How to Catalyze Innovation in Your Organization

Executives can fuel the emergence of new ideas by understanding and tapping the power of employee networks.

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BY MICHAEL ARENA, ROB CROSS, JONATHAN SIMS, AND MARY UHL-BIEN

? **THE LEADING QUESTION**
How can large companies foster emergent innovation within the organization?

FINDINGS

▶ Companies need to create contexts that allow people, ideas, and information to flow across different groups.

▶ "Brokers," who create bridges between groups, should work with "central connectors," who are well-connected in one subgroup.

▶ When facing a problem, innovators should engage their network early on.

ECONOMISTS HAVE ESTIMATED that approximately 50 percent of U.S. annual GDP growth can be attributed to product and service innovation,[1] and more than 90 percent of executives claim that long-term organizational success depends on developing and implementing new ideas.[2] Research shows that growth fueled through organic innovation is more profitable than growth driven by acquisition,[3] in part because the organizational capability required is vastly different.[4] Yet organic, or *emergent*, innovation typically does not occur without heroic effort in many large organizations. While technology giants such as Alphabet Inc., Apple Inc., and Facebook Inc. are lionized for their innovative cultures, other industries struggle with hierarchal organizations that make consistent organic innovation very difficult.

Companies try to address this by formalizing innovation processes. However, such programs, when they succeed, often produce only a portion of the growth that most large organizations require.[5] Many innovation programs fail to meet expectations, in part because they separate the innovation process from the informal networks needed to adapt and support an innovation.[6] For example, "skunk works" programs have some lauded successes but also many failures because their innovations have been developed outside the social ecosystem of the organization. Similarly, acquisition strategies that attempt to bring in new expertise and creative ideas make logical sense but far too often underperform due to integration challenges.[7] Of course, these stories of failure often don't make it to press, so those less effective approaches persist.

Leaders need to better support emergent innovation to supplement planned new product or service development activities. Our research suggests that, rather than leaving emergent innovation to serendipity, executives should create
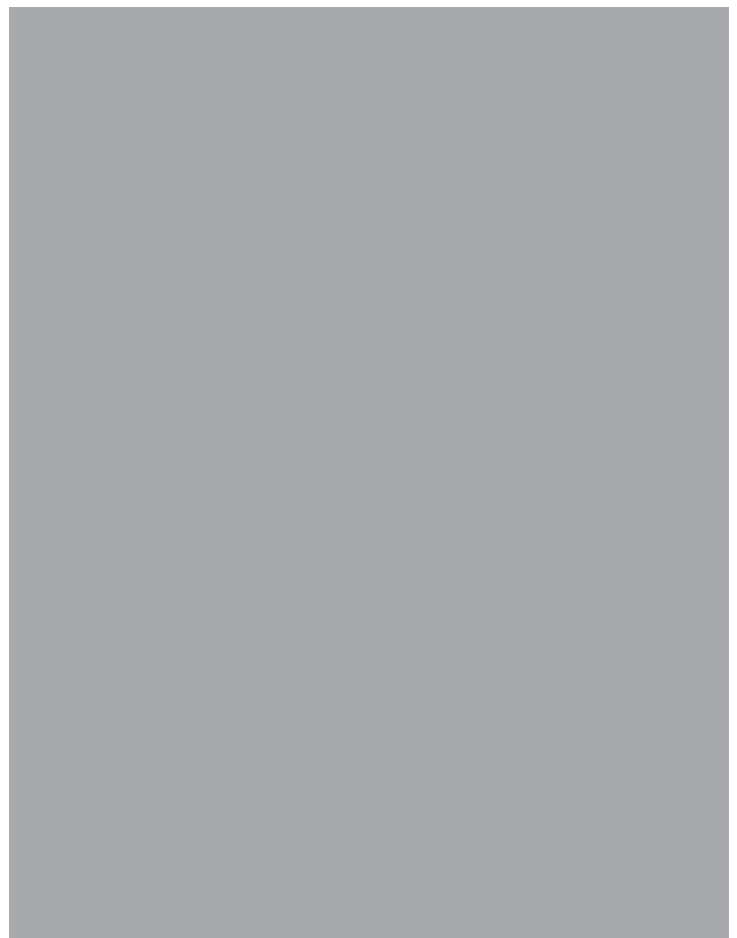
collaborative contexts where innovation is likely to emerge from unpredictable pockets of creativity. Importantly, managers need to stimulate these kinds of environments in a thoughtful way that does not simply overload employees with new collaborative demands from formal matrix structures, multiple "part-time" team assignments, or collaborative technologies that overtax people and that too often kill creativity and innovation.[8]

Emergent innovation occurs when entrepreneurial individuals within an organization incubate and advance new ideas for addressing customer needs and dynamically changing market conditions.[9] *How do we best connect employees in ways that more systematically unleash emergent innovation?* This is the question we set out to explore in a decade-long partnership between researchers and organizational leaders. (See "About the Research.")

Part of the answer lies in the power of network structures and the ability of organizations to create what we have termed *adaptive space*.[10] We define *adaptive space* as the network and organizational context that allows people, ideas, information, and resources to flow across the organization and spur successful emergent innovation. Adaptive space facilitates the movement of innovative ideas and information across a system. It works by enabling ideas generated in entrepreneurial pockets of an organization to flow into the operational system and develop into new products or services that lead to growth. (See "The Role of Adaptive Space.")

Adaptive space is not a physical building or lab such as an incubator or accelerator (although both offer great potential for sharing, creating, and developing ideas). Instead, adaptive space within organizations is fluid and can shift based on need. Companies create adaptive space through environments that open up information flows and enrich idea discovery, development, and amplification. That can be done in a number of ways. For example, Noblis, a nonprofit research corporation headquartered in Reston, Virginia, created adaptive space through an internal crowdsourcing initiative, while General Motors Co. has generated adaptive space through events that bring together people from different parts of the organization. (See "Creating Adaptive Space Through Crowdsourcing," p. 42 and "Adaptive Space at General Motors," p. 43.)

Using network analysis and data collected from more than 400 interviews, we found that innovation leaders within an organization engaged with experts, influencers, and decision-makers through different phases of an innovation's journey, and in the process managed to substantially expand the impact of their innovation and streamline its acceptance as it moved from concept to implementation.

We address this topic by exploring employee networks and the social nature of innovation, how to identify and manage the three network roles critical for emergent innovation — brokers, connectors, and energizers — and how individuals can drive emergent innovation in adaptive space.

The Social Nature of Innovation

Tales of a lone inventor with a blinding insight are unhelpful myths when it comes to corporate innovation.[11] Successful service, product, or process innovations within large, complex organizations are very much a social phenomenon. This is why organizations that are routinely innovative are intentional about enabling individuals to engage and connect in ways that trigger and expand ideas.[12] They know they must leverage organizational networks to allow innovation to emerge and be incorporated into the organization's formal operational system.[13]

ABOUT THE RESEARCH

Our research, conducted over a decade, focused on tracing commercially successful (and unsuccessful) innovations back to their origins. While successful innovations spanned the organization and had many originators, unsuccessful ideas were typically isolated to one part of the organization, and we were almost always able to find the originator in the first or second interview.

The first phase of this work focused on conducting over 400 interviews on successful and unsuccessful innovations as well as employing organizational network analysis to analyze the network dynamics of scores of institutions.

The second phase of work entailed interviewing 160 high-performing leaders (80 men and 80 women) across 20 well-known organizations in financial services, software, consumer products, retail, professional services, manufacturing, and life sciences. These interviews captured rich stories of how leaders had successfully introduced an innovation and, importantly, how they had managed both the innovation and the network to achieve success.

While the first stage of our work showed the importance of networks in identifying who leaders should engage in different kinds of innovation efforts, the second phase provided the blueprint for how successful innovators brought an idea to fruition by simultaneously developing the innovation and working with the network.

Recent advances in computing power, coupled with the proliferation of collaborative technologies, have made assessing these networks easier than ever before. Consider a portion of a network diagram of information flow within a roughly 10,000-person research and development (R&D) unit of a consumer-products organization. (See "Key Roles in a Network," p. 44.) In this diagram, the dots reflect scientists, the lines reflect who is turning to whom for information, and the two colors reflect two different scientific disciplines that should have been working closely together. The diagram shows clearly that large-scale collaboration between the two groups was not occurring the way leaders expected at this juncture. This lack of collaboration was also occurring at 42 other points in the overall network; mapping the relationships allowed us to see this.

The organization found that working through key network roles was essential to success. Many good ideas never come to fruition because people do not have the formal or informal influence to get them into play. In the consumer-products organization, leaders had sponsored ideation sessions with key experts selected from the two technical domains, believing that interesting innovations would emerge from bringing smart people together in a creative dialogue. What happened was quite different. Without the network analysis information in hand, the leaders selected people based on reputation. These leaders always ended up engaging the well-connected people *within* each area — those commonly thought of as "essential." (These people are what we call *central connectors*. See "Key Roles in a Network.") The "essential" individuals were also often the ones most wedded to their scientific paradigms and, sometimes, to their reputations. As a result, they were less effective at visualizing possibilities across groups. It was only when the leaders began to include lower-level employees with connections between the silos that the organization began to get integrative ideas and see emergent innovation flourish. (We call such bridge-building individuals *brokers*. See "Key Roles in a Network.")

Network mapping provides a valuable tool in that it enables much more targeted innovation efforts. But these efforts can take hold only if adaptive space exists to cultivate both the innovation *and* the network that generates it. Because large, bureaucratic organizations are designed for efficiency through
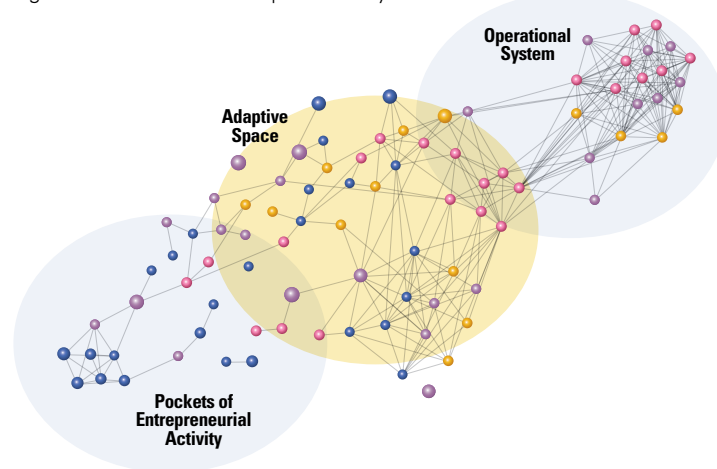
division of labor, their traditional structures limit the potential for innovation. Adaptive space is needed to connect these divided channels and allow ideas to advance from the entrepreneurial (informal) to the operational (formal) system. Such adaptive space allows for networked interactions to foster the creation of ideas, innovation, and learning.

Three Network Roles

A key to catalyzing emergent innovation is identifying and positioning innovators within an organization. Doing so requires an understanding of individual roles within organizational networks. The social capital necessary for evoking emergent innovation is best represented by three roles: brokers, central connectors, and energizers. (See "What Brokers, Central Connectors, and Energizers Do," p. 45.)

Brokers As mentioned earlier, brokers build bridges from one group to another within and outside an organization. As a result, they act as critical conduits of information and ideas. Specifically, brokers offer three competitive advantages to an organization: broader access to diverse information, early access to new information, and control over the diffusion of the information. New insights usually arise at the intersection of existing networks. That is, as two heterogeneous groups

connect, the potential for novelty increases. Brokers facilitate this discovery process through their social connections and then determine how and when these insights can be introduced to other parts of the organization. The creation of adaptive space enables brokers to more actively connect and navigate beyond their local subgroups to explore new possibilities. For example, in one pharmaceutical company, the innovation process could be traced to a few key scientists who were brokers to outside academics. When two of these brokers left the organization, critical relationships were lost; the result was a significant decline in the innovation rate for the company.

Examples of adaptive space and brokering are often studied between organizations (rather than within). One well-known example is Procter & Gamble Co.'s Connect + Develop program, which relies on external sources of innovation coupled with internal screening to allow P&G executives to identify new customer needs or possible product extensions, and then execute. The Connect + Develop program works on the premise that in an increasingly connected world, inspiration and innovation are the result of deliberate brokering relationships between the organization and external partners that generate value creation. Connect + Develop has led to novel products such as the Mr. Clean Magic Eraser.[14]

Central Connectors While brokers are outstanding at finding ideas, they are not always best positioned to drive implementation. This is where group cohesion and central connectors play a critical role. Group cohesion represents how connected individuals are to one another within a group. A group is considered cohesive when many redundant connections exist among group members. That is, the likelihood of any individual within the group being connected to any other individual within the group is high. As a result, cohesive groups can quickly share information and generally operate with high levels of trust.[15]

Connectors, especially those relatively central to cohesive groups, are essential to the development and implementation process. They are well-positioned to garner support for ideas from within a given group. Once introduced by a central connector, these ideas are easily diffused across the more tightly connected subgroup.[16] Furthermore, the level of trust within these subgroups facilitates engagement with the ideas, learning, and risk-taking — all crucial components of creativity and development.[17] As a result, connectors can quickly drive local applications of ideas as well as future iterations for improvement.

The "dailies" at Pixar Animation Studios in Emeryville, California, illustrate the kind of trust cohesive subgroups can have. Every day, creators at the company present the projects they are working on to get critical feedback. In most organizations, individuals finish their work before submitting it for critique. However, at Pixar, individuals trust that their colleagues have their best interest in mind, and thus the in-progress reviews enable more creativity. The

CREATING ADAPTIVE SPACE THROUGH CROWDSOURCING

Noblis is a nonprofit research corporation that consults to governments on science and technology issues such as data analytics, cybersecurity, and networking. Historically, Noblis relied on independent science and research programs to explore new ideas and develop new capabilities. To make this work, a few well-connected principal investigators would submit proposals to top management for endorsement. However, as Noblis grew, its leadership recognized that the organization had to become more collaborative to remain competitive. "We have smart people everywhere," said CEO and president Amr ElSawy, "but we don't always know what their interests are."

In 2015, the leadership team changed the discovery process. Using a crowdsourcing platform, employees generated ideas for innovative research and client-driven projects. The firm created methods to solicit ideas, not fully developed proposals, from employees. Two senior leaders reached out to colleagues across all areas of expertise to solicit comments on any idea, leading to fine-tuning and energy naturally gathering around some projects more than others. Since individuals were asked to submit ideas of interest, they became more energized to engage in the process of sharing.

The first year, the process generated hundreds of project ideas and all received numerous comments; more than half of employees gave feedback. From the initial suggestions, about 100 ideas were selected for further development and full proposals. Of those, more than two dozen research projects were approved and given resources.

The new approach led to several powerful innovation, network, and talent outcomes, including:

• **A shift in culture from more adversarial (idea generator vs. senior leader, or project vs. project) to collaborative:** The crowdsourcing approach began to build a culture of conversation, which carried over to ongoing project reviews and funding meetings.

• **More expansive idea generation and development:** By replacing the top-down and "inner circle" approach to the research agenda with a range of divergent perspectives early on, the company has been able to harness the collective intelligence of the organization more effectively — and profitably.

• **Increased employee engagement and alignment from transparency:** People voluntarily "killed" their projects and supported others. Decisions were made that supported the whole rather than protected turf.

• **A wider recognition of talent across the business:** Many ideas and insights were brought forth by employees who were below the radar or working in remote offices. Two-thirds of the funded projects were led by newcomers to the process.

ADAPTIVE SPACE AT GENERAL MOTORS

At General Motors Co., GM 2020, an initiative launched in 2014, creates adaptive space to spark the movement of ideas and information across the organization. The result has been many emergent innovations. For example, one group created a new process to improve buyer-supplier relationships, another developed a millennial-friendly interviewing process, and yet another created monthly cross-departmental sessions designed to share problems and proactively identify organizational roadblocks.

A GM 2020 event could take the form of a Co-Lab, a Summit, a Tipping Forward event or any number of employee-developed constructs. A Co-Lab, for example, is a 24-hour intensive challenge. As many as 60 individuals from across different groups within the company compete in small teams and pitch ideas to executives. A Co-Lab operates on the premise that sometimes the best solutions emerge when you have the least time. Challenges include everything from customer-service opportunities to product design ideas to employee engagement issues. Challenges center on the user and employ design-thinking principles to bring customers into the process.

A Summit includes as many as 300 individuals acting as brokers and connectors from across functions, using design-thinking methods to share, create, and build solutions. A Tipping Forward event, which typically involves 100 to 200 individuals, provides the adaptive space necessary to openly share the many successes that have already been applied locally, and then tap into the passion of energizers to amplify these successes across the broader enterprise.

GM 2020 also encourages individuals to leverage their networks to create their own solutions. For example, a small group of engineers and researchers launched an internal "maker space" to encourage cross-group tinkering. An internal learning community held an event to unleash more creativity across functions. Another group launched internal "TEC Talks" (technology, engineering, and creativity), featuring monthly presentations from internal experts.

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teams at Pixar believe dailies are a critical contributor to producing high-quality, innovative films.[18]

Innovation in a social context requires a thorough understanding of the interplay between brokers and connectors. This is why adaptive space is so critical: It helps position individuals within the network to drive progress. Consider the history of Hewlett-Packard Co., whose name was once synonymous with innovation. In its glory days, HP created a work environment that encouraged flexibility and innovation. At HP, the policy was to move engineers between major projects over time. The result was the movement of key learnings and technologies to new projects, where they could be reconfigured into new combinations and applications. As a former HP senior engineer once described it, "I had to work in a single field for only two or three years and then, like magic, it was a whole new field — a paradise for creativity."[19] HP executives intuitively knew that if they moved people around, knowledge would flow more readily. In essence, HP provided the space that enabled an active interplay between brokers and connectors.

In large organizations, brokers often introduce ideas and central connectors develop them.[20] Central connectors are often limited to insulated subgroups and therefore are likely to have their ideas dismissed by the larger organization.[21] Furthermore, cohesive groups are good at developing incremental innovations but rarely promote disruptive concepts.[22] Individuals within a cohesive group are less likely to take a major risk that could jeopardize their local group status. While the level of trust within these groups promotes risk-taking (and thus some forms of innovation), social acceptance limits the extent of these risks. The result: more, but safer, bets.

Energizers Energizers help push people beyond the safe bets. In an organizational network, energizers may be brokers, central connectors, or simply other individuals who enthusiastically adopt an idea and promote it. Energizers trigger the interest and engagement of others and unleash the passion necessary for bold innovations to advance. Network energy, or enthusiasm, drives diffusion, co-creation, and active engagement across the larger organization. It challenges people to think more boldly than they would within their own subgroups and creates a contagious mindset as the innovation progresses.

Energizers are able to fully engage in interactions, inspiring others to devote more time and energy to an initiative.[23] The reputation of an energizer spreads quickly across the network, attracting others to aggregate multiple ideas into bolder, integrated concepts that are more likely to succeed.[24] Energizers connect with individuals who have different expertise or backgrounds. These differences can be embraced as elements essential to the creation of bolder innovation. The result is the potential for new, more robust possibilities to emerge.

W.L. Gore & Associates Inc., a materials science company based in Newark, Delaware, embraces such possibilities by giving employees freedom to

both dabble with new ideas and act as energizers who share these ideas throughout the broader network. Then, a cross-functional review called "Real, Win, Worth" scrutinizes the concepts.[25] The intent of these peer reviews is to bring together people from varying backgrounds to challenge the fitness of a concept and ensure that it can win in the marketplace and make money for the company. In

KEY ROLES IN A NETWORK

This diagram represents information flows in a portion of the network within a research and development (R&D) unit of a consumer-products organization. The orange and green colors reflect two different scientific disciplines that should have been working more closely together — but the network diagram reveals that large-scale collaboration wasn't occurring between the groups. People who are well-connected within their subgroup are central connectors, while those whose connections span groups are brokers. In large organizations, brokers often introduce ideas and central connectors develop them.

Brokers

Central Connectors
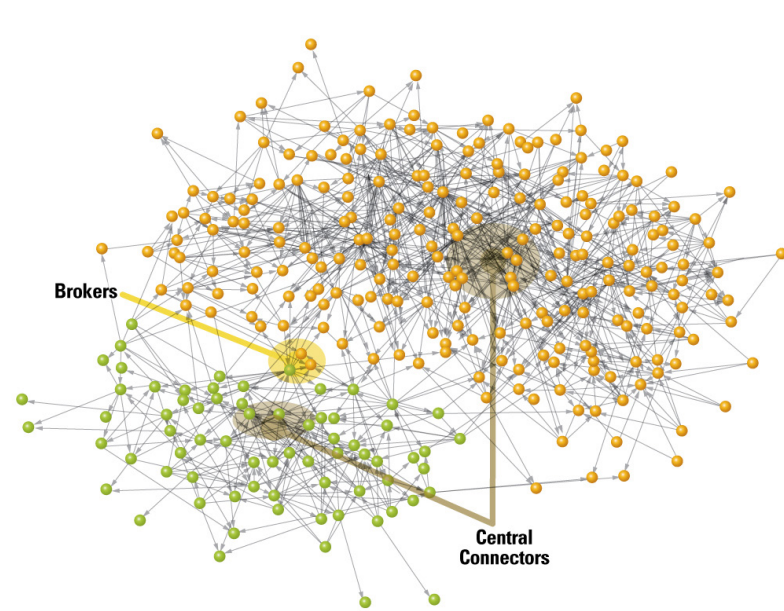
response to the scrutiny, the associate is challenged to experiment and learn with low-risk solutions. The result for W.L. Gore has been a multitude of innovative products and solutions that have been stretched beyond their original concepts.

Lessons for Innovators

So far, we have focused on the leadership implications of managing networks to drive emergent innovation. But our research also yielded important insights for individuals, by revealing *how*

individuals' collaborative activities play a critical role in all phases of a successful innovation. For example, every successful innovation we studied involved a non-insular network early in the problem-solving stage that helped the individual reframe the problem space and generate a more substantive solution and impact. Similarly, each success also benefited from ideas that other people brought and/or serendipitous encounters that dramatically shaped the course of the innovation. Overall, what was perhaps most striking to us in this work was the degree to which innovation had to occur in both the product or service and the network for success to unfold. The network was important not only in the generation of the idea but also in acceptance of the innovation. Successful innovators were innovating on both levels — the innovation and the network — following five principles, outlined below.

1. Tap into adjacent expertise and a broad network early in problem-solving. Almost universally, more successful innovators did not immediately solve a problem they were given. Whether asked by their board, boss, client, or a demanding coworker to address a significant problem, they were likely to ask questions and engage their network early to help them think about the problem differently and to find people with tangentially relevant expertise who might give them a different perspective on the solution. In contrast, less successful people were more likely to jump into the work without engaging adjacent expertise to reconceptualize the problem space. Interestingly, a good number of this latter group did solve problems and generate solutions. However, relative to the more successful people, this group solved smaller problems or produced less innovative outcomes over time. This group fell behind the other group and never really knew why. Even at this nascent stage, there is an interplay between the network, the nature of the innovation, and its likely success.

Our quantitative models and interview subjects found boundary-spanning ties as critical to innovation success over time. Consider four types of ties:

- **Emergence/creativity ties:** Identify silos or boundaries where value could be created by bridging two thought worlds — typically across expertise domains, functions, clients, and cultures.

- **Capability development ties:** Connect with people whom you normally seek out or who voluntarily offer you feedback — whether on work, interaction, or decision-making topics.
- **Depth/best practice transfer ties:** Identify others with similar expertise — across geography, company, or functional lines — where connections could help promote depth, currency, or efficiency in your work.
- **Sense-making/political awareness ties:** Seek out people or practices that help you get an accurate picture of the network and how to position ideas.

2. Make early interactions beneficial to others. The more successful innovators we studied sought to draw others to their ideas, rather than push their needs and seek help by mandate. Establishing mutual benefit was much more likely to create vibrant exchanges, vest other people in the outcome, and lead to successful innovation. This mattered in a significant but surprising way: Every successful innovation benefited at some point in the trajectory of the solution by a surprise insight, resource, or idea coming to the seeker. Invariably, these fortuitous developments had a material impact on the success of the project, but the seeker would never have been able to predict or foresee this. In contrast, less successful people were more likely to jump directly into their project without either establishing a personal connection to others or making a concerted effort to be helpful to them. As a result, they were far less likely to benefit from surprises from an extended network.

The lesson is this: Go into every interaction with a clear goal so that you are respectful of others' time. But engage in a way that benefits the other person and thus draws him or her into the relationship. Build people's trust by connecting personally, asking questions and shaping what you know to their needs, giving recognition and status, looking for ways you can benefit the people you have sought out, and creating positive energy in your interactions with them.

3. Spread ownership of the idea and seek feedback. Hub-and-spoke models of innovation — where individuals put themselves at the center of the network of interactions and coordinate all efforts and ideas — were rare and worked only in transactional settings. In fact, among our interviewees, trying to develop an idea in isolation until it was seen as bulletproof was a sure recipe for failure. The more successful innovators made decisions on whom to include and how to run initial meetings in ways that shaped both the innovation and the network. To be sure, they were quick to get the right expertise into the room and use open, divergent brainstorming processes to mold the innovation. But they were equally likely to diffuse ownership early, invite naysayers, and test ideas externally with key opinion leaders to help seed the network's acceptance of the innovation. Rather than shield an idea until it was perfected, they created conditions that engaged others in developing the idea.

The lesson? As you begin to form a nexus around an innovation, use facilitation techniques that create openness early. Focus on the *why* of the work to help engender a sense of purpose and commitment, and require teammates to reach out to source ideas with clients, stakeholders, experts, and network opinion leaders. Engage key opinion leaders and naysayers early. They bring needed information and insight to the project and later, as ambassadors, provide legitimacy and boost adoption. Innovation is more successful when ideation and development are diffused and contributors have pride of ownership. Great collaborative outcomes are generated when people share values and understand why the work is important.

WHAT BROKERS, CENTRAL CONNECTORS, AND ENERGIZERS DO

Brokers, *central connectors*, and *energizers* all play important roles in successful innovation processes within large organizations. While brokers and central connectors represent distinct positions in a network, energizers can be anywhere in a network; they can be brokers, central connectors, or other individuals.

BROKERS	CENTRAL CONNECTORS	ENERGIZERS
Connect different groups in networks	Are well-connected in a subgroup	Can be anywhere in a network
Bridge silos	Get things done	Provide support
Explore and seek new ideas	Organize others	Inspire others to act
Have diverse perspectives	Serve as experts	Fully engage in the moment
Focus on many things	Quickly solve problems	Strive toward vision

4. Develop a prototype early. Be open in process but insist on pushing to a prototype as early as possible. Throughout our interviews, prototypes were essential and took a wide range of forms. They could be working code, small-scale models, or full solutions. Early prototypes provide proof of concept. But even more important is that a working prototype dramatically changes the nature of the conversation and engagement with the network. With a prototype established, the exchanges become more targeted in terms of enhancements needed. More subtly, a prototype establishes trust that something can be accomplished and thus moves the innovation and network forward to a solution. As one leader suggested, "If we have a proof of concept or pilot, that is the right time to engage the negative people. A model speaks louder and does not require them to just trust me."

You will know you are on the right track when others are telling your story. Proactively engaging others builds "benevolence-based trust" (trust that you have others' interests in mind), while showcasing the prototype builds "competence-based trust" (trust that you can do what you say).[26]

5. Communicate the early-stage solution and then iterate with the network. In moving from prototype to solution rollout, two core activities matter. First, have a broad, inclusive, and collaborative communication process. Look for rich stories that engage people on an emotional level. For example, one leader made the case for change: "The story was not to make people afraid but to show we have a massive opportunity. Framing the narrative in terms of possibility instead of threat was key. After a few meetings of vision and opportunity, they bought in. Success for me was when a couple [of] important stakeholders started telling the story for me. They made it their own."

Second, it is critical to create forums and secure time and resources to adapt the innovation based on feedback. The biggest surprise for most leaders we interviewed was how much work they had to do at this stage, and the amount of adaptation needed when they thought their work was largely done. As more stakeholders and end users give input, ensure that your team is prepared to make incremental changes, test, and adapt quickly. As one leader indicated, "We needed to evolve significantly from our early thinking — 75 percent of the functionality changed based on those stakeholder meetings."

The Adaptive Space Imperative

For a large organization, innovation is both essential and increasingly difficult. Innovating requires managers to grapple with a conundrum: How does one empower those with innovative ideas (in entrepreneurial pockets within the organization), while ensuring that their best ideas are effectively implemented (using the organizational operational system)?

The value of networks and adaptive space is that they enable influential people to tell stories about an innovation they are championing in ways that echo across the network. As these stories spread, others are attracted to engage, and the network of those engaged begins to include critical stakeholders, therefore enhancing the likelihood of organizational support for the innovation. Our research suggests that by understanding social networks and developing an adaptive space, even seemingly bureaucratic organizations can facilitate emergent innovations.

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The biggest surprise for most leaders we interviewed was how much work they had to do at this stage, and the amount of adaptation needed when they thought their work was largely done.

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