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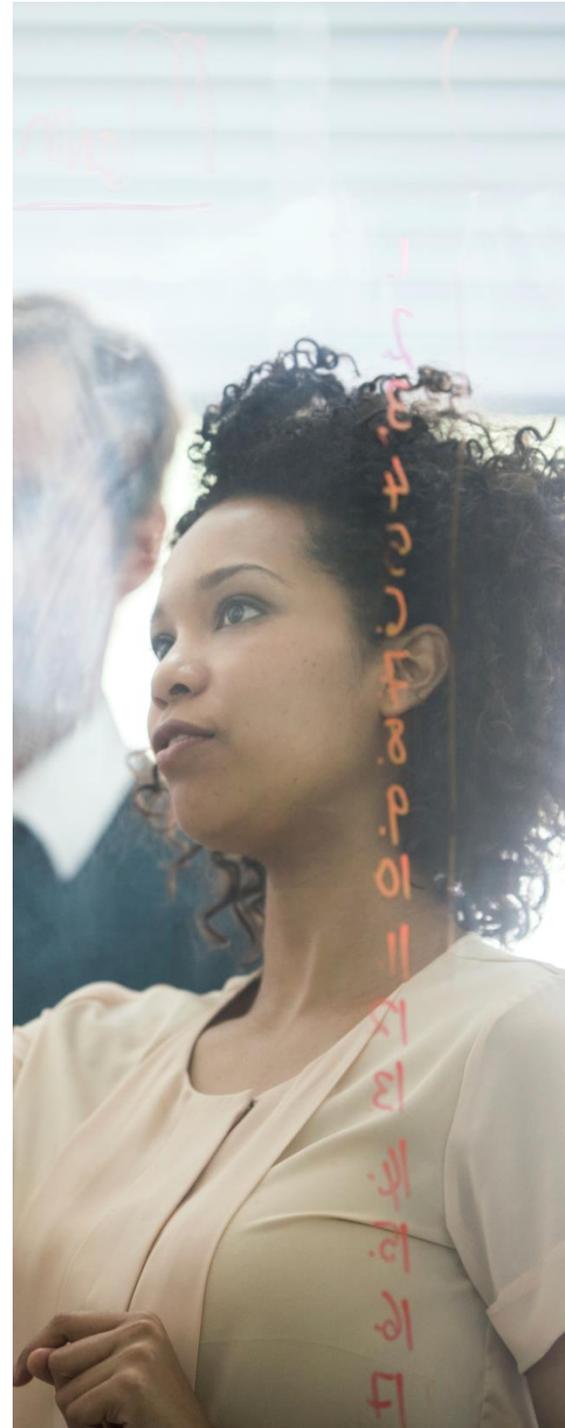
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# Executive Summary

In global organizations today, collaboration across functions, fields of expertise, and locations is essential to business performance. Leaders intuitively recognize the importance of these cross-boundary connections, yet they are often unclear about how to cultivate them in ways that will yield specific business outcomes. Over the past decade, we have integrated insights from two programs of research—Organizational Network Analysis and Boundary Spanning Leadership—to help organizations create and strengthen boundary-spanning networks. Throughout, we have seen companies pursue two primary goals through such networks: driving innovation and increasing efficiency. In this article, we describe how to identify critical boundaries and then apply appropriate interventions at strategic junctures in networks to achieve those two results.





# Investing in Boundary-Spanning Collaboration to Drive Efficiency and Innovation

In most global organizations, performance heavily depends on employees' ability to collaborate across various kinds of boundaries: vertical, horizontal, stakeholder, and geographic. The increased technical complexity of products and services demands knowledge far beyond what a single person or often even a single team possesses. Cross-boundary networks let groups throughout an organization achieve economies of scale through the transfer of best practices. These networks also enable the combination of diverse knowledge and experience, which can yield breakthrough innovations. Yet these two strategic benefits of collaboration—efficiency gains and innovation—cannot be achieved through a blanket approach to increasing connectivity among employees. Each requires its own intervention. Leaders who don't understand that most likely will not realize a good return on their investments in collaboration.

Executives clearly recognize the crucial role of boundary-spanning networks in the exchange of ideas and best practices. In a recent survey conducted by the Center for Creative Leadership (CCL), 86% of senior executives said that it was "very important" for them to work across boundaries. Yet just 7% said they were "very effective" at doing so. Only 53% agreed that their peer group was effective in this area. This

percentage dropped to 19% for middle managers and 8% for entry-level managers. Thus the employees who could provide the broadest performance benefit to the organization—those closest to the work—struggled the most with this kind of collaboration.

One problem lies with performance-management and incentive systems (and other formal structures) that do not encourage employees to help colleagues in other units. Another is a lack of technology and HR practices (e.g., rotation programs) that help build awareness of colleagues' expertise and experience. And yet another is the excessive collaboration that is a significant unintended consequence of matrix-based structures and collaborative technology platforms. When leaders push for cross-boundary connectivity, they are often foisting more demands on an already overloaded workforce, resulting in overbooked calendars and projects that involve too many people in multiple time zones. Meetings, teleconferences, e-mails, and duplicated conversations become a daily onslaught of "collaboration activities" that people must endure just to get to their real work. Our research shows that white collar employees spend 70% to 85% of their work week on the phone, on email, and in meetings. For some experts and leaders, it can be as high as 95%.

While collaboration is clearly essential, when it's excessive and unfocused it can harm organizational performance, stall innovation, and overwork employees for marginal gains. Gloria Mark and Victor Gonzalez of the University of California, Irvine and others have documented how seemingly endless interruptions and distractions—occurring as often as every three minutes—degrade individuals' cognitive performance and thus productivity. Information overload driven by requests from different parts of an organization also contributes to stress. Even vacation time isn't time off from collaborative demands: A 2013 survey by the consulting firm Accenture found that 75% of respondents work frequently or occasionally during paid time off, checking email, participating in conference calls, and taking advantage of uninterrupted time to catch up on work. Leaders often underestimate—by as much as 50%, according to our research—just how many people in their organizations are overburdened by collaborative demands. This network overload, as measured by the volume and cognitive diversity of the collaborative demands consuming employee time, is resulting in increased inefficiency, burnout, and turnover.

So, how can organizations improve connectivity and idea sharing across tangible and intangible boundaries without overwhelming their workforce? By cultivating networks and fostering collaboration in a strategic way, approaching cross-boundary collaboration in service of specific business goals rather than as a broad strategic imperative.

## Different Collaborations Produce Different Business Value

Our work over the past decade has shown that organizations tend to have two primary goals in mind when attempting to identify, create, and leverage boundary-spanning networks. The first is

innovation, which 92% of the senior executives CCL surveyed singled out as the top driver of organizational success. The second goal is efficiency. The drive for productivity improvements—in the form of economies of scale, streamlined processes, increased reaction times, and improved decision making—in most organizations today is relentless. According to a recent report from the Corporate Executive Board, organizations require just over 20% improvements in productivity to attain financial and strategic goals. Developing interventions to achieve either of those two goals requires accurate information about current levels of connectivity and obstacles to collaboration in an organization, an understanding of the nature of the boundaries that must be crossed, and a suite of leadership tools.

In the past decade, we have worked with a range of organizations applying Organizational Network Analysis (ONA) to assess where organizational silos and boundaries impede performance. ONA is grounded in the idea that formal structures in organizations don't reflect the entire array of valuable relationships and in fact can create performance barriers. Usually conducted through web-based surveys, ONA gives a detailed picture of the patterns of collaboration in an organization. Where are silos strongest? Where are connections needed to meet strategic objectives? Who are the key people who help others be productive? By answering these and other questions, ONA helps leaders be much more targeted in efforts to derive strategic value from specific boundary-spanning collaborations.

Once organizational leaders see how collaboration happens (or doesn't happen) across boundaries, they can focus on improving connectivity at key junctures in networks. A decade-long program of research involving more than 50 researchers associated with the Center for Creative Leadership (CCL) has shown the nature of various boundaries and, more important, how leaders and

organizations can span them. The researchers focused on five types of boundaries:

- **Vertical:** Rank, class, seniority, authority, power
- **Horizontal:** Expertise, function, peers
- **Stakeholder:** Partners, constituencies, value chain, communities
- **Demographic:** Gender, generation, nationality, culture, personality, ideology
- **Geographic:** Location, region, markets

From this research, CCL identified boundary-spanning leadership practices that involve clarifying and valuing differences (roles, purpose, or expertise, for example) across the five boundaries in ways that build safety and respect—and then bringing different groups together to achieve a larger purpose. With greater trust, engagement, and shared ownership, cross-boundary collaboration can be leveraged to discover and support innovation and reinvention. An array of tactics can be used, such as encouraging communities of practice, bringing people and perspectives from other teams or departments into a group's discussions, using flexible membership teams to develop needed network connections, or exploring and learning outside routine areas of work and expertise. We have found that these practices help organizations translate the data from ONA into action and, as a result, develop collaborative networks for greater innovation and efficiency.

Our work employing ONA and boundary-spanning leadership was informed by two schools of research on how collaborations across organizational boundaries create value. The first is a broad body of work on knowledge transfer between individuals. In general, this research views collaboration across boundaries as a process of acquiring information or knowledge from one setting and adapting it for use in another. Work

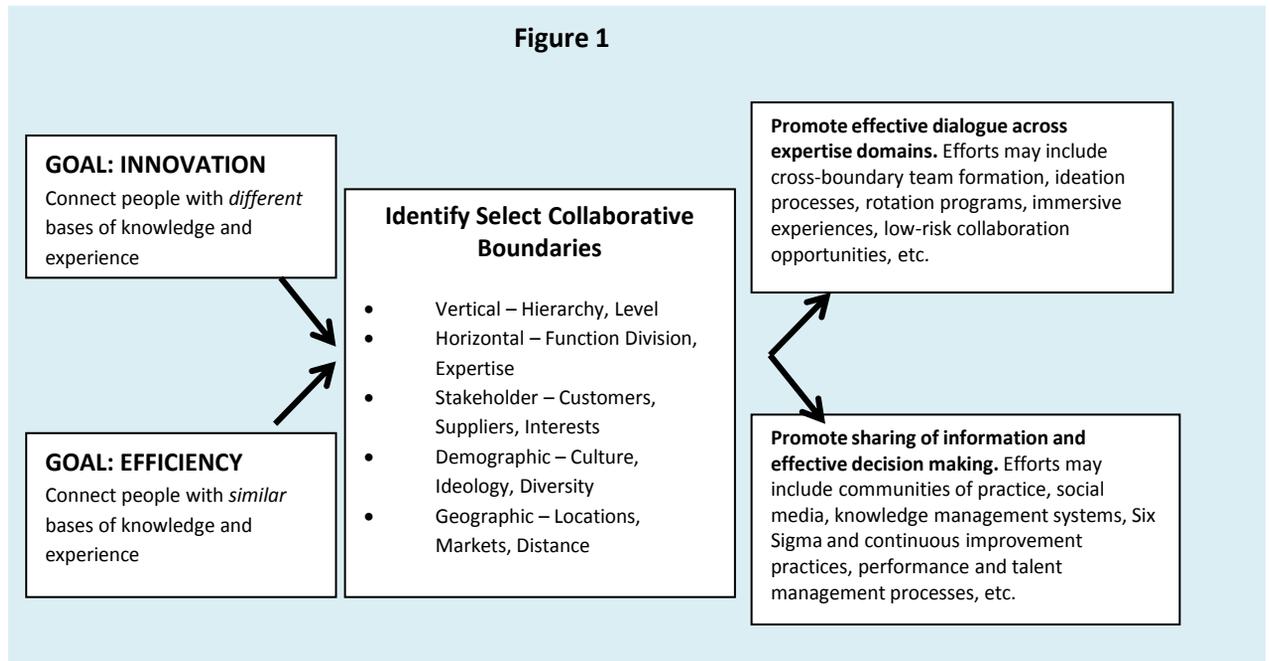
from scholars such as Linda Argote, Gabriel Szulanski, and Morten Hansen has shown cognitive, social, and organizational impediments to the movement of knowledge within organizations. The second is a stream of ethnographic research encompassing work in social learning theory, situated learning, and social identity theory from scholars including Etienne Wenger, Karl Weick, and John Seely Brown. This work has shown that knowledge generation is heavily conditioned by history and by the environment. From this perspective, interactions across boundaries involve more than a transfer of knowledge; rather, they create meaning based in part on the social and physical circumstances and the histories and social relations of the people involved. Learning, this line of research emphasizes, occurs in a particular physical and social context.

These streams of research helped us frame our work on boundary-spanning collaborations. The transfer perspective assumes that the recipients of knowledge understand how to apply it in their own context. Such knowledge transfers are most likely to occur between people in similar roles or with similar expertise and so may result in efficiency and quality improvements. If the goal is to move a best practice across organizational lines—often by connecting people doing similar work in different locations or units—then interventions such as communities of practice, best-practice repositories, knowledge management systems, and process improvement initiatives can be successful, as long as the recipient of the knowledge is able to evaluate whether it is appropriate for his or her context.

The situated, or constructivist, perspective sees knowledge as generated within a particular situation, often as a product of observation or rich interactions that may help people think about problems and solutions in a new light. When an organization is looking to spur innovation, people with different kinds of expertise or experience need to be connected in ways that will allow them to create knowledge. The type of interactions that

take place through a social media–based skill locator won’t suffice; instead, people need forums in which they can integrate their expertise in new and meaningful ways. Our research suggests a framework, outlined in **Figure 1**, for defining the desired business impact, identifying critical boundaries, and then developing appropriate collaboration.

forward-looking routing, switching, and security products. In turn, Juniper depends on thousands of globally dispersed employees with wide-ranging expertise and experience to work together to bring breakthrough technologies to market.



To get a fuller sense of the investments required to promote innovation versus those that can yield efficiencies, let’s consider two companies in greater detail.

## Driving Innovation at Juniper Networks

Juniper Networks is known as a disrupter in the competitive computer network industry. The company’s first product, the revolutionary M40 router, quickly became an essential building block of the Internet. Now, 15 years later, Juniper is a \$4.5 billion company that employs more than 9,000 people in 47 countries and powers the world’s largest and most demanding networks, including the New York Stock Exchange. Customers worldwide depend on Juniper for

But fast-growth companies like Juniper often face obstacles to innovation. Like many companies whose flagship product is a blockbuster, Juniper was under intense pressure to build on that success. In its early years, the company experienced exponential growth, gaining new customers, product lines, and employees, along with new layers of management with increasingly complex reporting relationships, new business units with their own priorities and perspectives, and new forms of external partnerships and relationships. Organizational silos were an unintended consequence of growth, one that presented organizational and relational barriers to innovation. For example, in earlier years, small groups of engineers would collaborate with relative ease to create a new product feature or solve a tough technology problem.

Innovation was an organic process that led to the development of the M40 router, the Junos Platform, and other solutions that differentiated Juniper from its rivals. Also in the early years, the goal, or direction, of innovation was set by the company's founder in close collaboration with a core group of engineers. Now, instead of engaging in exciting and innovative work, employees spent significant time navigating silos, layers, and rules.

Juniper's top leadership began to see that its operating model was undermining its ability to innovate. "Our formal organizational structure wasn't conducive to the types of rich interactions and conversations required for innovation to thrive," said Vince Molinaro, the executive vice president of worldwide sales. "We weren't integrating diverse expertise and experience across engineering, infrastructure, and sales teams the way we could when we were a small company." As a step toward reclaiming its culture of innovation, the company sought to combine ONA and boundary-spanning leadership practices. The initial effort involved three key steps.

### Determine the right network for the purpose.

To create meaningful innovation, three groups—engineering, sales, and infrastructure—needed to collaborate across function, level, location, and perspective. They needed to form a cross-boundary network that would not be found on the formal org chart but would be critical to Juniper's ability to produce breakthrough innovations.

The new network consisted of 85 employees from six vertical layers, from executive vice presidents to first-line managers; 13 horizontal functions across the engineering, sales, and infrastructure groups; five demographic tenure bands, from less than one year to more than 15 years; and participants from 18 locations. External stakeholders were not a formal part of the network, but the key account leader for Juniper's 15 largest accounts was included to ensure an outside-in, customer perspective. Bringing together people from different places in the

organization to contribute to product development is not a new idea; however, Juniper's methodical creation of a network that would represent all four critical boundaries, operate apart from formal operational structures, and be devoted to innovation was a groundbreaking approach.

### Conduct an Organizational Network Analysis.

Of course, naming people to a new network does not go far in driving boundary-spanning collaborations. Juniper knew it needed to understand the properties and characteristics of this group if its members were to connect in new ways. Conducting an ONA was central to this effort.

Juniper's ONA results showed strong connections within each function—engineering, sales, and infrastructure—but minimal or no connectivity across them. For example, sales and engineering had less-than-expected levels of collaboration with each other. Just 49% of engineering's incoming relationships were with sales and only 21% of sales' incoming relationships were with engineering. In other words, whereas some people in sales—where the client relationship is created and held—were going to engineering for information or clarification, far fewer in engineering were reaching out to sales for understanding or client insight. This created the potential for developing products and systems that did not serve customer needs. This weak connection between the groups was not surprising. Our research has shown that members of a practice or functional area tend to form a strong professional identity—based on their specialized knowledge and patterns of interaction—that can become its own cognitive universe, often complete with a technical language not spoken by others.

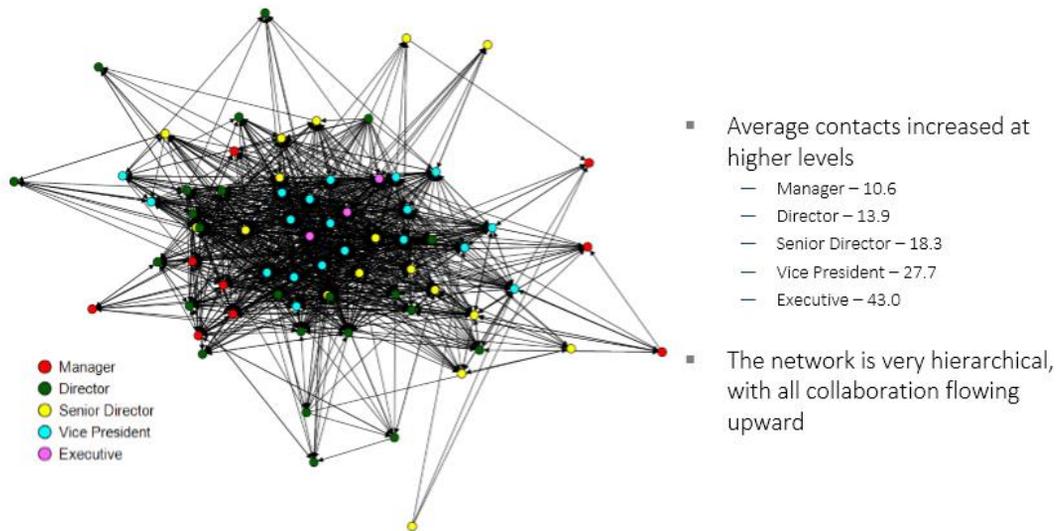
The ONA also clarified the hierarchical nature of interactions at Juniper. The formal organization structure overpowered cross-boundary collaboration. As the network map (Figure 2)

shows, communication and collaboration primarily flowed upward—people at higher levels had, on average, more contacts than those at lower levels. While some of this is expected, the pattern at Juniper was particularly strong. This adherence to formal channels interfered with the flow of ideas that is crucial for innovation.

the organization: a game-changing, high-revenue product and a template for using cross-boundary networks in strategic and effective ways. Minimal information about the event was shared with the attendees—only that they would be trying to come up with new business ideas. But the goal of boundary spanning was

Figure 2

## Network by Level



The ONA confirmed that the network members were not prepared to integrate and recombine their knowledge and expertise in pursuit of new ideas. They had been working with an us-versus-them mindset—i.e., sales vs. engineering, executives vs. line leaders, Germany vs. U.S.—and would need to reframe not only how they viewed customers’ problems but how they saw themselves in the context of those problems.

### Engage the network with new patterns of interaction.

Building cross-boundary connectivity in this network required creating new patterns of interaction. The 85 people in the network were invited to a three-day “Innovation Challenge” in San Francisco, which resulted in a double win for

just as important as any new ideas that would emerge. The event was designed to provide new types of interaction, spur new thinking about the work of innovation, and establish relationships. While the process felt murky for many employees, especially those with engineering-oriented mindsets, it helped drive the kinds of collaborations needed to generate innovation. Four principles guided the process:

### Design the right environment.

From the start, participants needed to know the event would not be business as usual. Rather than meeting at a hotel conference center, the new network gathered at a place called TechShop, a vibrant playground for innovation—a space that recreated the “garage vibe” revered

in Silicon Valley circles. Part prototyping studio, part learning center, and part open-tabled collaboration space, the location suggested that this was a place to think—and interact—in a different way.

### Explore new perspectives.

Instead of opening the event with a presentation from a senior executive, or formal remarks, the network members were immediately organized into six teams and sent out into the city to better understand the customers of Juniper’s customers. Equipped with journals, cameras, and maps, the teams used ethnographic approaches to compare and contrast how businesses in retail, hospitality, education, health care, and media operate. What did they need? Where might the industry be in five years? Is technology transforming this industry? What breakthrough in network technology might help—or be a game changer? This experience helped team members see opportunities in the white space of their expertise. They weren’t operating as sales teams or manufacturing teams or engineering teams. Instead, they were crossing those boundaries, and doing so in a way that was productive and energizing. It was a powerful immersive experience that created shared meaning while building network connections. Afterward, the teams returned to the garage space, and—fueled by cold beer, hot coffee, pizza, and snacks—shared observations, explored perspectives, and captured ideas. Working late into the night, the newly energized network began translating observations into product ideas.

### Use experts wisely.

The next day, four Juniper technical experts joined the network at the garage. But instead of giving presentations about their areas of expertise, they were offered up as a “human library.” Teams could “check out” various experts as one would check out a book. The experts served as a knowledge resource, while the network members asked probing questions and listened. This interactive approach reinforced the idea of a different kind of collaboration and, at the same time, reflected the constructivist view that

knowledge is created in the moment, as people share expertise.

### Mix formal and informal structures.

On the third day, the network went to Juniper headquarters to present the two most promising ideas to senior executives. However, the creative, informal processes continued. With a “No PowerPoint Rule” in effect, the teams used butcher paper and colored markers to introduce their ideas. Members of the network huddled around tables with executives, adding images and words, building on ideas and making connections. These methods resulted in conversations that focused on exploring rather than evaluating. Even so, formal structures and habitual behaviors collided with the emerging, informal network processes. Occasionally conversations bogged down. One executive said, “We are already working on a similar idea in my business unit.” Another said, “I need my teams focused on what’s already on their plates, and this adds yet another thing.” This push-and-pull between formal and informal structures was a clear reminder that innovation networks would need ongoing development and support to succeed within the existing structures.

Determined to pursue the ideas that the event generated—and not just appreciate the boundary-spanning experience—a group of network members came up with a proposal that was a hybrid of the two ideas. They also looked to draw in new people who could help translate it into a deliverable product. To that end, the Juniper team used results from the ONA to identify and recruit people to serve in three network roles: connectors, brokers, and energizers.

- **Connectors** create alignment within a team or department through their informal leadership and trusted opinions. By virtue of their central position in the network, connectors are often conduits of information whom people turn to for problem solving and advice.

- **Cross-boundary brokers** have the ability to drive change or innovate across structured groups: departments, functions, or locations. Given their knowledge of what will work in different parts of an organization, as well as their credibility among employees, brokers are often critical enablers of innovation efforts.
- **Energizers** get more out of those around them. They unleash passion, rather than grudging compliance, in the workplace.

The Juniper team found that these roles can and do shift, but the ONA insight was critical for guiding the implementation of the network's product innovation. The team also provided support for keeping the work within the network and preventing the formal structures and silos from impeding progress. In less than six months, the network built a prototype and began to get customer feedback. A large Asian telecommunications company agreed to pilot the product. Soon after, another customer signed on. At the time of this writing, the product is being tested in production environments in more than a half-dozen large companies. "There's still work to do, but the product has all the makings of a breakthrough innovation," said Molinaro. "We know it would have never seen the light of day if we hadn't taken the network approach."

The outcomes of the Innovation Challenge went beyond the creation of a new product. After the event, 100% of the network participants reported being engaged and excited to be part of Juniper's future, better connected to colleagues, and better positioned to have conversations with their customers. The event—and the energy the innovation network displayed in the months that followed—introduced the idea of using targeted networks to drive value-creating innovation. On the basis of the lessons learned from this network, Juniper is now deploying 5% of employees globally in boundary-spanning networks. In the future, the expectation is that similar networks will be operating routinely and effectively in service of innovation at Juniper.

## Driving Efficiency at Global Oil & Gas

For one of the world's largest independent energy producers, business success depends on the optimal productivity of sophisticated, expensive facilities and machinery. One key piece of equipment is an \$80 million gas turbine—a machine that is as large as a school bus, weighs over half a million pounds, and produces more power than 3,000 automobiles. Another critical machine is an oil heater that separates unneeded components from oil before it is delivered to market. The unit can process more than 100,000 barrels per day. The cost of downtime for either machine can run to tens of thousands of dollars per hour.

Avoiding unexpected downtime, minimizing disruptions from planned maintenance, and making ongoing improvements in efficiency are critical to the business. The cost of equipment problems and operational inefficiencies—when extended across this company's operations in 30 countries—totals hundreds of millions of dollars. As a result, more than ten years ago, the company (which we'll call Global Oil & Gas) embarked on a massive effort to boost the enterprise-wide collaboration needed to operate at higher levels of efficiency. The company had grown rapidly through mergers and acquisitions, creating numerous functional, geographic, hierarchical, demographic, and stakeholder silos. Knowledge, expertise, and insight needed to be shared among people doing similar work in different business units and locations. The breaking down of barriers could not be left to chance.

To address the need for cross-boundary collaboration, the company created global networks, or communities of practice, through an ambitious knowledge management initiative. While many companies deploy technology to promote peer-to-peer collaboration, the knowledge management (KM) team at Global Oil

& Gas knew that leading with technology would not work. Instead, it focused on two things: generating business value and changing behavior. The KM team began with the idea that networks would be aligned with specific business functions and collaboration would be linked to business results. Indeed, the existence of each network would depend on its ability to deliver results.

Guided by the KM group and a 20-person team of senior-level managers representing multiple functions and locations, networks were created to address various business goals. Each network was assigned deliverables and activities tied to those goals. For example, when the company sought to boost the performance of its globally distributed wells, a team of senior leaders established a Well Optimization Network and set a specific goal of reducing losses related to equipment by 10%. Other networks focused on areas such as facility optimization, production systems, safety, environment, and highly specialized technical areas.

By tasking networks to deliver real business value, leaders sent the message that collaboration was critically important to the company's growth and success. They were not touting collaboration for collaboration's sake. The KM team and business leaders also understood that participation in the networks could not be an add-on to employees' existing commitments. The nature of the networks (as well as the logistics of participation) needed to mesh with the daily work of employees. This meant that collaboration behaviors—and beliefs—needed to change. The KM team sought to effect such change through consistent messaging and management support—all of which would help employees realize that soliciting knowledge from colleagues actually saves time, allow them to experience successful outcomes of collaboration, and demonstrate that collaboration is recognized, measured, and valued. Specific behaviors, aimed at creating a culture that values the give and take

of collaboration, included:

- Share what you know.
- Stop protecting your turf.
- Reach out instead of thinking: It's not my problem.
- Ask questions—go after information.
- Share a problem or puzzle.
- Admit when you don't have a solution or answer.
- Be willing to "spill your guts" to prevent other people from suffering through errors and difficult lessons learned.

Always guided by the dual goals of business results and behavior change, the team took a three-pronged approach to building strong communities of practice: seamless connection within networks, measurement and promotion of results, and select cross-network exchange.

### Seamless connectivity among employees with similar expertise and experience was the primary focus.

Peer-to-peer problem solving and best-practice transfer across units and locations required a combination of (1) key roles, (2) streamlined processes, and (3) effective technology. Unlike many organizations, which leave their networks or communities to self-organize, Global Oil & Gas found that, for the purposes of collaboration for efficiency, more structure was needed. By identifying four formal roles for each network—sponsor, leader, coordinator, and core member—the members were easily able to see how the network functioned and where they fit in. Sponsors are champions of the network and are usually involved in getting it started. Network leaders actively set the direction of the network and promote knowledge-sharing goals and objectives. Coordinators handle much of the day-to-day monitoring and content

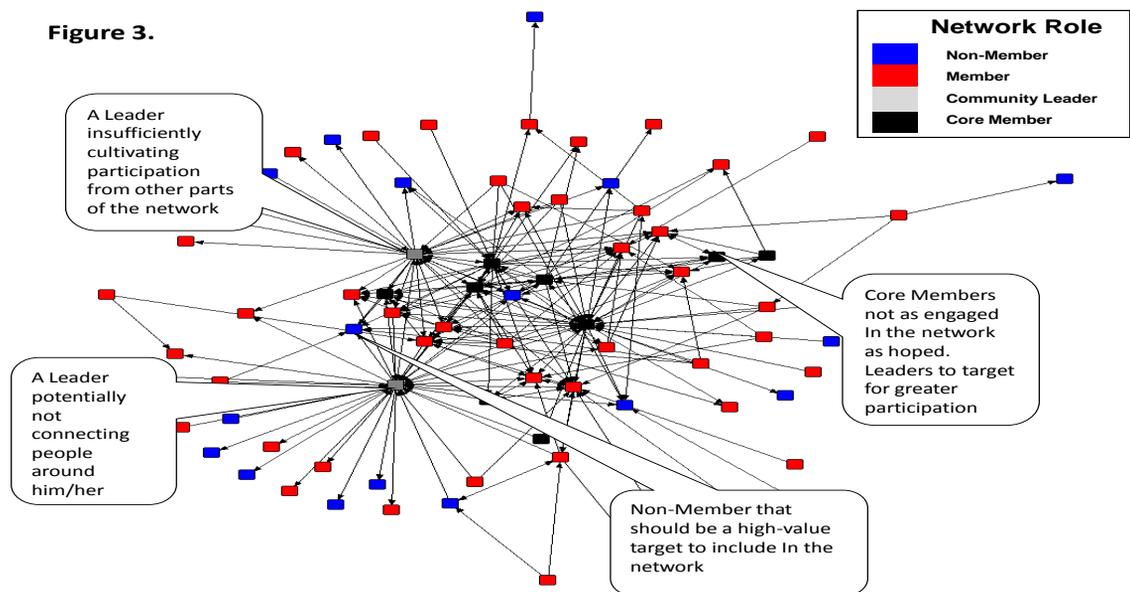
management. Core members are people doing similar work in different locations or units and with related expertise and experience; they spur connectivity at the local or expertise level and add substantial energy and knowledge to the day-to-day activities of the network.

Once established, networks and the members in formal roles aren't left without guidance. The KM team provides coaching and technical solutions that facilitate collaboration and best-practice sharing. Through the processes created and refined by the centralized KM team, each network has the structure and support to be effective collaborators. The KM team also coordinates with managers to provide regular community "health checks" that assess not only participation levels but also the business value of each community. These regular reviews provide a systematic way for networks to evaluate themselves against ten factors crucial for collaboration. Once a community meets all ten factors, a new metric for success is introduced: business impact. This new criteria involves a set of best practices to benchmark business performance and helps community leaders and the sponsor understand concrete steps that will lead to greater business value.

Along with the right roles and good processes, collaborative technology was required for seamless connectivity among the network participants. While the technology didn't drive the networks, getting it right was essential. The company built a customized, user-friendly portal to capture critical knowledge and spur network collaboration. The portal included Intranet-based discussion forums, browse-and-search

tools, email alerts to summarize discussions, and functionality for network leaders to flag issues for members with valuable expertise. The technology was also designed to gauge the vibrancy of each network by mapping electronic communications among members. These connectivity maps provided feedback to the KM team and network leaders to ensure that 1) people were appropriately connected, 2) people in key roles and in various geographic locations were actively participating, 3) the group was capitalizing on its subject-matter experts, and 4) the network was engaging peripheral experts.

**Figure 3** is a network map, based on problem-solving discussion threads for one of the Global Oil & Gas networks, that shows key network



roles and level of participation over a period of time. The analysis helped assess the strength of the network and identify specific people for network organizers to leverage or draw in. Key influencers were apparent, providing organizers with clues about how best to engage others and meet the objectives of the group. Core network members and network leaders are expected to be active—in this case, some were and some were not. Several non-members were involved, indicating their high value to the network. Other members stayed on the periphery, providing an opportunity for improvement. The visual patterns provided by the ONA were used in various ways to enhance collaboration and strengthen the various networks throughout the organization.

### Measuring the impact of network collaboration and sharing results was deemed essential for maintaining strong links to business needs.

The team instituted a process that allows a business to track the payoff from investments in collaboration. As part of that process, employees submitted success stories linked to specific collaborations. These stories included metrics such as savings in capital expenditures, operating efficiencies, and barrels of oil and gas that resulted from the collaboration.

For example, a China-based member of a Specialty Equipment Network connected with a member from North America and, on his advice, insisted on a rigorous inspection of a gas turbine rotor that was on order from the manufacturer. The inspection turned up more than 200 deviations from the original specifications. Had the inspection not occurred, the product would have halted operations once it was put into offshore production in Asia. Ensuring all discrepancies were corrected prior to shipping helped the company avoid engine failure. As another example, a team in Indonesia asked the Heavy Metals Network for guidance in removing mercury from an organic compound. The process for removal was developed and supported by network experts from around the world, preventing a major

contamination risk. This single collaboration saved several million dollars in costs that would have been incurred had the problem not been resolved efficiently and effectively.

Leaders further emphasized the importance of the networks by linking knowledge sharing with global business-performance metrics. Regions, business units, and functions set annual targets for participation in networks, which helped emphasize the desired behaviors for effective global knowledge sharing.

### Targeted cross-community exchange was facilitated by community leaders, preventing networks from becoming isolated.

Network leaders chose 10 to 40 “sister networks,” thus allowing answers to key business challenges to move within and across functions. The collaboration technology was adapted so that network leaders could share discussion items and tailor their communication protocol. Cross-network collaborations were generally less time consuming than those within a single network, because the process was structured and efficient rather than open-ended or uncontrolled. This balance of boundary spanning and structure was needed to foster collaboration in the heavily matrixed and decentralized organization without diluting problem-solving activity in any one network.

These cross-network collaborations had substantial impact on business performance, and the KM team began to track and share those stories as well. For example, the Drilling Network received a request for information and assistance to deal with spikes in Hydrogen Sulfide (H<sub>2</sub>S) in order to better manage gas wells. It shared the query with the Chemical Network, which then helped formulate the response. Because of this collaboration, a solution was implemented that enabled the wells to become fully and safely operational in less time, avoiding costly delays. In another example, the Drilling Network collaborated with

the Well Integrity Network to reduce production losses resulting from barium scale buildup in large wells on an offshore platform. Working together, experts in both networks identified and solved the challenge, decreasing production losses at the initial location by more than 10,000 barrels per day in the first year after the change was made. Savings continued in subsequent years, and the lessons from this improvement were shared with units in other parts of the world dealing with the same challenge.

As the overall collaboration initiative grew, the dual emphasis on business results and behaviors remained. Regions and business units reported network progress as measured by contributions to enterprise-wide performance. The KM team continued to use success stories to measure the impact and value of global collaboration, and added an emphasis on network participation. The documented results early on allowed the initiative to expand to all parts of the company and allowed the KM team to introduce other tools and knowledge-sharing resources. A semantic analysis of network forums led to the ability to deliver content to employees through intuitive topics and sub-topics. Another big initiative was the deployment of an enterprise-wide wiki. This global encyclopedia complemented the network structure, allowing employees to create and re-use knowledge. Each year, network leaders gather to share best practices for driving collaboration behaviors and delivering business value, and awards are given to recognize business units and regions for collaborative, knowledge-sharing behaviors.

More than ten years into the effort, Global Oil & Gas has succeeded in breaking down barriers, building trust, and sharing knowledge. Network members are affiliated with employees far beyond their physical location or cultural background, and are better connected to the enterprise as a whole. Participation in the networks by company “knowledge workers” has become the norm; 75% (more than 12,000 employees) are involved in some 100 networks, and each person belongs to three networks, on average. The networks have documented more than 100,000 collaborations

that yielded critical efficiencies and savings of hundreds of millions of dollars.

## Four Principles for Promoting Boundary-Spanning Networks

Juniper Networks and Global Oil & Gas exemplify much of what our research over the past decade suggests is critical for companies to derive value from investments in collaboration across boundaries. Juniper’s success derives from an emphasis on promoting collaboration among people with different expertise, focusing on boundary-spanning networks and roles to boost connectivity across functions, sites, and perspective. In contrast, Global Oil & Gas invests in collaboration to facilitate connectivity and best-practice transfer among people with similar experience and expertise across locations, level, and culture to optimize efficient utilization of equipment and facilities. While their collaborative strategies are different, both organizations found success by investing in collaboration and connectivity with rigor and clarity—just as they would invest in other strategic priorities.

Our combined research over the past two decades has helped Juniper, Global Oil & Gas, and other companies approach boundary-spanning collaboration in a way that is strategic and pragmatic. Our work suggests four principles to bear in mind to promote desired results from boundary-spanning collaboration.

### Principle 1. Clarify the strategic purpose of boundary-spanning collaboration (e.g., innovation or efficiency).

Before embarking on network-building and boundary-spanning efforts, be sure to clarify—for everyone involved—the purpose. Is it to spur and sustain innovation through the combination of diverse expertise and perspectives? Or to

increase efficiency through the transfer of knowledge and best practices? Both Juniper and Global Oil & Gas identified an organizational pain point, determined the type of network that could address it, and developed boundary-spanning practices and processes that would produce the desired results.

Some organizations have succeeded in pursuing a dual purpose. Consider a global consumer products organization that had eight autonomous divisions run largely as stand-alone business units. Although the organization was successful, there were clearly both innovation and efficiency opportunities to be gained through better coordination and leverage of expertise across

the units. The catch was that the leadership teams of each unit were intensely protective and had no desire to give up their autonomy. In addition, each unit had its own culture and organizational structure. The CEO felt that getting people in the units to become comfortable working together in a new way, by implementing something like a matrix structure, would be a very costly and lengthy process. And he was sure he would lose a lot of the benefits of market focus the company currently enjoyed within each unit.

ONA provided a way to drive both efficiency and innovation in a more targeted way. In this case, we conducted a network analysis of the top 1,700 people in this organization. The results were then used in targeted ways to attain desired performance gains. To increase efficiency, the company took several actions: It mapped decision-making interactions across the units to identify points where reallocating decision rights and streamlining decision processes could reduce collaborative demands. It implemented 12 communities of practice to connect those with role or technical expertise who were spread across units and locations. And it established dramatically different on-boarding processes to help transfer organizational knowledge and memory to newcomers, a move that made this critical group of people more productive and thus able to

support the organization's growth goals. All these efforts focused on a knowledge transfer approach employing staffing, information technology, and Six Sigma processes to move ideas and best practices through the organization. Further, each effort was informed by the ONA and so was much more targeted than a broader plan, such as implementing a matrix structure, would have been.

In parallel, another set of initiatives targeted innovation opportunities that were critical to this organization's strategy. For example, several business units had complementary product lines that were not being exploited to develop new offerings, in large part because fiercely autonomous leaders had unwittingly (and sometimes wittingly) stalled the innovation efforts mandated by the organization. With the network information, product development teams were established that combined formal leaders and those who were very central, and therefore influential, in the network. These groups were brought together in rich ideation forums similar to the one Juniper organized.

Our point is that it is not impossible for leaders to achieve both efficiency and innovation in a strategically important network. The key, however, is to be targeted in the kind of collaboration that is needed and then to invest appropriately at those points. Throughout our research, we have seen this approach produce much better results than the common approach of implementing matrix structures and social media indiscriminately, in the mistaken belief that more collaboration is always better. This leads us to our next principle.

## Principle 2. Avoid collaborative overload, which can invisibly derail performance improvement efforts.

Managers and executives in large and small companies alike feel overloaded with initiatives that demand collaboration on multiple fronts.

Our research shows that time spent collaborating in many kinds of knowledge work has increased 30% to 55% in the past decade. Yet managers don't seem to be paying attention to the depletion of this precious resource (i.e., employees' work time); instead, they implicitly require that employees manage this on their own.

ONA makes these demands visible and so ultimately more actionable for leaders. For example, it is very common for well-intended restructurings to falter because collaborative demands overwhelm some of the best people in the organization. These unlucky employees end up having all their old colleagues and many new ones coming to them for advice and guidance. They often burn out and, at the same time, slow the work of many others. In merger scenarios we often find that 5% to 10% of the people—often middle managers—are absorbing upwards of 40% of the collaborative demands as people look for guidance, clarity, and permission throughout a change process. The paradox is that efforts to promote boundary-spanning networks often result in collaborative overload within units or locations, thus creating even more rigid silos in these domains. Taking stock of pre-existing knowledge and expertise and critical patterns that support collaborative work helps leaders rethink how to put in place the right network structures and interventions to support strategic goals.

For Global Oil & Gas, this meant that networks were established only when there was a clear and compelling business case. Rather than overloading the organization with redundant networks or low-priority interests, the KM team made sure that collaboration (and the supporting technology) meshed with daily work and business priorities. This resulted in networks that aligned with the company's focus on efficiency and that were consistent with performance objectives at the employee level. As a result, over the course of a year, a network would typically focus on only one or two business objectives. Culturally, this signaled that collaboration and knowledge sharing mattered; these communities were important to the work, not an aside.

Further, they were empowered to be accountable for having a measurable impact. While initially the networks required additional work (and certainly the KM team and some roles involved new or extra work), in the long term network collaboration helped the broader employee base become far more efficient in daily tasks. In many ways, "more" is always easier to come up with. But agreement on less was the path to greater business value for the Global Oil & Gas networks.

At Juniper, the heroic, around-the-clock efforts of key engineers to solve fast-breaking, mission-critical problems had long been celebrated. At an executive offsite, however, when the ONA findings were first presented, the executives began to question the sustainability of this behavior. The collaborative overload and inefficiencies resulting from this kind of fire-fighting had created barriers to innovation. By developing the innovation network, the company was able to tap existing knowledge and cut through barriers. The result was fast-track product development—and traction for future innovation efforts.

Overall, organizations in our research program have found that simply mapping how "in demand" a person is can help both the individual and the organization. We often map two networks to see where overload may prevent boundary-spanning collaborations. The first network is active information flow, which shows the extent to which employees are consumed with collaborative work. The second, greater access, identifies employees whose time, information, or approval is needed by other people to meet business goals for the coming year. Our research shows that when more than 25% of the individuals in a person's network say that they need more contact with the person in order to achieve business goals, it is a red flag for burnout and turnover—as well as organizational inefficiency. Often these people are overwhelmed and holding others up despite working long hours at a frenzied pace. At a minimum, companies do not want to overload

these people even more with the next project, committee, or task force—an all too common scenario among top talent. Companies in our research have found that helping these people shed unnecessary collaborative demands and working with them to shift portions of roles, decision rights, and informational requests can decrease these demands.

### Principle 3. Measure and promote appropriate collaborative contributions.

Although boundary-spanning networks are less formal than the formal organization structure, they don't operate effectively when given free reign. These networks need to be cultivated and promoted; over time they need to be pruned and curbed. The ability to measure whether boundary-spanning networks are paying off is crucial for deciding where to continue investing and when to redirect resources. Initially, boundary-spanning efforts should be clearly linked to business performance goals. Once networks are up and running, mechanisms are needed to track and measure both network processes and collaboration outcomes. For example, with respect to innovation or a new-product development process, ONA often helps identify and assess roles at different stages of the maturity of a product, at critical junctures for bridging tech communities, or when assimilating new knowledge into the process. Who are the connectors, brokers, and energizers at each stage? Are they the same people throughout the process, or do people play different roles at different stages? Outcomes, too, need to be tracked and rewarded so that employees truly see the value of collaboration. For example, the group managing a large team that involved 12 functional areas in chip design was required to take into account ONA metrics and emerging roles. As a result the group brought in some well-connected individuals who transcended demographic (gender, age, etc.) **stories were an important indicator of the company's progress in the journey to develop an excellent knowledge-sharing culture.**

For innovation, we have found that setting ambitious goals (e.g., a 15% improvement in NPD cycle time) pushes networks beyond conventional thinking. But promoting, tracking, and measuring outcomes and processes remain important. For Juniper, success was measured both in terms of how the network functioned and the outcome, or product, it created. The speed of product development (six months from concept to customer) is one metric; the potential revenue of the product is another. From a network perspective, improvement in collaboration patterns across functional, hierarchical, and geographic boundaries is another outcome Juniper is watching. To encourage more networked behavior, Juniper is reimagining a number of its talent practices. First, the Performance Management system is being evolved to recognize both employees' individual contributions and network contributions to the success of the enterprise as a whole. Second, the Rewards program is being recast from a leader-driven to a peer-to-peer program, enabling anyone in the company to recognize anyone else. Third, The Executive Comp program is putting in place a "One Juniper" metric that allows all leaders in the company to rally around an overarching goal.

### Principle 4. Embrace both formal structure and informal networks.

Formal and informal organizational structures are complementary in today's organizations. Formal structure is designed to promote control and steady performance, which is why managers use it to allocate resources and guide many kinds of decision making. Informal networks by definition can be more agile, forming and dispersing in response to specific opportunities. It is important to embrace the benefits of each to attain specific goals. For example, in establishing a mandate for a network, it would be silly not to call on individuals influential by virtue of their formal position, who can provide

resources, perspective, and political support. In addition, though, picking well-regarded people from the network—central connectors, brokers, and energizers in particular—promotes the flow of relevant ideas through the network. Just as important, these people have a legitimacy in the eyes of their peers that those high in the formal structure often do not. Whether for efficiency or innovation purposes, leveraging this form of influence often increases the uptake of ideas.

For example, as it became increasingly clear that the product idea being developed at Juniper was a winner, there were many conversations among leaders about who should “own” it. The prevailing thought was that only by moving the idea out of the informal network and into a formal structure could the product be managed, controlled, resourced, and brought to market. Ultimately, leaders backed down from this way of thinking, allowing the product development process to continue to flow through the informal network. “With the network, we had the relationships and expertise we needed to bring the product to market,” Vince Molinaro said. “The network got us this far—the network will get us across the line.”

At Global Oil & Gas, the combination of formal business functions, the KM team, and people in designated community roles allowed the informal networks to succeed. For example, formal leaders defined the policies and procedures for the entire project life cycle.

However, what enriched the experience was the informal nature of the discussion, which allowed practitioners to interact globally when work did not fit into formal processes. The informal “global water cooler” filled in the gaps in knowledge, sending a message that people needed to listen to the informal banter in global discussions to do their jobs effectively.

Another angle for combining formal structures and informal networks is through talent management practices. Formal systems such as performance reviews, individual development plans, and succession planning can reflect and foster goals of the informal networks. For example, one global company uses crowdsourced, peer-based performance evaluations, reinforcing its extensive investments in collaboration, self-managed teams, and project networks. Other (perhaps easier to implement) tactics include factoring network collaboration skills into individual goals—and facilitating experiences such as low-risk collaborative assignments, travel opportunities, and even boundary-spanning social activities to build those skills. Flexible membership teams and job rotations may be used in service of larger boundary-spanning goals. Managers can be held accountable for collaborative or shared goals, not just their department, division, or project goals.

## Obtaining Value from Boundary-Spanning Networks

Boundary-spanning networks can provide significant economic return and even competitive advantage. But cross-boundary collaboration does not occur organically or effectively in most large organizations. We’ve found that broad, unfocused efforts to increase improve collaboration simply add to employee overload and block organizational goals. Instead, organizations can obtain value from cross-boundary networks by taking a strategic, three-part approach. First, leaders must determine the kind of impact desired: innovation or efficiency. Second, looking across the hierarchical, functional, demographic, stakeholder, and geographic boundaries, they need to identify where connectivity can produce value, rather than shooting blindly with interventions that simply layer on collaborative demands. Third, they must ensure that appropriate organizational contexts are designed to facilitate collaboration and nurture networks.

# Selected Bibliography

Two streams of literature influenced our thinking in the development of this article. First is research from network and boundary-spanning literatures that have shown how collaboration across boundaries fosters innovation and new product- and process development efforts in multi-level settings, involving people, teams and business units. Research on how networks and key boundary-spanning roles within them facilitate information and knowledge flow includes: Michael Tushman and Thomas Scanlan "Boundary Spanning Individuals" *Academy of Management Journal*, 1981, 24, 289-305; Dorothy Leonard-Barton *Wellsprings of Knowledge* (Harvard Business School Press, 1995); Gabriel Szulanski "Exploring Internal Stickiness," *Strategic Management Journal*, 1996, 17, 27-43; Morten Hansen "The Search-Transfer Problem," *Administrative Science Quarterly*, 1999, 44, 82-111; Argote, L. 1999. "Organizational Learning: Creating, Retaining, and Transferring Knowledge." Boston: Kluwer Academic Publishers; Tsai, W. (2001). Knowledge Transfer in Intraorganizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance. *Academy of Management Journal*, 44: pp. 996-1005; Levin, D. & Cross, R. (2004). The Strength of Weak Ties You Can Trust: The Mediating Role of Trust in Effective Knowledge Transfer. *Management Science*. 50(11): pp. 1477-1490. Ron Burt *Brokerage and Closure* (Oxford University Press, 2005); Dimitris Assimakopoulos, Elias Carayannis and Rafiq Dossani *Knowledge Perspectives of New Product Development* (Springer, 2011); Marco Tortoriello, Ray Reagans and Bill McEvily "Bridging the Knowledge Gap," *Organization Science*, 2012, 23, 1024-1039;

Although influential, this body of research has not typically focused on principles to enact knowledge transfer and manage organizational learning and change through networks. We therefore sought to leverage rich research traditions in organizational learning and management of change and leadership. Important work leveraged from this perspective includes: Jean Lave and Etienne Wenger *Situated Learning* (Cambridge University Press, 1991); John Seely Brown and Paul Duguid "Knowledge and Organization" *Organization Science*, 2001, 12, 198-213; Wenpin Tsai "Knowledge Transfer in Intra-organizational Networks," *Academy of Management Journal*, 2001, 44, 996-1005; Beth Bechky "Sharing Meaning across Occupational Communities" *Organization Science*, 2003, 14, 312-330; Chip Jarnagin and John Slocum "Creating corporate cultures through mythopoetic leadership" *Organizational Dynamics*, 2007, 36, 288-302; Rob Cross, Chris Ernst and Bill Pasmore "A bridge too far? How boundary spanning networks drive organizational change and effectiveness" *Organizational Dynamics*, 2012, 42, 81-91.

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