind-set helping them to overcome many of the challenges to broad-based collaborative activity that Mancur Olson and others have described. Successful creation nets must therefore focus on building long-term relationships with participants and on creating opportunities for repeated interactions that demonstrate the value of cooperation.

Building and participating in creation nets

To harness the institutional mechanisms that give creation nets their power, executives will have to master new management approaches. Four are particularly relevant: choosing appropriate ways to coordinate the activities of the network, balancing local innovation with "global" integration, designing effective action points, and establishing useful performance feedback loops.

Choose the right approach to coordination

Although creation nets share many characteristics, they differ in notable ways—for example, the degree of diversity among their participants. Open-source software initiatives and extreme-sports networks, two of the best-known examples of creation nets, bring together participants who share relatively extensive sets of practices. Such groupings, which we call "practice networks," rely on looser forms of coordination.

[6] This point is bolstered by a 2002 Universum European MBA Survey, which found that European business school students are much less focused than past ones on job security. Instead, the top three priorities were constant opportunities for learning, variety in tasks and job rotations, and international career opportunities.

Other types of creation nets—the design networks assembled by ODMs in Taiwan, for example, or the apparel production network created by Li & Fung in China—mobilize participants with very different practices and experiences. As a result, these networks, though still far too loose for the comfort of most executives of large enterprises, require more active forms of coordination. We categorize this subset as "process networks," a type of organization we have written about extensively to illustrate innovative ways of tapping into distributed expertise.[7]

Because of the diversity among the participants in process networks, their organizers play a more active role in mobilizing them—specifically, the part of orchestrator: recruiting participants into the network and then deciding which of them will be involved in each creation initiative, the specific role they will play, and the performance requirements they must satisfy.

In contrast, practice networks are coordinated much more loosely, both for recruiting participants and for managing specific creation initiatives. Network organizers tend to focus their coordination activity on the integration stage of the creation process, when the contributions of the participants are brought together and incorporated into a consistent or compatible release.

The general point is that executives must carefully consider how great a diversity of skills and experiences their creation networks require and then tailor their coordination approaches accordingly.

Balance local innovation with "global" integration

Some creation nets of all types involve looser forms of management. Others are managed more tightly. To strike the right balance, it is important to differentiate among three primary challenges in the creation process:

- accessing and developing highly distributed talent
- providing appropriate contexts for the participants to come together and engage in collaborative experimentation, tinkering, and innovation
- effectively integrating the creations of diverse participants into shared releases

Looking at the way creation nets address each of these challenges, you begin to discern interesting blends of emergent behavior (which occurs and evolves

[7] John Seely Brown, Scott Durchslag, and John Hagel III, "Loosening up: How process networks unlock the power of specialization," *The McKinsey Quarterly*, 2002 special edition: Risk and resilience, pp. 58–69 (www.mckinseyquarterly.com/links/21168).

spontaneously, without an active, centralized manager) and managed behavior. Managed behavior is most pronounced at the integration stage, when the contributions of distributed participants must come together in a consistent or compatible release or offering. At this point, governance structures become critical to resolve differences that are often deeply held. Some of the greatest insights and innovations emerge as diverse parties clash and seek to address one another's concerns. In contrast, the aggregation and development of talent tend to be shaped more by emergent behavior, especially on the periphery of creation nets, which often rely on loosely organized environments (such as local business ecosystems and online forums) to attract, identify, and assemble talent.

Often, a creation net's collaborative experimentation, tinkering, and innovation activities are the least actively managed ones—perhaps the most challenging aspect for executives of traditional companies to embrace. After all, isn't the whole purpose of creation nets to drive innovation? If so, shouldn't the network organizers devote most of their time and attention to that? Surprisingly, the answer is no.

It is in this respect, perhaps, that creation nets represent the biggest break with more conventional approaches to open innovation. Executives are understandably tempted to develop detailed blueprints of what they require from their partners. For the sake of innovation, they must resist that temptation.

Design effective action points

Organizers of a creation net play their most active role at the integration stage. In fact, the success of such nets hinges on the use of this stage as an action point to focus and align the efforts of diverse participants that must now come together and hand off their work to others, which either build on it or integrate it into a consistent or compatible release. By specifying when these activities must occur, the performance requirements that each participant must meet, and the protocols for escalating and resolving disputes, the network organizers create the institutional mechanisms necessary for productive friction.[8]

The essential point is that diverse participants must confront and resolve any significant differences in approach. Rather than determine outcomes by developing blueprints, the designers of effective action points specify high-level performance requirements and give the participants a substantial

[8] For more on this topic, see John Seely Brown and John Hagel III, "Productive friction: How difficult business partnerships can accelerate innovation," *Harvard Business Review*, February 2005, Volume 83, Number 2, pp. 82–91 (www.hbr.com).

degree of freedom in meeting them. Greater freedom means a greater opportunity for divergence, especially in those parallel innovation initiatives, involving many participants, that modular approaches to management make possible.

When incompatibilities emerge across a product's modules or subsystems, the network organizer encourages the relevant participants to swarm the problem and resolve it on their own. Each participant understands that its designs will be included in the next release only if they work well with other parts of the product. Participants must therefore continually identify and make trade-offs between optimizing the performance of their own components and the broader performance requirements of an integrated product. On the margin, the ability to work effectively as part of a broader system determines which components are integrated into the final release.

Establish performance feedback loops

Although creation nets may use much looser management techniques than more traditional approaches to open innovation do, they operate successfully in some of the most demanding global markets imaginable, from fashion apparel to enterprise software. Loose management doesn't mean sloppy performance; on the contrary, these creation nets perform at a very high level. More important, they continually improve their performance at a faster pace than conventional enterprises can match.

How? In part, the answer is the tight focus on relevant performance requirements. But something more is involved. Successful creation nets build explicit performance feedback loops to give participants a much better idea of how they are doing. Even in relatively loosely organized open-source software initiatives, the participants receive rapid feedback from others who have used their software. In these projects, the broad adoption of software modules ranks among the key drivers of status. Participants monitor this performance metric not only for their own software contributions but also for those of others, and they strive to learn from programmers whose modules gain the greatest acceptance.

To establish these performance loops, network organizers focus on three key design principles. First, they encourage rapid movement from concept to prototype. The faster participants can come up with prototypes, the easier it will be to test their performance, especially in concert with other components and subsystems. Second, the organizers define early and frequent rounds of performance tests so that participants gain early insights into performance issues and can make changes rapidly to solve any problems that arise. Finally, they establish broad-based communication

mechanisms so that everyone in the creation net gains access to performance data quickly and easily.

Getting there from here

The case for open innovation is clear: in today's rapidly moving world, companies can ill afford to retain outmoded closed models of innovation management. The case for creation nets as the best form of open innovation should also be clear: the institutional mechanisms embedded within them help to overcome its thorniest challenges. Furthermore, these networks focus solely on creation, so they promote innovation more than do stand-alone corporate enterprises, where executives must reconcile the competing demands of managing both innovation and routine operations.

Yet the case for creation nets does not extend to every corporate situation and endeavor. They work best in areas with three attributes: uncertain demand for goods and services, a need for the participation of many different specialists if creation and innovation are to occur, and rapidly changing performance requirements in the marketplace. In these areas, creation nets have their most distinctive value: the ability to mobilize dispersed and diverse talent for innovation in a flexible way, whatever the scale.

If these criteria do apply, executives must choose whether to participate in an existing network or to organize a new one. Too often, their instinct is to organize a new network. Those that try to do so late in the day may underestimate the network effects involved and wind up struggling to attract the attention and resources of relevant participants.

Once executives have decided to participate in or build a creation network, they will need to revise some corporate structures, aspects of corporate culture, and management and leadership practices, which often stand in the way of harnessing the network's full potential. Most institutions have been organized around push models of resource mobilization, but effective participation in a creation net requires a different skill set, focused on building, deploying, and managing pull models.[9]

At a more fundamental level, leadership teams will have to challenge conventional ways of thinking within their own groups and companies. One natural reaction to an accelerating pace of change is a desire to turn inward and tighten control in an attempt to protect what already has value—for instance, by strengthening a company's patent protection or

[9] For more about pull models, see John Seely Brown and John Hagel III, "From push to pull: The next frontier of innovation," *The McKinsey Quarterly*, 2005 Number 3, pp. 82–91 (www.mckinseyquarterly.com/links/21169).

limiting the number of business partners that have access to a company's intellectual property. Creation nets require a different way of thinking, built on the recognition that the key to success in a rapidly changing world is understanding how and why knowledge crosses institutional boundaries. This in turn requires an even more fundamental shift in mind-set: managers must move their focus beyond narrow efficiency gains and recognize that increased flexibility will help them embrace and explore the possibilities that uncertainty creates.

A creation net gives executives an opportunity to amplify open innovation's potential, but they can realize it only by challenging dominant ways of thinking. Those who do may, at long last, close the gap that has made open innovation a seductive mirage and an exercise in frustration for many of the companies that have tried to exploit its promise. Q

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