

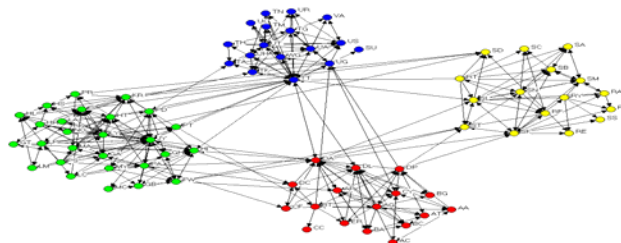
# Assessing and Improving Communities of Practice with Organizational Network Analysis

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### **Abstract**

Although many organizations initiate communities of practice (CoPs) to drive performance and innovation, managers typically have little insight into their internal effectiveness and business impact. Based on work with 15 organizations over the past four years, this article offers network analytics, interventions and metrics to improve and track success of a community initiative. Specifically, it shows how organizational network analysis can help move a community from an ad hoc, informal group to a value producing network by focusing on five critical levers: 1) improving information flow and knowledge reuse; 2) developing an ability to sense and respond to key problems or opportunities; 3) driving planned and emergent innovation; 4) nurturing value-creating interactions; and 5) engaging employees through community efforts.

## Assessing and Improving Communities of Practice with Organizational Network Analysis

As knowledge has become increasingly central to the economy, many executives have taken steps to improve knowledge worker productivity. In the mid to late 1990s, organizations focused heavily on capturing and sharing lessons and reusable work products to avoid costly replication of effort and improve performance on critical tasks throughout an organization.<sup>i</sup> These efforts resulted in substantial databases and organizational infrastructures to record, screen, and make volumes of knowledge assets available to employees. However, the resulting databases did not become as central to knowledge worker effectiveness as many managers and IT vendors had hoped.<sup>ii</sup>

A part of the problem can be traced to assumptions of knowledge work. Knowledge workers must often solve complex, ill-defined problems with short time horizons. Doing so requires more than simply finding an answer in a database: knowledge workers must also define relevant dimensions of a problem space, craft a solution that is feasible and appropriate for the situation, and convince others of the correctness of a proposed course of action.<sup>iii</sup> Given this dynamic problem-solving process, it is no surprise that databases did not supplant people as a key source of information. Instead, informal networks continue to be critical to knowledge transfer,<sup>iv</sup> diffusion of innovations and ideas,<sup>v</sup> and creation of knowledge that is actionable in a given organizational context.<sup>vi</sup>

Appreciation of the central role informal networks play in knowledge creation and transfer has led to what many call the second (or third) wave of knowledge management—a movement starting in the late 1990s that focused heavily on technical and organizational initiatives to promote collaboration.<sup>vii</sup> On a technical front, collaborative technologies have grown to account for nearly one-fifth of corporate spending on software,<sup>viii</sup> with the market for real-time collaboration tools estimated to be close to \$6 billion in 2005.<sup>ix</sup> Organizationally, many executives have begun to identify and support CoPs as vehicles to improve organizational performance and innovation.<sup>x</sup> Yet the question remains as to whether these efforts yield productive collaborations and business value or simply consume excess money and time, as happened in the first wave of knowledge management. Addressing this question requires targeted means of assessing and improving communities to ensure that investments deliver business value.

Organizational network analysis (ONA) helps by allowing executives to visualize the myriad relationships either facilitating or impeding community effectiveness.<sup>xi</sup> Over the past several years we have engaged in a research program applying network analysis to 15 CoPs. In this process, we learned that ONA helps community leaders do such things as identify opinion leaders, draw in peripheral members, guard against knowledge loss, and ensure connectivity across key network gaps. In Table 1, we have highlighted 10 case examples showing the applicability of network analysis as a vehicle for community improvement in a range of leading organizations. Below we provide an in depth example.

[Editor's Note: Insert Table 1 About Here]

Consider Halliburton, one of the world's largest providers of products and services to the petroleum and energy industries. An industry leader in the knowledge management realm, Halliburton has regularly employed ONA in many of its efforts to systematically build 19 CoPs across a variety of business disciplines and technical services. Halliburton did not implement these communities in an ad hoc fashion: Senior management demanded more than loosely defined or difficult to measure objectives such as “improved collaboration” or “better knowledge sharing.” Rather, the community initiatives had to show measurable results directly linked to financial performance. By applying targeted interventions based on ONA assessments, Halliburton has been able to do just that across a number of internal and external communities. As an example, a global CoP within a critical business unit produced the following measurable results in one year:

- Lowered customer dissatisfaction by 24%
- Reduced cost of poor quality by 66%
- Increased new product revenue by 22%
- Improved operational productivity by more than 10%

Employees in this community design, manufacture, and install equipment enabling production of hydrocarbons from newly completed oil and gas wells. Although initial planning for the completion of a well is very important, the final design is highly dependent on the operational parameters of the well. This means that a completion may go through a large number of changes depending on how the drilling of the well develops, various reservoirs it may cross, expected production, and local logistics. Because of this dynamic environment, all those involved must collaborate closely to avoid errors in hand offs from one group to the next. Through its community investments, Halliburton created a global, collaborative environment that helped mobilize expertise to solve problems at an individual well and also benefited drilling around the world as others avoided costly mistakes. For example, at one point a member of the completions community experienced a specific problem with a deep-water well in West Africa. Through both virtual forums and specialist roles in the network, a solution to the problem was found and then propagated with such speed that three other similar completions to be performed within the next 24 hours avoided the same problem and saved important customers millions of dollars in non-producing time.

Halliburton’s CoP pilot was initiated in 2002 to reduce non-producing time, which cost the business unit 4% of net profits due to penalty contracts: a substantial drain only likely to grow due to increased complexity in new designs. The pilot community demonstrated its value in a mere six months and, as a result, Halliburton expanded the community initiative to cover the entire globe. A network analysis of this group was integral to establishing the CoP, as it allowed management to take targeted actions to improve network effectiveness. Rather than a “more is better” philosophy to promoting collaboration with a technology or cultural change program, Halliburton took a targeted approach that increased connectivity at certain points and decreased it at others. For example, some of the improvements included the following:

- **Identifying overly connected people.** The network analysis highlighted the community's over-reliance on three Global Technical Advisors (inside the oval in the graph in Figure 1a). Prior to community launch, employees in each operational unit turned to people in these formally designated roles for problem solving help. Halliburton initiated the community, in part, to help employees connect directly with each other to solve problems and thereby eliminate the inefficiencies and bottlenecks resulting from excessive reliance on this group of specialists. Instead of investing time capturing and sharing best practices, these highly valued experts often became consumed by repetitive and mundane requests from the field. This pattern of behavior impeded critical knowledge dissemination and also made the community vulnerable to the departure of these employees. The network analysis showed that the loss of these three people – from simply quitting or even being promoted to a different role – would cause a high degree of disconnection within field operations.
- **Bridging invisible network silos.** A series of silos was also found in the network across both geography and function (though we show only geography in Figure 1a). As an example, operations in the Gulf of Mexico (USA) had developed several new best practices and, as a result, decreased the cost of poor quality in the Gulf of Mexico operations by 50% in 12 months. Yet during that same time frame, the rest of the countries involved in the ONA had experienced a 13% *increase* in the cost of poor quality. Clearly the Global Technical Advisors were not effectively transferring these practices – and only a few connections between the countries existed outside of these roles (connections between people in the Gulf of Mexico and Angola were due to the fact that four individuals in Angola had worked in the Gulf of Mexico before).
- **Creating awareness of expertise distributed in the network.** In part, the ineffectiveness of the Global Technical Advisor role arose from the advisers being overloaded. But an equally important impediment was that they did not know many people in the field who needed their best practice insight. The ONA revealed that, on average, six people in the field knew one or more Global Technical Advisors; the Global Technical Advisors, however, on average knew only one person in the field. A significant focus for improvement lay with technical and organizational means to help build awareness of “who knows what” throughout the network.
- **Identifying and drawing in peripheral network members.** The ONA also helped identify key individuals within the various countries who were very knowledgeable and experienced but were not actively engaged in helping to solve problems outside their area of operations. Halliburton targeted these individuals to become a lot more involved as the community coordinator tapped into their knowledge and expertise to help others. In addition, the company assigned several highly-skilled individuals in specific countries to local knowledge champion roles who became effective community coordinators.

[Editor's Note: Insert Figure 1A]

Two types of interventions improved this community’s effectiveness. First was a series of organizational (e.g., revised roles) and technical (e.g., skill profiling system) changes to facilitate interactions within the existing community structure. These changes significantly improved knowledge transfer: Community members’ estimates of the time it took to get answers and solutions were reduced by an order of magnitude, from 30 days down to three days on average. Second, the network analysis also informed several strategic personnel transfers of high-potential employees between select countries. These international transfers offered professional development opportunities for the selected individuals and established connections between previously disjointed operating regions.

These highly targeted efforts generated substantial business results as outlined above. In addition, a follow-up analysis (Figure 1b) performed one year after the interventions revealed overall improvement in the network. The ONA allowed Halliburton to focus efforts on connectivity that had value for the organization—not just an indiscriminate increase in collaboration that could simply drain resources and time. For example, “cohesion”—a key network measure of the average number of steps it takes for each person in the community to get to every other person when in need of knowledge or expertise—improved by 25%. This improvement, combined with anecdotal evidence, made clear to Halliburton that important business conversations were occurring (e.g., moving best practices from the Gulf of Mexico to the rest of the field operations) without imposing an unnecessary collaborative burden on all employees.

[Editor's Note: Insert Figure 1B]

### **Moving Communities of Practice from Ad Hoc to Value-Creating Networks**

As the Halliburton example shows, network analysis can be very helpful for improving existing CoPs. Rather than simply implementing another collaborative tool—a solution that often leads to bottlenecks as already overloaded community members get even more consumed—network analysis allows a community leader to target points where connectivity needs to be decreased as well as increased. The analytic possibilities offered by network analysis are substantial, with one of the leading primers in the field running in excess of 800 pages.<sup>xiii</sup> We don’t hope to recreate all that can be done with network analysis here but rather to demonstrate a set of analyses that managers have found most helpful in our work with 15 CoPs. In Table 2 we outline six network views that can help a community leader assess the health and inner workings of an *established* community and thereby guide intervention efforts.

[Editor’s Note: Insert Table 2 About Here]

In addition to established communities, ONA can also help create new communities. By understanding a nascent network and tracking improvement over time, community leaders can be much more effective at transitioning a fledgling community into one that produces value for both community members and the organization. Table 3 identifies common value propositions sought from CoP programs and then shows how ONA can be used to target interventions and track improvement in collaborations within the community as well as business objectives such as revenue growth or cost savings.

The remainder of this article explains network interventions targeting five critical levers for increasing the return on community investments:

- Improving information flow and knowledge reuse
- Developing a sense and respond capability to capitalize on new opportunities
- Driving planned and emergent innovation
- Nurturing value-creating interactions
- Ensuring employee engagement through CoPs

[Editor's Note: Insert Table 3 About Here]

**Improving information flow and knowledge reuse.** A common objective for any CoP program is to encourage information flow, knowledge reuse, and learning among employees.<sup>xiii</sup> This informational focus derives from early scholarship on the situated nature of learning and problem solving in communities.<sup>xiv</sup> However, from a purely practical perspective, substantial efficiency and effectiveness benefits result from communities that promote effective knowledge creation and transfer. Unfortunately, in new communities, we typically see information flow and learning networks that are constrained by formal structure,<sup>xv</sup> homophily,<sup>xvi</sup> and to some degree personality or interests of those involved.<sup>xvii</sup> These social forces create silos and a wide dispersion of connectivity that undermine knowledge transfer and performance benefits of communities.

We regularly find new or emerging communities where 15% of the members (those central in the network) have 50% or more of the ties, whereas 40% of the members (those peripheral in the network) have only 5-10% of the ties. A network perspective can help leaders create connections that redistribute relational load and improve community effectiveness. Consider the diagram in Figure 2a, which reflects information flow among technical architects in the CIO's office of a major utility. This group of highly skilled technologists needed to collaborate to ensure consistency of standards and strategic direction in technology investments. Managers whom we interviewed suggested that up to 95% of projects completed required rework, which carried both a financial cost and customer dissatisfaction burden. Greater consistency in applications and methodologies employed throughout this network would help avoid replication of effort. Greater depth in certain knowledge domains would help improve solution quality. Although a number of opportunities emerged from the assessment, one common to all communities lay with working through brokers in the network (those people identified with large circles in Figure 2a) to promote overall connectivity.

Editor's Note: Insert Figure 2a About Here

Identifying brokers in a network (those who may not have the most direct connections but by virtue of where they sit in the network are disproportionately influential in holding the whole community together) and then making them "go to" people on topics important to the ongoing work of the community can efficiently improve network connectivity. For example, in this case the company sought to maintain consistency of development process, framework, and applications to avoid substantial

costs of application proliferation throughout the organization. As a result, management was concerned with developing depth in key programming domains (e.g., JAVA, .Net, and testing) as well as other technical expertise (e.g., application, infrastructure, data, and business architecture). Creating “go to” people out of those already central in the network because of their knowledge on these topics provided an efficient route to improve connectivity. Brokers already have credibility and legitimacy in the eyes of their peers, so they are much more likely to be sought out and listened to than a designated expert who might not be influential in the network.

In general, three simple actions can efficiently promote community connectivity. First, identify key brokers (see Table 2) who have expertise important to the community and designate them the “go to” people on those topics. Publicize this designation to the network, but, just as importantly, also ask the brokers to help point people to others and not necessarily always answer questions directly. To ensure action, this designation should become a part of the “go to” person’s job, potentially including relevant decision-making authority and definitely encompassed in his or her performance reviews. Second, use a regularly scheduled (e.g. biweekly) call or meeting among this small set of brokers to share challenges and help them better understand the expertise of other brokers as well as key community experts. Finally, ask the brokers to specifically reach out to two to three peripheral people and help draw them into the community. These seemingly simple efforts can have a substantial impact. In this example, creating ties among the five brokers and connecting two peripheral people to them improves the cohesion of the entire network by 22%.<sup>xviii</sup> And importantly, it does so through targeted efforts focusing specifically on the expertise that needs to be transferred and leveraging the network to ensure this is done most efficiently rather than increasing time consumed in collaboration among the entire group.

A second opportunity for improving community connectivity lies with assessing network susceptibility created by the most central members. What happens if highly connected employees leave? Most often, this knowledge drain affects the group by virtue of both what the departing person knows AND how his or her relationships hold the entire network together. Mentoring relationships that transfer key people’s expertise to others can help guard against this loss. Similarly, redistribution of relational load via brokers also decreases network vulnerability to key departures. For example, losing the top three connected people (just 5% of the group) prior to leveraging the brokers or “go to” people as outlined above decreases network connectivity (cohesion) by 21%; however, after the changes, losing the top three decreases connectivity by only 8%.

Finally, we can have a disproportionate effect on a community by focusing on the personal connectivity of its most central members. Quite often in either CoPs or formal departments, the most central people in a network get overly consumed with demands from their colleagues and so become bottlenecks in the network. As the pressures for disseminating knowledge increase, these central people often become highly insular and stop learning from as broad a personal network. Using coaching, mentoring, or career development efforts to help these influential people diversify their networks can have a powerful impact on the individual and the group as a whole. For example, in Figure 2b below, we have inserted a summary personal network profile of one of the most central members in the above community. The box titled “Functional Group” shows that the most influential relationships this person had were from those in similar areas—a



common career trap. But our work has shown that high performers consistently display ties bridging outside of their unit as well as outside of the organization. Helping central people diversify their network can improve learning and effectiveness of the individual over time and ensure that the community as a whole is not overly influenced by a small, insular group of people.

Editor's Note: Insert Figure 2b About Here

**Developing a sense and respond capability.** Creating a healthy community requires more than simply facilitating the flow of information. A network needs to sense and respond to crises or opportunities dynamically. To do so, members of the community must be aware of expertise distributed throughout the network—not just the knowledge and skills of those currently accessed for problem solving. Certain employees might not be getting information from others at a given point due to existing project demands; however, being aware of colleagues' knowledge and skills improves performance, as they are able to tap into the most relevant expertise when projects shift.<sup>xix</sup> This awareness of colleagues' expertise can be mapped to provide a latent view of a network—not the people currently tapped for information but the people who might be sought out when circumstances change.

For example, consider the network analysis of a CoP in a well-known intelligence agency. A major concern in the intelligence field lies with an agency's ability to rapidly leverage relevant expertise (often distributed across departments and geographies) in the face of new crises. This ability to “surge” in response to or anticipation of crises means better internal network connectivity between such groups as 1) data collectors and analysts; 2) Cold War veterans and Gen Xers; and 3) those with local cultural knowledge and technical understanding of threats. In a broad effort to improve lateral coordination, this agency implemented a number of programs—one of which was a new CoP focused on improving knowledge creation and sharing. Although the ONA revealed a number of interesting points about information flows within the community, it also highlighted a *lack* of awareness of colleagues' expertise (see Figure 3). The shear density of the diagram underscores that a major opportunity to improve learning and knowledge transfer in this nascent network lay with developing a broad understanding of the distribution of expertise throughout the community.

Editor's Note: Insert Figure 3 About Here

Such lack of awareness is by no means unique to this agency. Across all of the communities in this research program we have consistently found lack of awareness to be a substantial impediment to collaboration in CoPs. Fortunately, increasing awareness proves to be relatively simple and does not impose a substantial time or cost burden on all community members. In contrast to interventions that push more information through a network or simply demand more collaboration, the focus here lies with developing a latent network, where the most relevant expertise in the network can be located and brought to bear as new conditions warrant. Two broad categories of interventions help build this meta-knowledge.

First, make fairly simple information about community members' expertise available so employees can reach out to each other as appropriate rather than simply rely on reputation or a current set of contacts. These expertise or skill profiles can be provided in paper or electronic form but commonly carry two kinds of content. First, an expertise profile should focus on information that creates legitimation in that professional context. This ranges across communities and can include such things as patents, publications, degrees, or project experience. To be effective, a leader must understand what creates credibility in a given community and capture that information in a community member's profile. Furthermore, the best profiles go a step further and disclose some level of personal information. Though seemingly simple, things such as alma mater, interests, hobbies, and a picture can be non-threatening to reveal and critically important in helping to start a conversation between two strangers.

Second, simple shifts in face-to-face or virtual gatherings can substantially improve awareness among community members. If left to their own devices, most people choose to cluster with those they already know and like. In face-to-face meetings, community leaders can help break out of this trap by shifting where people sit or pre-populating breakout sessions to encourage connectivity where an ONA suggests it would be helpful. In virtual forums, a community leader can ensure that peripheral voices are heard by how they design the agenda. Regardless, whether face-to-face or virtual, more effective meetings draw participants with educational content for the group—but importantly also include interactive forums focused on community members' successes and challenges. These efforts engage others in problem solving so that work gets done while people in the network also learn about each other's expertise.

**Driving planned and emergent innovation.** Although CoPs often focus on sharing current best practices, all CoPs have the potential to help drive product or process innovation. ONA can help identify the degree of integration of certain skills and competencies and how overall network patterns facilitate or inhibit innovation. For some time, research has drawn attention to how an organization's existing knowledge affects its ability to recognize and take action on new information and opportunities.<sup>xx</sup> ONA allows one to visualize the distribution of expertise in information and decision-making networks to see if a specific point of view or competency (often ones that contributed to past organizational success) garners disproportionate attention. Such dominant paradigms can influence what information gets attention and which opportunities warrant action in a way that undermines desired innovation or inappropriately drives innovation along a traditional trajectory.

Because they are often voluntary groups, communities tend to form based on affinity—those people who care about similar aspects of their work will naturally be drawn together. Unfortunately, this can drive fairly rigid silos in the network based on people's expertise (defined in terms of either core technical skills or functional affiliation). Rather than produce creative friction key to innovation, these groups tend to regenerate similar solutions and ways of thinking. A network perspective allows a community leader to focus on three opportunity points: 1) identifying and bridging network fragmentation between technical expertise where it might undermine strategic growth initiatives; 2) recognizing, and adjusting where appropriate, the relative influence of overly prominent and marginalized voices in the community; and 3) ensuring problem-

solving networks are integrated and used early in projects prior to a solution trajectory being established.

For example, consider a small CoP that had been formed to develop and share best practices globally on the topic of knowledge management. A number of issues emerged from our network analysis, including this issue of the distribution and dominance of expertise in the network. The network diagram in Figure 4 shows the centrality of those with technical backgrounds, which created a dominant paradigm of technical solutions to address knowledge management problems throughout the organization. Knowledge management technologies proliferated despite evidence of relatively low use. Yet rather than consider organizational solutions, the community tended to seek ever more sophisticated tools in hopes of finding the “silver bullet”—which of course never happened. In short, the expertise of a few well-connected, but narrowly-focused people in this community had a striking impact on certain knowledge management practices not proliferating throughout a global organization despite the potential performance benefits.

[Editor’s Note: Insert Figure 4 About Here]

When assessing networks in key innovation functions—such as R&D units—it is relatively simple to find ways to ensure influence of various categories of expertise through things such as project staffing, internal improvement efforts, or career development processes. Leaders of broad-scale CoP efforts often lack direct control over these levers—imposing a daunting, but not an insurmountable challenge. One way to overcome this challenge is to thoughtfully organize tables or breakout groups in face-to-face meetings to help build out important connectivity. Another technique, creating “alternative perspective” stories that characterize how different expertise produces different solutions to the same problem, can help members see complementary strengths, even in a virtual meeting format. Communities with small budgets can promote light-hearted competitions and report outs on “what if” innovations that might emerge through the collaboration of those with different skills. Such actions also allow leaders (or go to people) to model desired behaviors by bridging connections between different experts rather than trying to answer all questions directly.

**Nurturing value-creating interactions.** Although few will argue against collaboration and learning in the abstract, executives tend to decide whether or how to support a CoP based upon measurable value creation. Those CoP proponents who can document value creation are much more likely to be successful in acquiring resources. We have employed two ways to demonstrate the value of CoPs with ONA. First, one can test the correlation of individual or community networks with important outcomes such as increased revenue, decreased cost, and improved customer satisfaction. A strength of the network approach lies with its quantitative foundation, which allows a community leader to relate group-level properties to business results and statistically assess the extent to which individual network dimensions drive outcomes such as performance or rapid promotion.<sup>xxi</sup>

Second, one can measure value creation in relationships of the community participants. With this view, the community leader maps a network diagram based on

community members' perception of value derived from interactions with other members (e.g., time saved, revenue generated). In contrast to looking at outputs such as revenue growth or customer satisfaction, this perspective helps identify where action needs to be taken to improve a community. Consider the network diagram in Figure 5a, which is a snapshot of a technology-based CoP in a well-known financial services organization. Although we analyzed a variety of dimensions in the network, this diagram maps answers to the following request: Please provide an estimate of the typical time saved per month as a result of information, advice, or other resources received from each person. Measuring time saved among members of this internally focused community allowed us to quantify the value of network interaction savings with a loaded compensation figure. This calculation revealed savings of a little over \$100,000 per month from this community, a substantial sum—even for the skeptics who discounted the savings by half—given the small investment that the organization had made to date in supporting the group (simply a Web site and some of a leader's time).

[Editor's Note: Insert Figure 5a About Here]

At least two opportunities for improvement were immediately apparent from the diagram. First, the bulk of the value-creating interactions were focused on a small number of people. In particular, the nominal leader of the community alone accounted for a little over a fifth of the value creation in the entire network. When we asked what would happen if she left the organization, the sponsor of the network analysis indicated that, in fact, she had recently decided to leave this role. So an immediate and pressing goal of the network analysis was to help find and nurture new leadership to fill this void. Second, we also focused attention on the periphery of the network. Here we found 20 people who were, in the eyes of their colleagues, producing no value. Of course, just because someone is peripheral in one network does not mean he or she is not central in another. Here, however, our interviews revealed a number of people with the expertise and desire to help the community but who had unfortunately been unable to break in or be heard. Armed with the network information, managers had a much greater ability to focus on community activities and mentoring that could help integrate these people.

Beyond looking at the distribution of value-creating interactions in a community, it is also helpful to consider key fragmentation points. We often employ a set of quantitative analyses as network diagrams become overly complex when they get to a significant size. In particular, Figure 5b reveals a table where each cell contains the number of hours saved within and between functions that this community was spread across (read this table from row to column in determining value-creating interactions both within and between units).

[Editor's Note: Insert Figure 5b About Here]

There are two general insights from assessing a network this way. First, looking down the diagonal of the table, we can see the value creation (or lack thereof) within functions in this community. For example, we find those in HR to be very helpful to one another but those in other functions deriving much less benefit from collaborations with their colleagues. We can (and did) look at these kinds of interactions across a number of

fragmentation points—hierarchy, physical distance, key projects, and functions—to name a few. But the general point is to identify those pockets in the network that need help as well as those that are working well and can share the keys to their success.

Second, we assess the value-creating interactions between functions (i.e., those off of the diagonal). Here the question is a strategic one: Given the purpose of this community, do we see the right intersection points generating value in the network? Typically, the real value proposition of a community lies with increasing knowledge transfer and learning across some natural fragmentation point in the networks—ties across function, physical distance, expertise or key projects. The overall return of the community can be broken down into value-creating interactions within functions (in this case, \$75,500 per month that might happen anyway because formal structure encouraged these interactions) and between functions (in this case, \$28,000 per month that derived from interactions the community enabled). Armed with this information, community leaders can both target points where they want to drive improvement in the network as well as approach executive decision makers with well-thought-out economic justification for any resources they might need.

**Ensuring employee engagement through CoP efforts.** Although a small number of leaders or subject matter experts might have some of their time committed to fulfill community roles, most members of a community dedicate discretionary time and effort. As a result, it is important for leaders to minimize obstacles to participation and ensure the community engages the hearts and minds of its “volunteers.” Network analysis can provide structural and relational insight on this front. First, reciprocity—or balance in the give and take in relationships—offers an important indicator of the health of voluntary groups like communities.<sup>xxii</sup> Information and resource exchanges visualized in the network must be somewhat balanced to ensure members’ continued engagement and willingness to help others.<sup>xxiii</sup> Network analysis can show a community leader where to intervene via 1) visual assessments of reciprocated or one-way interactions highlighting specific people or relationships seemingly out of balance and 2) indexing group reciprocity by the ratio of reciprocated ties to total ties in the network as a measure of overall community health.

In addition to the structure of exchanges in a network, a community leader can also look at specific kinds of relationships to determine the extent to which network connections are generative or draining. Traditionally network analysis has focused on instrumental networks such as task-related communication, information exchange, workflow, or transfer of resources.<sup>xxiv</sup> However, research has begun to show the substantial impact that affective or emotional dimensions of networks can have on employees’ subjective well-being and productivity at work. For example, network analysis can be used to assess energy or enthusiasm in networks and help make improvements at fragmentation points or areas of low connectivity through behavioral interventions.<sup>xxv</sup> Though seemingly soft, it turns out that this view of enthusiasm in a network provides a great deal of insight into emerging pockets of innovation and is also a strong predictor of high performers (i.e., those in the top 20% are much more likely to energize others).

Several affective relationships can be mapped in a community. For example, various studies have shown that networks of friendship, career advice, trust, and energy,

in various combinations, drive individual and group performance, knowledge transfer, and quality of work life. Whether a community leader decides to assess these kinds of relationships tends to depend on the context and values of management. Managers solely focused on information flow, problem solving, and value creation may try to avoid mapping one of these so-called “soft” dimensions, but increasingly we try to assess at least one affective relationship appropriate to the context.

For example, Figure 6 contains a network diagram where we mapped interactions of personal support in a CoP in a major consulting firm. Here a relationship between two people indicates a positive response to the following question: “To what extent do you turn to each person in this network for personal support (i.e., to discuss issues at work that bother you or to simply vent in order to get back on track)?” In this and other work we have found that the presence or lack of supportive relationships predicts individual performance and job satisfaction. Quite often, those who provide personal support help us get back on track and be productive in more subtle ways than many of us realize. In this situation, management used ONA to examine whether and how employees received support through CoPs during the challenging times of a major consolidation.

The community in Figure 6, although distributed across three major cities, was very well-connected in terms of information exchange and sales collaborations (in network analyses not shown here). Particularly informative in this case was the extent to which the personal support networks varied radically in each city. Although all faced similar consolidation issues, one city had done a much better job of creating strong connectivity in this time of transition, offering lessons of value to the other cities. Further, it was interesting to note the substantial drop-off in connectivity between cities when comparing the personal support network to the information network. In this case (and many others we have seen), although information moved readily across wires, deeper relational dimensions seemed to require at least some periodic face-to-face contact. Clearly, managing this softer dimension proves more challenging and important in virtual community relationships and can be critical in ensuring engagement of the “road warriors” in CoPs, who do much of their work in the field, such as consultants, staff auditors, and technical troubleshooters. Views like this—or other affective dimensions—can provide important insight into a community that would be missed in a traditional assessment of information flow.

### **Editors Note: Please Insert 6 About Here**

Finally, we often include an organizational context diagnostic with our network assessments. Such diagnostic questions determine the extent to which organizational forces inside and outside of the community influence employee ability and willingness to engage in the efforts of the community. It does little good to make myriad changes within the community network itself if the organizational context in which the network sits will simply drive the community back to ineffective patterns over time. The diagnostic we apply is based on Cross & Parker’s organizational context dimensions but adapted to specific needs of CoPs.<sup>xxvi</sup> We have provided a sample of diagnostic questions for a community of six sigma practitioners in the appendix (along with the other questions needed to perform all of the analytics shown in this paper). In addition, we have included a bar chart of results from an assessment conducted with a global CoP to show typical

kinds of findings that community leaders obtain from this portion of the diagnostic. For example, in this case we find a high degree of consensus (based upon the coefficient of variance) of a strong collaborative culture, whereas the ease with which people can find out who knows what ranked poorly but with more variance in opinions. Although leaders may use all, part, or new items relevant to their own context, we advise them to pay attention to the five or six issues across cultural values, work practices, human resource policies, technologies, and formal structure/leadership that can disrupt community success if not addressed. However, as this kind of assessment is consistent with traditional organizational diagnostics, we will not review it in depth here but offer the items as a tool in the appendix for interested readers.

### **Conclusion**

Appropriately connected communities can yield substantial benefits when collaboration among community members decreases unnecessary time spent on tasks (e.g., recreating the wheel), improves consistency and quality of offerings, and drives innovative solutions by leveraging expertise distributed throughout the community. Though seemingly difficult to manage, such collaborations are increasingly the lifeblood of any organization heavily involved in knowledge-intensive work. Based on work with 15 CoPs across a number of industries, here we have shown consistent ways that network analysis can inform interventions and help move a community from an ad hoc group to one that creates value for both the community members and the host organization. By making seemingly invisible interactions visible, leaders can make informed decisions that benefit all.

**Table 1**  
**Community of Practice Efforts Facilitated with ONA**

<b>Community</b>	<b>Benefits</b>
Fortune 500 oil and gas company	A Fortune 500 oil and gas company applied ONA to its IT department on the exploration and production side (upstream) of the business. This network of about 100 active members across 10 major geographic locations was fairly robust due to dynamic community leadership, virtual tools, monthly problem-solving conference calls, and annual face-to-face meetings that let members participate in working sessions helping to build awareness of and trust in colleagues' expertise. The ONA also demonstrated that 60 core network respondents had saved close to 35,000 hours of time over the past year due to interactions in the network. This equated to a monetary savings of almost \$5 million per conservative estimates, which a follow-on ONA hoped to improve on after a series of interventions.
Multinational biotech company	A multinational biotech organization applied network analysis to a community of 70 engineers responsible for transfer and scale-up of new products from R&D into a production environment and continuous improvement of processes to maximize yields and reduce cycle time. Network analysis revealed that connectivity between individual engineers contributed significant value, yet network silos existed across eight plants operating on five continents. Language barriers, time zones, and lack of personal relationships meant that the engineers tended to maintain contacts they had within their own sites. The analysis indicated that although collaboration was encouraged culturally and adequate infrastructure existed to support it, available tools were not consistently used, information networks had some bottlenecks, and expertise location in the network was too cumbersome. The improvement opportunities on these and other network dimensions were projected to be \$5-\$10MM per year.
Global 250 pharmaceutical company	A global pharmaceutical organization applied network analysis to an important drug discovery community of practice. Community members were part of a therapeutic area (immunology) that played a role in over 50% of the organization's project portfolio but was distributed over 12 research sites around the global. Network analysis identified opportunities for the group to improve collaboration and targeted interventions helped create a vibrant community involving over 100 scientists organized into "working groups" focused on specific topics. These "working groups" now hold web- and teleconferences regularly, engage in ad hoc networking to discuss recent literature, share internal findings, and help each other solve problems. Measurable results include saved time, improved decision making, better project success rates, and ultimately reduced cycle time, a key driver of pharmaceutical company profitability.
Multinational consumer electronics organization	Having recently undertaken a substantial merger, this multinational organization was centralizing core processes at a major U.S. location. Network analysis revealed opportunity points with the core community as well as in interactions between the major U.S. location and smaller sites in the United States and Europe. The analysis indicated that the community was focused around six people in the major U.S. location and that the reorganization had left those in the smaller U.S. and European locations dislocated. As a result, the community began to employ synchronous technologies (e.g., IM and NetMeeting) as well as asynchronous technologies. Members were also required to seek input from community colleagues prior to key projects and to make their expertise available to others, a mandate that became part of employee performance evaluations and had substantial impact on business results and community connectivity.
Global 250 computer manufacturing organization	This multinational high-tech company formed a community of practice for people interested in ONA. Membership quickly grew to over 150 people, representing all geographic areas and business units in the company, thereby providing a strong body of knowledge for members to leverage in applying network techniques. An initial ONA revealed targeted opportunities to improve awareness of member's expertise, cross-geography, and business unit connectivity and community leadership within the network. Select interventions included monthly communications (newsletter and conference call), an on-line database, a skills directory that helped members learn about each other's expertise, and technology that supported a wide range of instant messaging capabilities. A follow-up ONA in about a year combined with a new metrics program was planned to assess the impact of the community on the core business of the company, satisfaction of its members and new innovations.



U.S. intelligence agency	A U.S. intelligence agency used network analysis to develop a community of practice among those engaged in collection and analysis of intelligence. The ONA revealed several well-connected members (who were subsequently leveraged in community leadership roles); lack of awareness of colleagues' expertise in the community; and fairly substantial disconnects across hierarchy, physical distance, and departmental lines. Targeted efforts to improve connectivity in this case lay with developing relationships between highly connected and peripheral people, leveraging personal network profiles to create grass roots connectivity, and targeting specific cross-functional and distance fragmentation points in the network. A follow-on assessment six months later was anticipated to reveal targeted improvement in this group that was to become a model for organizational change agency-wide.
Global 250 defense contractor	A defense contractor that provides a broad array of technologically advanced products and services applied network analysis to a global community of quality engineers. The network analysis revealed opportunities to improve connectivity by focusing on better leveraging expertise of "black belts," improving consistency of TQM process methodology application across sites, transfer of best practices via a portal and collaborative tool suite and use of face-to-face meetings to promote cross-distance connectivity. Specific cost savings, stakeholder satisfaction ratings, and network metrics were being measured for a follow-on network analysis to be conducted a year later.
Global 250 consumer products organization	A global consumer products organization applied network analysis to a community of high-end engineers in the quality services function. These engineers were distributed around the globe but needed to collaborate effectively in order to share best practices on issues such as raw ingredient quality variations, process cycle time, and advanced manufacturing equipment/processes. The network analysis revealed a series of disconnects across food segments (despite commonalities of practices that could be leveraged), three critical brokers that reflected a substantial lost knowledge risk, fairly significant network fragmentation across hierarchical levels, and a very insular network with few ties reaching outside of the organization. A series of off-site meetings, new HR practices, and virtual media served to both bridge key divides and reduce connectivity at bottleneck points.
Global consulting organization	Since June of 2000, this global consulting organization has applied network analysis to develop and support several virtual communities in strategically important knowledge domains. One analysis targeted a community of 326 consultants, with results showing low overall connectivity (3% of possible ties) and high distribution of ties, as some employees were sought out by nearly 50 people, whereas others had only one or two information relationships. Interventions focused on bridging network disconnects across function and distance, balancing out collaboration to ensure expertise was effectively tapped throughout the community, and helping to develop awareness of expertise through face-to-face and virtual forums. Cumulative results are promising over the past five years, as the community has had direct impact in winning over \$430MM in work by providing access to experts and facilitating effective collaboration with a balance of synchronous and asynchronous tools.
Global software development organization	A global software organization applied network analysis to a community of just over 100 software engineers and executives focused on development and production of high-end collaborative software. This group was distributed across four sites and several categories of expertise that the organization as a whole needed to better integrate to bring a series of new, innovative products to market more effectively. The network analysis revealed significant disconnects across location and role (particularly engineering versus marketing roles), bottlenecks in the network, and a substantial reliance on six employees who were considered flight risks due to knowledge and respect in the industry. In this case, synchronous collaborative tools and formally designated liaisons helped build connections across sites. Also key employees were nominated "go to" people and redistribution of information access and decision rights in the community itself had a dramatic impact on several products getting to market more rapidly.

**Table 2**  
**Developing Communities with a Network Perspective**

<b>Network Views</b>	<b>Benefit</b>
<b>Central connectors</b>	Central people often have the most direct connections in a network and by virtue of this can have a substantial impact on a community. Sometimes it can be important to recognize those that engage in their work selflessly and support the overall group in ways that often go unrecognized. Lose these people and you have a substantial gap in your community’s ability to leverage knowledge and expertise, share best practices, and engage new members. However, sometimes highly connected people – often through no fault of their own -- find themselves overloaded with requests and end up holding the network back despite working long hours. In these cases it is important to help overly burdened community members make information they hold that others need accessible in multiple formats and cultivate unique expertise in other community members who can become “go to” people.
<b>Brokers</b>	Network analysis not only helps identify people in a network with a large number of direct connections, it also helps leaders find those who, by virtue of where they sit in the network, are disproportionately important in holding the entire community together. We call these people brokers because they tend to integrate important subgroups in a network in ways that central people or those in formal positions of authority sometimes do not. Because these people reside on the shortest path between many others in the network, they are ideal employees to work through when trying to quickly diffuse certain kinds of information such as a new best practice or organizational change. They can also represent the most effective and efficient path to promoting overall community connectivity – forming a small leadership team among key brokers and communicating these people’s expertise to the rest of the network can rapidly draw together the entire community with comparatively little effort.
<b>Peripheral players</b>	Network analysis can also help reveal loosely connected or isolated members. These peripheral people often represent underutilized resources of a community, as their skills, expertise and unique perspectives are not leveraged effectively. They also are often more likely to leave or disengage from the activities of a community than those who are contributing to and benefiting from the group. Network analysis can help a leader identify these people and target efforts to draw them into the heart of the community – actions that help sustain a community over time with fresh ideas and perspectives.
<b>Fragmentation points</b>	A critical function of communities is that they help knit together various formal groups or kinds of expertise. By coloring the nodes in a community network diagram you can pick up fragmentation points that might affect a community’s ability to promote innovation and knowledge transfer throughout an organization. It is not desirable to have everyone connected to everyone else – people have finite time to spend interacting with others and this is particularly true of a discretionary group such as a community of practice. However, disconnects usually exist across kinds of expertise, cultural values, functions, projects, hierarchy, physical location, and tenure that can keep a community from being as effective as possible. Targeting these gaps, rather than promoting connectivity indiscriminately, yields much more effective and efficient solutions for community development.

<p><b>External connectivity</b></p>	<p>Although internal connectivity is important, it is also critical to consider the way a community is connected externally to understand how the entire network is learning and/or impacting the work of others. For example, it is often important in R&amp;D settings to see if a community is well-connected to the right academic spheres of influence. Alternatively, one might look to ties outside a community but inside the host organization to ensure that solutions developed within the community make it into key business units. This external perspective can be critical to promoting points of connectivity that need to be established with external stakeholders as well as areas where a community might be overly influenced by a certain group in ways that degrade their effectiveness over time.</p>
<p><b>Personal networks</b></p>	<p>Each person in a network has the ability to take action based on his or her own personal network profiles (the data collection software we use allows each person in the network to get a detailed assessment of his or her own network and compare his or her connectivity to aggregate profiles of similar others). These personal network profiles can help community leaders improve their own effectiveness within the community. Similarly, assessing the personal connectivity of other key community members can help determine how best to help them become more influential and effective in the group. Working through each person's personal network profile – whether via individual coaching, career development processes, or facilitated workshops – provides a powerful grassroots approach to improving collaboration and effectiveness.</p>

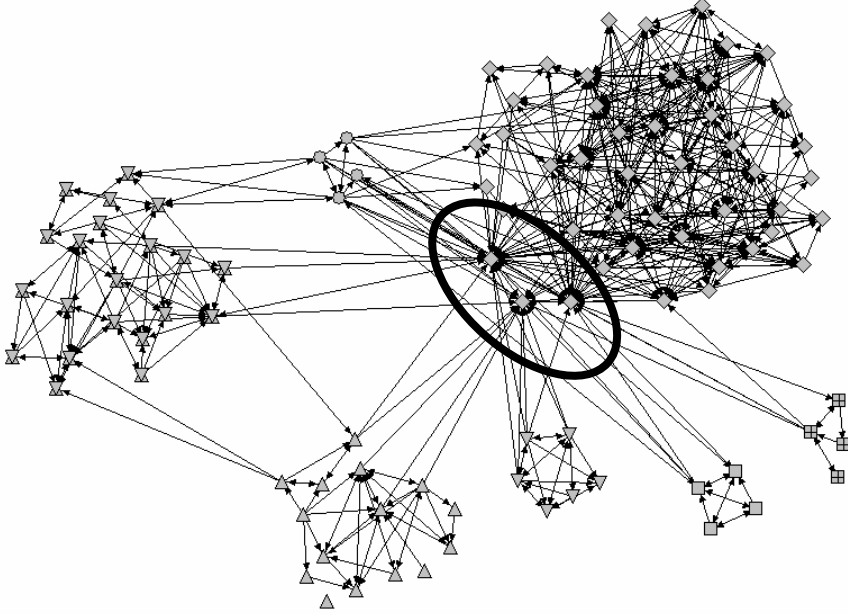
**Table 3**  
**Network Assessments of Knowledge Reuse, Innovation and Value Creation**

Network Objective	Transitioning from ad hoc to value-creating communities	Actions to transform	Network measures to assess
<p><b>Improve information flow and knowledge reuse</b></p>	<p>Move from ad hoc interactions conditioned by formal structure, homophily, and personal interests to a more balanced pattern of information exchange focused on key roles and designated “go to” people with expertise that is central to community effectiveness.</p>	<ul style="list-style-type: none"> <li>• Build depth in key community expertise areas by creating “go to” people from those central to the network (i.e., high on betweenness or in-degree centrality); publicizing their expertise to the community; and holding periodic calls or meetings for these experts to exchange ideas and help create connections to others in the network.</li> <li>• For peripheral people: 1) Try to draw them in by assigning two to three to each broker; 2) consider ways to influence staffing or internal projects to engage these people; 3) develop community on-boarding processes to ensure others are aware of the expertise of the newcomer.</li> <li>• For overly connected parties try to decrease bottlenecks by 1) re-allocating information and decision rights as appropriate; 2) job redesign (e.g., community leader as more of a broker than technical expert); and 3) development opportunities identified in the personal network results.</li> <li>• Leverage personal network profiles throughout the network to help develop external connectivity (ideally via key brokers and thought leaders to ensure that high value external information comes into the heart of the community).</li> </ul>	<ul style="list-style-type: none"> <li>• Measure the information flow network (i.e., “Please indicate the extent to which the people listed below provide you with information that helps you to accomplish your work”) on a scale ranging from a response of “I do not know this person or his or her expertise” up to some indicator of highly effective ties based on either frequency or effectiveness.               <ol style="list-style-type: none"> <li>1. Track core/periphery pattern and the extent to which it adheres to “go to” people.</li> <li>2. Track distribution of ties to ensure that connectivity of overly central people decreases and connectivity of overly peripheral people increases as relevant.</li> <li>3. Track improvements in collaboration at key network junctures (e.g., across expertise, distance or function).</li> <li>4. Use personal network profiles to ensure relevant and balanced external ties to key stakeholders.</li> </ol> </li> </ul>
<p><b>Develop a sense-and-respond capability</b></p>	<p>Transition from an ad hoc community where awareness of colleagues’ expertise is low and clustered to one where awareness of expertise is high and balanced – thereby increasing the likelihood that those with the best and most relevant expertise can be located when opportunities arise.</p>	<ul style="list-style-type: none"> <li>• Use electronic and paper-based media to communicate and educate on colleagues’ expertise. Persona books, skill profiling, social network technologies, and virtual forums can help create broad awareness of <i>who knows what</i>.</li> <li>• Leverage virtual and face-to-face community activities to focus on problem solving (not report outs or simply social activities) and other means to help members both solve immediate problems and become aware of experience and knowledge of others in the network.</li> </ul>	<ul style="list-style-type: none"> <li>• Measure the awareness relation either through a scaled question (e.g., “I am aware of the knowledge and skills of other members of this community [1-strongly disagree to 5 – strongly agree]” or by taking responses greater than “I do not know this person or his or her expertise” from the information question above.               <ol style="list-style-type: none"> <li>1. Track improvements in the overall awareness network and at critical expertise or distance gaps in the network.</li> </ol> </li> </ul>

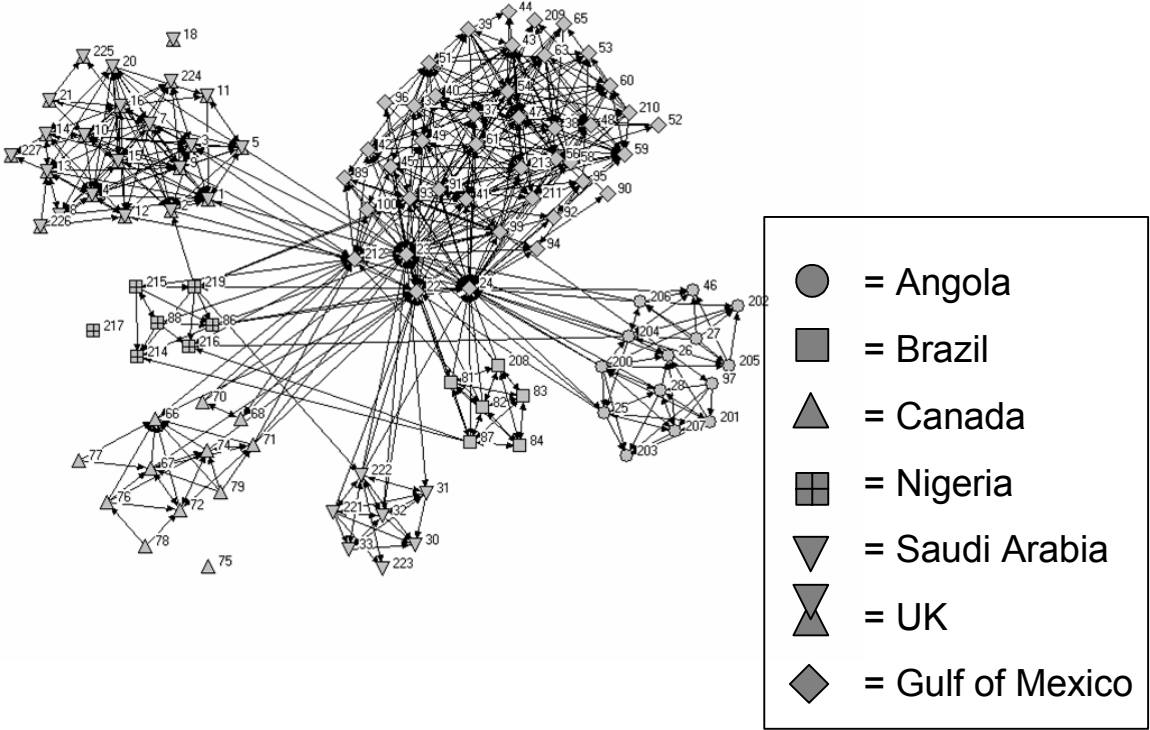
<p><b>Drive planned and emergent innovation</b></p>	<p>Transition from information and problem-solving networks where subgroups exist among those with similar expertise or functional background to a community where ties across expertise or functional groups help generate new ways of conceiving problems rather than reinforce existing paradigms.</p>	<ul style="list-style-type: none"> <li>• Use rotation programs, staffing, or other internal projects as a vehicle to help create bridges across technical competencies, roles, and functions where value creation potential exists.</li> <li>• Assess whether certain categories of expertise are overly influential by being central in the network and potentially drowning out alternative perspectives or opportunities.</li> <li>• Assess whether highly marginalized kinds of expertise exist in the network, and where appropriate (e.g., when strategic objectives require greater focus on that expertise domain), look for ways to promote this perspective in meetings, planning sessions and via community role definition.</li> <li>• Use brainstorming or other structured mechanisms (e.g., peer assists) to ensure that diverse and relevant perspectives are brought to bear early in a project.</li> </ul>	<ul style="list-style-type: none"> <li>• Measure people’s top three to five technical competencies and then employ the information and problem solving (i.e., “People help us consider various dimensions of a problem and/or anticipate issues and concerns likely to appear in the future. Please indicate the extent to which the people listed below are helpful in helping you to think through problems to accomplish your work.”) on a scale ranging from a response of “I do not know this person or his or her expertise” up to some indicator of relations highly relied upon) networks to see how expertise is distributed. <ul style="list-style-type: none"> <li>○ Density tables and clique analysis can identify fragmentation points of concern.</li> <li>○ Network prominence measures can identify overly influential and marginalized voices.</li> </ul> </li> <li>• Measure important outputs such as new product development cycle time, revenue generated from new products, and customer satisfaction.</li> </ul>
<p><b>Nurture value-creating interactions</b></p>	<p>Transition from an informal group where discretionary time spent helping other community members is based on passion, personality, prior work experience, and friendship to a more vibrant network with targeted interactions based on needs of both community members and the organization.</p>	<ul style="list-style-type: none"> <li>• Identify high value creators and ensure they are not a vulnerability point; identify low or non-value creators and establish a plan to engage relevant skills.</li> <li>• Intervene within subgroups where leveraging those with similar expertise can reduce replication and improve output.</li> <li>• Intervene across subgroups (e.g., functions or skills) where integration opportunities exist (e.g., cross-selling)</li> </ul>	<ul style="list-style-type: none"> <li>• Assess value creation relationally in the network itself. <ol style="list-style-type: none"> <li>1. With internally focused communities, assess estimates of time saved from interactions with community members. Multiply estimates by a loaded compensation figure to derive economic value of interactions.</li> <li>2. With a revenue producing community, track estimates of lead or revenue generation.</li> </ol> </li> <li>• Assess improvement in outcome measures that derive from effectively connected communities. Measure such outcomes as cost reduction (e.g., CoQ); revenue generation; customer satisfaction, retention or cross-sales; employee satisfaction, retention or quality of work/life measures.</li> </ul>

<p><b>Engage employees through CoP efforts</b></p>	<p>Transition from a discretionary group where interactions and context are sufficiently compelling to draw in only the most dedicated members to a vibrant community that thrives in its ability to attract and retain engaged members over time.</p>	<ul style="list-style-type: none"> <li>• Ensure that interactions are marked by reciprocation to the extent possible. One quick way to kill a voluntary community initiative is to allow giving and taking of information or resources to fall out of balance.</li> <li>• Focus community members on behaviors and events that inspire energy and enthusiasm. At a group level can do this via play.</li> <li>• Interview highly central and highly peripheral members to determine key drivers of satisfaction/dissatisfaction in the community. These groups will have different concerns due to position in the network. Addressing them as possible will be key to ongoing functioning of voluntary groups.</li> <li>• Assess individual and organizational context dimensions and intervene where gaps exist.</li> </ul>	<ul style="list-style-type: none"> <li>• In the information flow, problem-solving, and value-creation network, track: <ul style="list-style-type: none"> <li>• Overall and dyadic reciprocation rates.</li> <li>• Plot tenure against network centrality to ensure that either new people do not have a hard time getting integrated OR that too many experienced people are disengaging</li> </ul> </li> <li>• Assess some affective dimension such as the energy network (e.g., “People can affect the energy and enthusiasm we have at work in various ways. Interactions with some people can leave you feeling drained, whereas others can leave you feeling enthused about possibilities. When you interact with each person below, how does it typically affect your energy level?”) and track the following: <ul style="list-style-type: none"> <li>○ Energizing people and points in the network.</li> <li>○ De-energizing people and points in the network.</li> </ul> </li> <li>• Track individual ratings of community satisfaction, identity and engagement. Relate this to position in the network to better target interventions.</li> </ul>
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**Figure 1A**  
**Halliburton pre-change network analysis.**



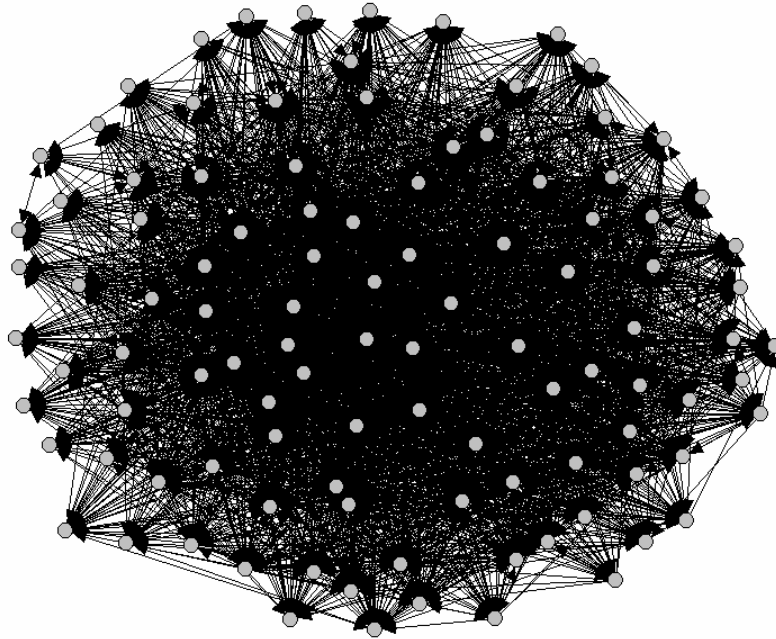
**Figure 1B**  
**Halliburton post-change network analysis.**



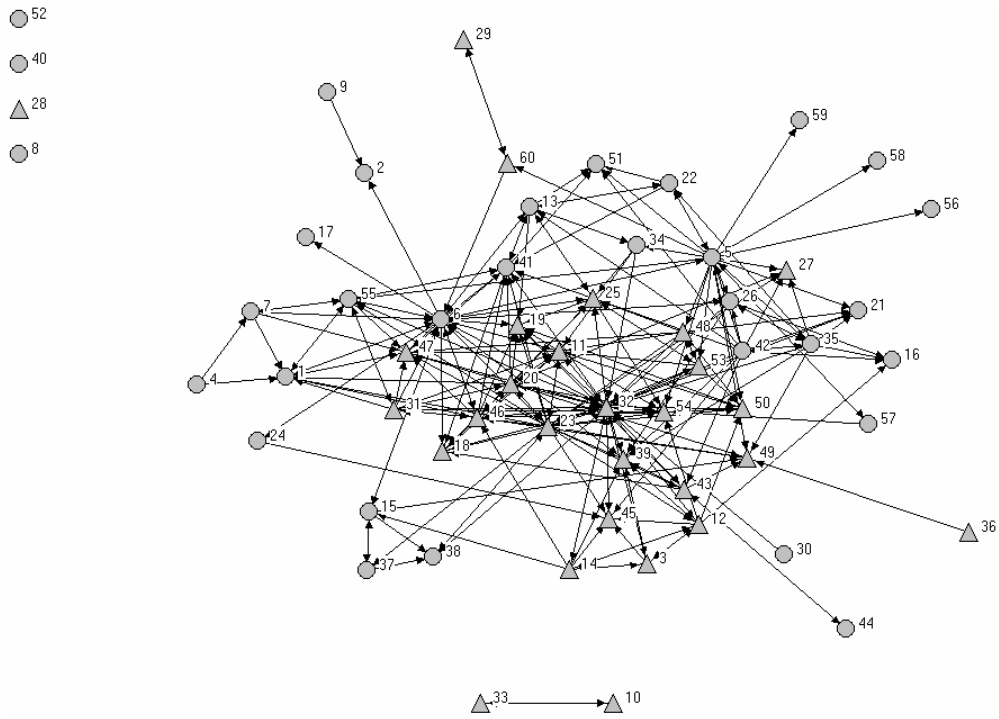




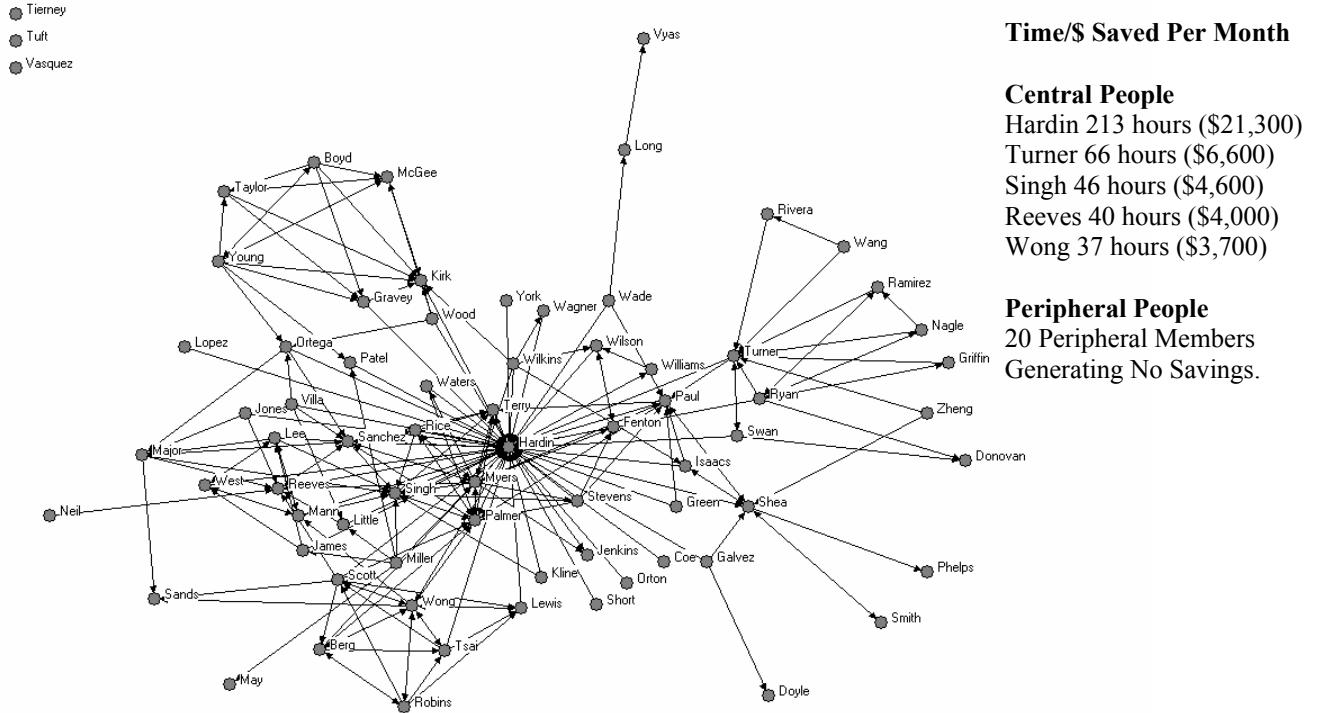
**Figure 3**  
**Lack of awareness in a community of practice**  
**(lines indicate one person is NOT aware of another's expertise).**



**Figure 4**  
**Distribution of technical expertise in a community.**



**Figure 5A**  
**Community of practice in a financial services organization.**



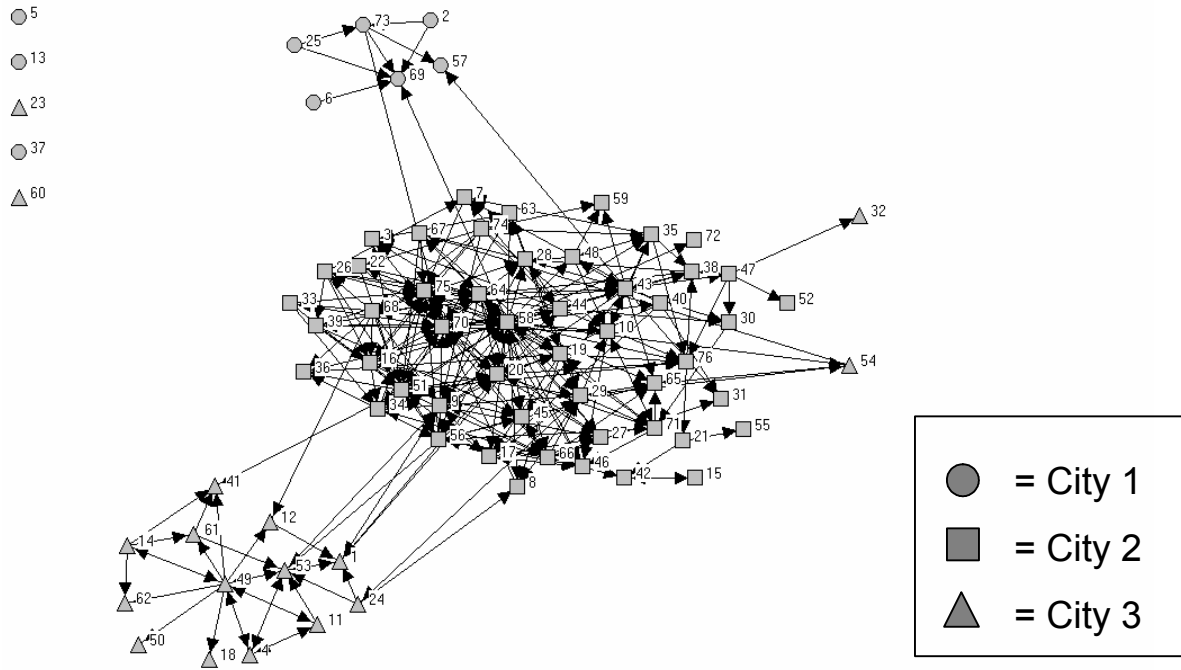
**Figure 5B**  
**Monthly savings (\$) by function within the community.**

	Finance	GF	CRM	HR	IT	CG	Total
<b>Finance</b>	\$7,400	\$200	\$0	\$5,600	\$1,700	\$400	\$15,300
<b>Global Finance</b>	\$0	\$0	\$0	\$200	\$0	\$400	\$600
<b>Credit Risk Mgmt</b>	\$0	\$0	\$0	\$1,600	\$0	\$0	\$1,600
<b>HR</b>	\$4,900	\$200	\$1,800	\$51,900	\$200	\$400	\$59,400
<b>IT</b>	\$200	\$0	\$0	\$600	\$200	\$2,000	\$3,000
<b>Corp Governance</b>	\$600	\$800	\$0	\$6,000	\$200	\$16,000	\$23,600
<b>Total</b>	\$13,100	\$1,200	\$1,800	\$65,900	\$2,300	\$19,200	\$103,500

Savings for the past month: Total (\$103,500).

- Within Function (\$75,500)
- Between Function (\$28,000)

**Figure 6**  
**Personal support in a distributed community.**



## APPENDIX A

Name: \_\_\_\_\_ Business Unit: \_\_\_\_\_  
 Job Title: \_\_\_\_\_ Region: \_\_\_\_\_  
 Job Tenure (*months*): \_\_\_\_\_ Company Tenure (*months*): \_\_\_\_\_

**Demographic Information:** (*Please circle best description among options offered*)

Gender: *Male Female* Education: *BA BS MS MBA PhD*  
 Nationality: *N. American European Asian S. American Other* Discipline: *Engineering Business Statistics Other*  
 Current Certification: *Black Belt Green Belt Other*

**Six Sigma Expertise:** (*Please circle the appropriate level each competency area.*)

Seven Simple Quality Tools	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Process Mapping	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Basic Statistics ( <i>e.g. regression, t-tests</i> )	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Advanced Statistics ( <i>e.g. ANOVA</i> )	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Formal Experiments ( <i>e.g. DoE, Taguchi</i> )	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Team Facilitation	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Project Management Tools	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
PowerPoint Presentations	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Financial Analysis	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Six Sigma in Manufacturing	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Six Sigma in Service Operations	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>
Six Sigma in Backroom Operations	<i>Novice</i>	<i>Experienced</i>	<i>Expert</i>

**Community Value:** (*Please circle appropriate choice.*)

Participation in the Six Sigma Community of Practice...

...improves customer satisfaction:	<i>Not at all</i>	<i>Somewhat</i>	<i>Substantially</i>				
...enhances my job satisfaction:	<i>Not at all</i>	<i>Somewhat</i>	<i>Substantially</i>				
...increases my career opportunities:	<i>Not at all</i>	<i>Somewhat</i>	<i>Substantially</i>				
...saves me time personally:	<i>0</i>	<i>1-2</i>	<i>3-5</i>	<i>6-10</i>	<i>11-20</i>	<i>20+</i>	hours/month
...saves project team time:	<i>0</i>	<i>1-2</i>	<i>3-5</i>	<i>6-10</i>	<i>11-20</i>	<i>20+</i>	hours/month
...reduces project cycle time:	<i>0%</i>	<i>5%</i>	<i>10%</i>	<i>15%</i>	<i>20%</i>	<i>20%+</i>	on average
...increases project savings:	<i>0%</i>	<i>5%</i>	<i>10%</i>	<i>15%</i>	<i>20%</i>	<i>20%+</i>	on average

## Community Interaction

*In the table below, please indicate the quality of your interaction with members of the Six Sigma Community on the following four dimensions.*

**Frequency** Please indicate the frequency with which you typically turn to each person for assistance on work related topics.

- |                               |                        |
|-------------------------------|------------------------|
| 0 = I do not know this person | 3 = At least quarterly |
| 1 = Never                     | 4 = At least monthly   |
| 2 = At least annually         | 5 = At least weekly    |

**Responsiveness** Please indicate the responsiveness of each individual in replying to your requests for work-related assistance.

- |                                 |  |
|---------------------------------|--|
| 0 = I do not know this person   | 3 = Generally responds within the week |
| 1 = Often fails to respond      | 4 = Typically responds within 24 hours |
| 2 = Usually responds but slowly | 5 = Always responds same day           |

**Effectiveness** How effective is each person in helping you solve work-related problems when they respond?

- |                               |                             |
|-------------------------------|-----------------------------|
| 0 = I do not know this person | 3 = Reasonably effective    |
| 1 = Very ineffective          | 4 = Very effective          |
| 2 = Ineffective               | 5 = Exceptionally effective |

**Energy** When you interact with this person, how does it affect your energy level?

- |                               |                         |
|-------------------------------|-------------------------|
| 0 = I do not know this person | 3 = No effect/Neutral   |
| 1 = Very de-energizing        | 4 = Slightly energizing |
| 2 = Slightly de-energizing    | 5 = Very energizing     |

Community Member	Frequency	Responsiveness	Effectiveness	Energy
Ausidon, Andre				
Brown, Bill				
Chen, Charles				
Davies, Deborah				
Einstein, Elijah				
Friedman, Frank				
Gusthurst, Gustav				
Hellmann, Henri				
Isakson, Isaac				
Johnson, Jack				
Knocklesford, Karen				
Lee, Liu				
Menendez, Miguel				
Norabuto, Nogie				
Oman, Olivia				
Patel, Priyanka				

## Organizational Context

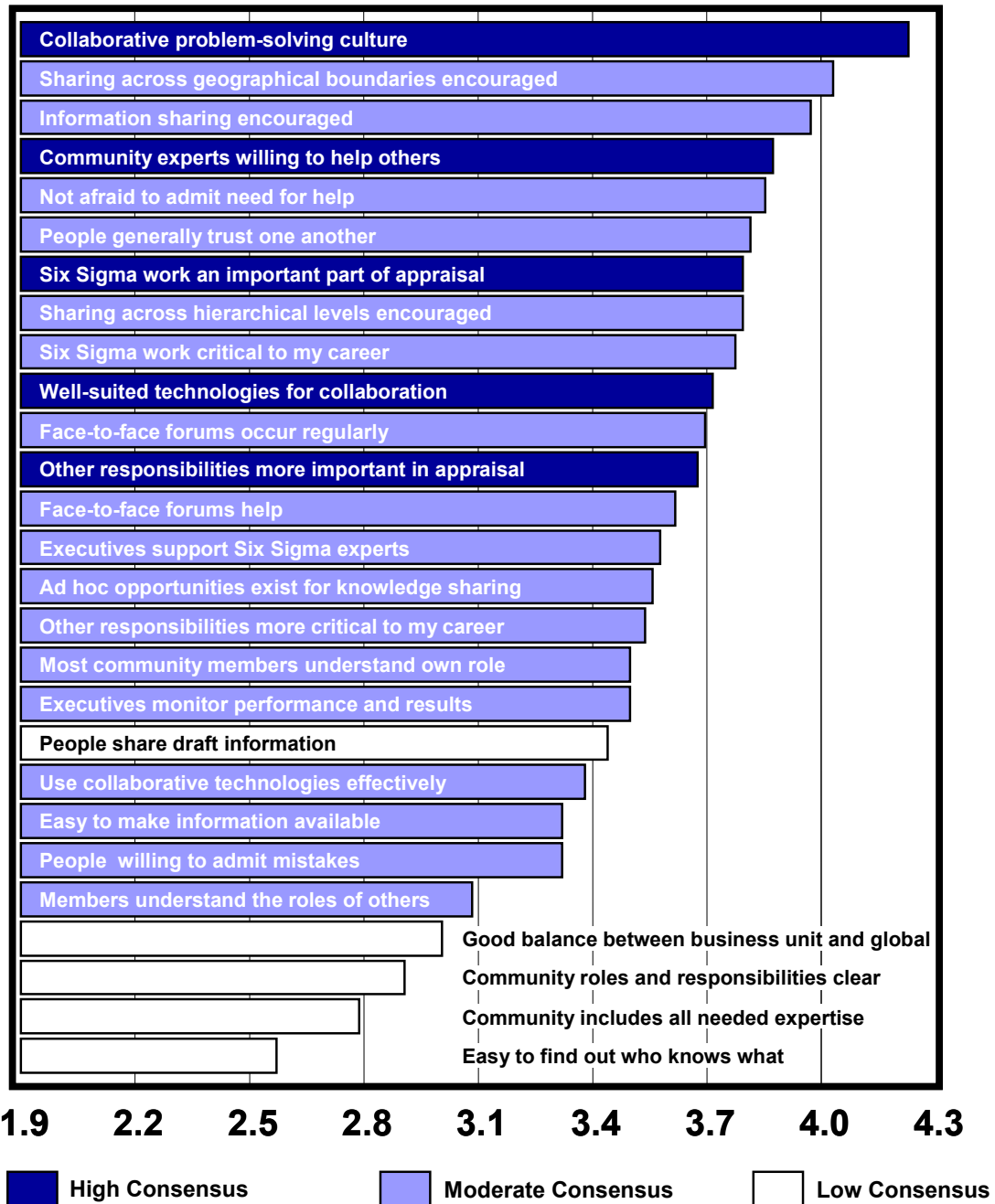
Please indicate your agreement/disagreement with the following statements.

Response Options:

1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree

ITEM	STATEMENT	RESPONSE
1	Collaborative problem solving is part of our culture.	
2	People in this community are not afraid to admit they need help.	
3	People will share information in draft form rather than wait for perfection.	
4	People generally trust one another in within our community.	
5	People are willing to admit mistakes.	
6	Executives support Six Sigma experts in our work with the business units.	
7	Executives monitor Six Sigma community performance and results.	
8	Sharing information across organizational boundaries is encouraged.	
9	Sharing information across hierarchical levels is encouraged.	
10	Sharing information across geographical boundaries is encouraged.	
11	Good balance exists between business unit/local tasks and global projects.	
12	Face-to-face forums regularly help build relationships.	
13	Face-to-face forums help develop social ties and learn others' expertise.	
14	Opportunities exist for ad hoc meetings that promote knowledge sharing.	
15	The technologies provided for collaboration are suited to the work we do.	
16	Our community generally uses collaborative technologies effectively.	
17	It is easy to make information available for others who might need it.	
18	It is easy to find out who knows what, without having to ask superiors.	
19	Community experts are willing to help the other community members.	
20	Community roles and responsibilities are clearly identified.	
21	Most Six Sigma community members understand their own role.	
22	Most community members understand the roles of other members.	
23	The community includes all needed expertise to get the job done.	
24	Six Sigma project work is an important part of my performance appraisal.	
25	Other responsibilities are more important in my performance appraisal.	
26	Six Sigma project work is critical to my career development plan.	
27	Other responsibilities are more critical to my career development plan.	

## Organizational Context Findings





## Notes

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