Executive Summary

IT executives in most large enterprises must build organizations that can adapt and thrive in a global economy while operating with fewer resources. Yet despite implementing sophisticated organizational redesigns and collaboration technologies, improvements in performance are frequently disappointing. All too often, the problem can be traced to patterns of intra-firm collaboration that do not adapt to support strategic objectives and new organizational designs.

This article describes one organization's five-year journey in applying organizational network analysis (ONA) to help it transform from a regional to a global IT function by selectively investing in and tracking the improvement of its collaboration and social networks. It shows how performance transformation can be achieved through targeted efforts to align an organization's informal collaboration networks with strategic objectives. Based on the experience of this organization, the article concludes with three lessons that can be applied by IT leaders as they seek to improve performance in a global environment.

THE NEED FOR EFFECTIVE COLLABORATION ACROSS THE IT ORGANIZATION

How does an IT executive do more with less today? One answer is simply to ask employees to work harder. But decades of initiatives—from de-layering to re-engineering to matrix organizations—have all pushed work and coordination down the hierarchy in most organizations to such an extent that employees are overloaded. Most IT leaders are reluctant to ask high-performing employees to take on more. A more promising route lies with finding ways to boost performance through more effective collaboration. Informal networks that enable IT employees to make better use of the expertise, resources, and contacts within their organization can yield significant innovation and efficiency gains in today’s demanding environment.

Unfortunately, many organizational design and technology solutions result in too much connectivity between employees. Matrix structures frequently overload employees at all levels and create gridlock in decision making and execution. Collaboration tools—like e-mail and the more recent Web 2.0 technologies—often drain the most productive employees and swamp IT leaders with relational demands. These and other approaches to collaboration that indiscriminately build more connectivity are frequently counter-productive because of the collaboration...
burdens they impose on organizations. Instead, IT leaders need a targeted approach to managing informal networks on two fronts:

1. Eliminating unproductive collaborations
2. Selectively investing in connectivity at junctures that can yield business impact.

Organizational network analysis (ONA)\(^4\)—also known as social network analysis—provides a set of tools for assessing patterns of relationships in an organization’s informal networks and can help executives visualize and understand the relationships that facilitate and impede such networks. ONA has enjoyed a rich research tradition within the fields of anthropology, sociology, psychology, and management. It has also been shown to be an effective tool in helping IT professionals to:

- Increase organizational and collaboration network effectiveness
- Understand the organizational uses of IT
- Employ strategic management principles
- Improve collaboration in business units
- Facilitate innovation.\(^5\)

By making critical patterns of interaction visible, managers can make informed decisions to improve collaboration strategically rather than applying tools that promote connectivity in an ad hoc fashion.

To demonstrate some of the opportunities and challenges that an organizational networking perspective can help IT leaders address, we provide a case study of an organizational transformation within the global IT function of MWH Global, Inc. MWH is one of the world’s largest engineering consulting firms, and during a five-year period, its IT leadership team conducted an annual ONA, which helped it to design targeted change initiatives and track progress in transitioning from a multinational to a global organization. This annual checkup enabled MWH to create a truly global IT function by working through—rather than bumping up against—highly influential webs of relationships.

**DRIVERS FOR A GLOBAL IT FUNCTION AT MWH**

MWH did not undertake a transformation because it was in crisis. At the time its change journey began, the firm was considered a global leader in water, hydropower, and environmental remediation. The company’s engineers were frequently recognized for their excellence. For example, they received honors in 2002 from the American Academy of Environmental Engineers and the 2002 Hans Albert Einstein Award for accomplishments in sedimentation engineering. MWH’s service lines include environmental engineering, power generation, facilities development, construction, multi-sector program management, asset management, government relations and applied science. The firm manages hundreds of projects each year, providing services to a wide array of institutions worldwide, including municipalities, government agencies, multinational companies, industrial concerns and military organizations.

Although MWH’s projects before the transformation spanned the globe, the firm did not operate as a truly global enterprise. The company had grown through numerous mergers, some large and some small, but had not established consistent processes across the organization.\(^6\) Vic Gulas, then Chief Knowledge Officer (CKO) of MWH and responsible for the IT reorganization, was concerned that the firm’s structure was multinational, heavily based on business units and regional autonomy, rather than global.\(^7\) In 2003, the CEO asked Gulas to bring the major regional and functional IT entities, six in all, into a cohesive group. These entities comprised:

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5 For more details, see Oinas-Kukkonen, H., Lyttinen, K. and Yoo, Y. “Social Networks and Information Systems: Ongoing and Future Research Streams,” *Journal of the Association for Information Systems* (11:2), 2010, pp 61-68. For an example of how ONA was used to analyze patterns in software development, see Nielsen, P. A. and Tjørnhøj, G., op. cit., 2009, pp. 33-51.


7 For a further discussion of the types of organizational structures and the challenges they present to IT functions, see Kettinger, W. J., Marchand, D. A. and Davis, J. M. “Designing Enterprise IT Architectures to Optimize Flexibility and Standardization in Global Business,” *MIS Quarterly Executive* (9:2), 2010, pp. 95-113.
• Three separate regional teams (Europe, Asia/Pacific, and the Americas) supporting IT infrastructure—networks, servers, e-mail systems, telecom, etc.
• An ERP support and development team for the Americas regional operation
• A group dedicated to developing computer-aided design technology and methodology
• A global IT strategy team tasked with determining future technology direction.

Each of these entities was autonomous and reported to different units within MWH. For example, the regional infrastructure support teams reported to the president or managing director in their respective regions while the Americas ERP team reported to the Americas regional CFO.

The redesigned global IT function—named iNet—was to be the first MWH function to establish global processes, beginning in 2004. The initial iNet organizational design created three separate global operational functions—network management, server management, and messaging/collaboration—each with a global leader. Customer support (help desk) and field operations were led at the regional level but with the intention of adopting common global processes. In addition, a global team was formed to develop and support key global (or soon-to-be global) applications—e.g., an ERP system, knowledge portal, CAD systems, etc. The hope was that this reorganization/change process would serve as a model for the globalization of other functions within MWH, such as HR and finance.

An IT function organized by geography had been acceptable when MWH was smaller. However, this multinational approach—which, for instance, had resulted in six different e-mail systems and three ERP systems—made it impossible for the IT function to deliver sophisticated, standardized solutions. The IT function had made some progress in standardizing major technology platforms across the company—it had migrated the entire firm to one e-mail system, established software standards, implemented a knowledge portal, and mapped the initial steps toward creating a global ERP system. However, there had been only limited collaboration across the regional centers.8

Although best practices were, at times, shared across groups, they were rarely adopted in any systematic way. The leaders of the various IT groups met two or three times a year in an effort to standardize IT systems for the company, but the teams and groups continued to operate independently, each reporting to different leaders and business unit stakeholders and employing unique measures and processes. Operational leaders in each geographic region were most interested in driving IT costs down in their region, which meant that different systems were employed for the same end. The extreme example of these differences was the IT function’s three separate financial systems—one for each geographic region. This led to duplicated staffing across the regions, which, in turn, resulted in additional work by the staff in the Global Finance Office, who had to translate the reports to ensure consistency.

Even where there were common systems, such as e-mail, the lack of consistent processes drove each region to set up its own teams to handle day-to-day issues instead of establishing global teams that could support one another. The net effect of duplicated systems and staff and a lack of consistent processes was that the IT function’s internal customers received varying levels of service and functionality and were charged varying amounts for technical solutions and applications. Even more crucial was the impact on services to external customers. Market trends suggested that IT would become an increasingly substantial component of MWH’s revenue as customers demanded more complex solutions and real-time collaboration tools.

Moreover, external benchmarking studies showed that the total cost of IT at MWH was higher than industry averages. As he stepped into his new CKO role, senior management told Gulas (who was also interim CIO at the time) that IT was too expensive and had been slow to develop the infrastructure necessary to meet market needs.9 These executives demanded more creativity and collaboration—and, of course, they needed it rapidly and at low cost.

APPLYING ORGANIZATIONAL NETWORK ANALYSIS AT MWH

As a senior manager, Gulas knew that his job was to orchestrate the work of others. Because much of the firm’s most important work was accomplished through relationships—and not necessarily those depicted on the formal organizational chart—his job

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8 For a more detailed analysis of the difficulties of instituting global practices, see Kirsch, L. J. and Haney, M. H., op. cit., 2006, pp. 79-104.

9 For more information on the difficulties of transitioning between localized systems and a global system, see Kettinger, W. J., Marchand, D. A., and Davis, J. M., op. cit., 2010, pp. 95-113.
was, in effect, to orchestrate what he could not see. The iNet organizational chart couldn’t show him the informal organizational networks that did and did not exist within the group. Rather, he needed a more granular understanding of collaboration throughout the global organization to better target interventions, organizational shifts, and technology investments. This understanding would help him to identify points in the networks where greater collaboration was required to produce benefits of global scale (e.g., across similar roles in different regions for best practice transfer). But just as importantly, he needed a tool to show which roles, experts, or leaders were experiencing relational overload that was unintentionally and invisibly slowing the work of many others.

To obtain these insights, Gulas decided to undertake an ONA of the newly created iNet organization. Given the lack of longitudinal research in the ONA literature, the purpose of the project was to apply networking ideas to a strategic issue of concern for many IT executives—globalization—and track networking improvements over time. The starting point in this action-learning project was an ONA survey sent to all 185 iNet employees in August 2003—a process that was repeated annually for five years to track progress and make improvements. Two specific networking relationships, based on prior research, were assessed. The first was awareness of expertise given the degree to which this “meta-knowledge” has proven important in predicting information-seeking behavior and performance. The second was active information flows assessed with a frequency-based response scale. (See the Appendix for more details of the project methodology.)

Even though Gulas had anticipated that the analysis would demonstrate some fragmentation of iNet across geographic locations, he and his management team were struck by how vividly the network maps generated from the survey data highlighted three areas of concern (see Figure 1). First, the maps clearly depicted that collaboration among the regional teams and some of the functional teams—specifically the Americas financial system IT support team—was restricted to “silos.” For the new global IT function to be successful, the boundaries between these silos had to be removed. Individuals in the new IT organization had to be able to identify “who knows what” across the entire organization and then use that knowledge to accomplish tasks more efficiently and effectively.

The results of the first ONA survey were immediately communicated throughout iNet, along with an expectation that groups would collaborate more closely. Global and cross-organizational teams were formed to facilitate a global feel to the organization. Enabling well-connected employees from different silos to collaborate with each other was a vital and efficient way of getting iNet to quickly realize its capabilities and full potential.

A second concern highlighted by the initial ONA was that the common expertise groups in each of the geographic organizations were not well connected. The network, server, and desktop groups—the keepers of the digital highway and service response for the company—were held together by a small number of individuals in the United States. Losing just one of these people would spell trouble for the new organization. Strengthening these expertise networks would not only enhance service but also result in better information flows across the geographic divides. As a result, the ONA findings were used to design targeted global team-building meetings among the expertise groups to address cultural, communication, and work differences. Also, short-term exchange programs were initiated in which well-connected individuals with common expertise swapped places for two or more weeks to work and build relationships with their counterparts overseas.

The third concern that the initial ONA revealed was a striking lack of connectivity across lower hierarchical levels. Although senior leadership was well connected, lower levels were not collaborating effectively—both within and across hierarchical levels. The IT leadership team was concerned that this network rigidity could impede its ability to further influence and gain buy-in for the reorganization. Creating better connectivity across the hierarchy would also help the organization become more effective at best practice transfer and innovation.

Improved leadership was needed to help bridge divides created by the hierarchy. An approach developed for the company’s managers of virtual communities was adapted to address virtual leadership for the first- and second-tier leadership positions in the new organization. A key element was the creation and deployment of a course called “Leading Virtually” to iNet leaders. The training reinforced

four competencies required for virtual leadership in MWH’s decentralized, global world:

1. The art of building relationships with virtual team members
2. Creating an identity and unifying the team around it
3. Communicating a vision that is shared among the team
4. Effectively using tools to enhance the virtual experience.

Given the number of insights from the first ONA, Gulas committed to repeating it annually to help systematically monitor and improve iNet’s collaboration network. Over a five-year period, this annual assessment became an important planning mechanism for the IT function. Results from each year’s ONA fed into each leader’s goals and agenda for the subsequent year. And individuals developed plans to improve their personal connectivity after seeing where they were positioned in the network. In aggregate, these efforts yielded significant business results.

**BENEFITS OF ONA IN TRANSITIONING TO A GLOBAL IT FUNCTION**

After five years, MWH had a well-integrated iNet function. IT costs had been reduced from 5.2% to 3.6% of gross revenue between fiscal 2002 and fiscal 2008. Despite the overall growth of the company and increased demands on the IT function, iNet staff actually declined, from 185 people to approximately 155 in this period. Importantly, these efficiencies did not reduce service levels: customer satisfaction scores from internal surveys improved from 93% to 99% over the five-year period.

“Our management team values the insight our annual ONA provides. It’s been a key measure for us to ensure we are continuing to think and act as a global service provider to MWH.”

(Micki Nelson, MWH CIO)

Both operational measures and qualitative data revealed how improved organizational networks and collaboration across iNet enabled the IT function to deliver benefits on a global scale. For example, consider the follow-the-sun approach that was
implemented for iNet’s help desk function. Help desks had been established within the three major geographic regions (Americas, Asia/Pacific, and Europe), but they were of little value when issues arose after business hours. In those cases, people turned to field support or technical staff members, who were engaged with other work and were not always able to respond to problems in a timely fashion. Rather than setting up or outsourcing a 24-hour service in a single location such as India, iNet established a process for connecting help desks. This meant that if an individual in the United States needed after-hours support, she could talk to a customer support representative in, say, New Zealand who was MWH savvy both in the installed technology and business culture. This follow-the-sun approach increased issue resolution by help desk personnel by 60% and resulted in speedier resolution.

The business benefits resulting from ONA included not just cost savings but also the generation of more effective client solutions and revenue. In particular, the analysis helped iNet develop more effective collaborations with key business partners within MWH—a perennial challenge for most CIOs. One example of an important business partner was the MWH construction organization, which was not favorable to iNet at its inception. This was a major challenge for Gulas. At the time, the construction operation was growing rapidly, and its success was a key strategic driver for the company’s growth and diversification.

When the construction organization initiated a project to install a data bridge between new project management software and the ERP system, iNet was not asked to play a major role. It did, however, convince construction to allow an iNet staffer to take a “light” consultative role, which was given to one of iNet’s strongly collaborative and high-energy individuals, as measured by the ONA. Construction’s approach was to rely heavily on an outside vendor for technical leadership to build the bridge, while a project manager within the construction organization took on the project management responsibilities. Unfamiliarity with IT and over-dependence on the vendor led the project to a dead end.

At that point, the iNet consultant on the project was able to convince construction to let iNet take over both the project management and technical lead roles. This resulted in a solution that exceeded the construction organization’s expectations. The business sponsor sought out Gulas to say, “I didn’t think I would ever be here telling you this, but your team did an outstanding job on the data bridge project. From now on, we will come to your team first for any IT project we undertake.”

MANAGING THREE DIMENSIONS OF ORGANIZATIONAL NETWORKING

The annual ONA helped iNet’s leaders take action in multiple ways. With knowledge of the people and the social histories between groups, they were able to use the diagrams and other analytics to identify targeted ways of improving collaboration. In addition to situation-specific uses of the ONA results, Gulas and Nelson (MWH’s CIO) used the approach to manage three key dimensions of connectivity over the five-year journey (see Figure 2).

The first dimension to ensuring the success of iNet was to build awareness of expertise across the informal organizational networks. Increasing awareness of colleagues’ expertise reduces search costs, speeds the dispersion of information across the network when projects shift, and ensures the IT function is responding with the most relevant expertise regardless of geography or unit. The second dimension focused on improving network balance. When networks are unbalanced, those employees who are overloaded may cause bottlenecks and slow down others’ work, while those on a network’s fringe can represent under-used expertise or resources. The third dimension addressed specific cross-functional and cross-location collaboration silos in the network. Failure to connect individuals across locations and functions is frequently a major barrier both to obtaining efficiencies from best practice transfer and to innovation from targeted integration of unique expertise.

Networking Dimension 1: Building Awareness of Expertise

The annual ONA gave iNet a map of awareness of expertise—not the people currently being tapped for information but the people who could be when new

11 For more detail on the alignment of IS with firm objectives, see Chan, Y., op. cit., 2002, pp. 97-112.

projects or clients come along. At MWH, the trend results from the annual ONA clearly showed that efforts to increase awareness of expertise had been successful. When iNet undertook the baseline analysis in 2003, the average number of individuals’ expertise a person was aware of was 52—a number that seems high until you realize that most of the ties were within geographic locations or departments. Several locations were essentially isolated, and there was little awareness of expertise across unit lines. No amount of organizational redesigns or new technologies would get people collaborating—and iNet operating as a global entity—without helping employees understand the expertise of far-flung colleagues, to whom they could reach out as new projects or challenges came along.

MWH took several actions to build this awareness. It first targeted the intersections of locations and expertise areas. This was accomplished through team-building exercises designed to strengthen the trust network among the expertise teams spanning the globe. For example, during fiscal 2005 and fiscal 2006, four team-building sessions for key global teams were held at an off-site location over a weekend. The goals were to:

- Build trust and gain further understanding of global teams
- Understand the impact of personality and culture on team dynamics
- Improve communication
- Examine individual and group reactions to change
- Strengthen the leadership relationship of the manager to his team.

Team-building activities that united well-connected people within the network (not just those who seemed prominent by virtue of their role or reputation) resulted in significant changes in the awareness of expertise. By 2008, the average number of individuals a person was aware of increased to 82. Critical to the success of iNet was that this increase in awareness was happening across location and functional boundaries, enabling it to operate as a truly global function. To MWH’s credit, this jump in awareness occurred despite an average staff turnover rate of 33% over the five years—59% of those included in the 2003 survey were no longer with iNet at the end of the period. Also of importance is that the rise in awareness corresponded to an increase in effective information usage ties, from 29% in 2003 to 45% in 2008. In other words, the ONA revealed that people were more effectively tapping into the expertise of their colleagues. This indicates that employees were not just becoming more aware of their colleagues’

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14 This is one of the six “network-building” designs mentioned by Galbraith to improve the likelihood of cross-boundary problem solving. Galbraith, J. R. Competing with Flexible Lateral Organizations, Addison-Wesley, 1994. For a further description of the uses of horizontal mechanisms, see Brown, C. V. “Horizontal Mechanisms Under Differing IS Organizational Contexts,” MIS Quarterly (23:3), 1999, pp. 421-454.
expertise but also using those ties to get their work done more effectively and efficiently.

iNet leaders employed two approaches to improve awareness of expertise in the network. The first was facilitating travel between offices and regions. Well-connected mid-level leaders were encouraged to visit their teams in other offices, particularly overseas. Group team-building meetings were encouraged to bring people face-to-face for the purpose of building trust and expertise awareness. While conventional wisdom held that virtual technology should be able to connect people, the trust between individuals that grew at face-to-face meetings accelerated information flow and awareness development. The annual ONA completed at the end of the year in which these meetings were held confirmed this: both awareness and information flow markedly improved and had important impacts on business results, as evidenced by several accounts of best practice transfers.

Second, the use of technology (such as instant messaging, online meetings, discussion forums, and teleconferences) enabled a level of sophistication and cooperation that improved iNet’s effectiveness. For example, when a computer virus attacked iNet’s systems in Asia/Pacific over a weekend, an instant message dialogue box was immediately set up to capture all actions taken by the team in the region. When the European team awoke the next morning, they immediately tapped into the instant message documentation and began working on the issue. Information captured in the instant message dialogue was then transferred to the Americas team when it came online.

In the past, virus attacks took weeks to clean up; in this instance, the threat was under control after just a few days. Technology played a central role in the collaboration, but it was critically enabled by the trust-building meetings, during which participants established norms for behavior and expectations of team performance. This led to a commitment to be and stay connected to other team members. In addition, as individuals improved their virtual work methods, meaningful (and accountable) friendships developed.

Networking Dimension 2: Improving Network Balance

Another outcome from the annual ONA was that IT leaders were able to identify opportunities for improving the balance of the organizational network. These efforts helped to reduce the burden on overloaded people in the network while simultaneously drawing in experts, newcomers, or rising stars—a process that made the overall network more responsive and adaptable. When the initial ONA was completed, Gulas could clearly see that some individuals in the information network were bottlenecks and overloaded with ties. One very central person, for example, had just worked three consecutive all-nighters. This employee seemed to love his work and was heavily relied on by people in the group. But Gulas wondered how long he could keep up that pace and, more importantly, what would happen to the network if he were to leave the organization. Similarly, another person ranked as highly central was a technical expert in the networks and servers area and was seen by the more junior members as a mentor; she often filled in for her director when he was away. However, Gulas was concerned that she had not secured either a manager or director role in the latest reorganization and wondered if she might leave and how her departure would affect the group.

Of real concern was the certainty that employees like these would become even more overloaded in the transition to a global organization. It is common for highly central people to become bottlenecks in organizational redesigns as both old and new colleagues come to them for help. As a result, Gulas continually took steps to ensure that highly connected people decreased their networks by shifting portions of their roles and developing other talented individuals in the organization. Overall, the effective ties of iNet staff members increased over the five-year period. However, the most highly connected individuals experienced a 37% increase, while the least connected experienced a 60% increase. Another interesting way to examine the change in information ties is to look at the difference between the high performers’ number of ties and that of all others. The difference in 2005 was 32%; by 2008, it had decreased to 7%.

Initially, efforts to minimize network overload helped reduce and/or leverage responsibilities through delegation or organizational design within a team. In one case, a valued but overloaded leader was


coached to consider better ways to use decision-making authority and knowledge in her group. Yet the ONA a year later did not indicate there had been any significant improvement. Gulas was concerned that this valued and respected individual would burn out and found an opportunity to place her in a more strategic, thought leadership role with fewer direct reports—a move welcomed by the individual and by the organization, which became more responsive.

As well as finding overly connected people in each ONA, iNet leaders also discovered employees who were less connected than they had hoped. Of course, not all individuals on the periphery were of equal concern. Sometimes low connectivity indicated poor performance or cultural fit issues that were addressed through coaching and, in some cases, attrition. But some people on the fringe of the network needed to be protected, such as high-end technologists with a great deal of external ties and highly valued employees managing work-life issues. Forcing such employees to expand their internal networks would have increased the probability of their leaving and might have diminished what made them successful in the first place. Rather than targeting all peripheral employees, IT leadership focused on two types: newcomers (whom they sought to incorporate into the network more rapidly) and high performers, as measured through MWH’s performance management system (whom they sought to re-engage so that the rest of the organization benefited from their expertise and skills).

Gulas was particularly concerned with integrating newcomers more rapidly into the network. Experience had shown that newcomers whose first few assignments required contact and working with numerous people across the organization became connected more quickly than those whose initial assignments were constrained. The iNet management team therefore encouraged broad, challenging assignments for new hires with high potential. For example, a new transfer into iNet who showed promise as a project manager was quickly placed in a role in which she supported the development of and training in project management practices. She also supported iNet’s senior project manager in facilitating a process for prioritizing all important enterprise-wide projects. These two initiatives exposed her to all the key technical and project management people in iNet as well as IT and business leaders.

### Networking Dimension 3: Addressing Specific Cross-Function and Cross-Location Silos

When iNet was established, IT leaders focused on promoting connectivity across geographic locations, expertise domains, and units to develop a truly global function. One of the most interesting shifts was in the project management area. Through team building and innovative leadership, this group developed a knowledge community and engaged in worldwide training, which resulted in important collaborations. But the increased emphasis within MWH on project management led to a drop in cross-unit collaboration in the network server group. Prior to 2004, members of this group not only functioned as subject matter experts but also managed most, if not all, of the projects related to the IT infrastructure—a task they did not relish. Consequently, numerous projects were late and over budget. In 2004, when MWH began to emphasize project management, individuals who had sought information from the network and server population turned to the project management group, which resulted in significant efficiency benefits for the company.

ONA results enabled the iNet leadership team to identify many cross-function and cross-location silos and helped it to put in place efficient ways of connecting locations and expertise. Instead of embarking on another reorganization or mandating the use of another collaboration technology to get results, ONA enabled iNet to maintain its core organizational design while focusing on points in the network that yielded the greatest business and operational impact.

For example, a global Application Development Group was created, comprised of team members from all of iNet’s geographic regions. Previously, each region had its own niche expertise in creating or supporting technical applications for the business. By creating a central team that was responsible for the development and strategic direction of all applications, iNet achieved significant savings through consolidation. At the same time, iNet was better able to support business needs by having a more diverse team and expertise base to identify solutions.

Where bottlenecks resulted in organizational silos, project opportunities were found to build cross-functional relationships between the group where a manager was the cause of the bottleneck and other groups. Consider the case of a manager who was a strong protector of his group and controlled most communication and project management
coordination. Shortly after the formation of iNet, the project management responsibilities for his team’s area of expertise were given to the newly formed project management office, while he was tasked with putting together a formal plan for global support of a key company IT application. The result was rapid development of network linkages between this application group and the regional teams.

For other employees who had become bottlenecks, changes in responsibilities were necessary. For example, more responsibility was given to key influencers and those revealed as energizers in the organization.

LESSONS LEARNED IN DRIVING ORGANIZATIONAL TRANSFORMATION THROUGH COLLABORATION NETWORKS

By providing the equivalent of an x-ray that showed who was collaborating with whom, ONA allowed leaders throughout iNet to take targeted actions to improve collaboration. Beyond these more situational uses of the ONA data, iNet also managed three key network dimensions that any IT leader can address to improve the effectiveness of his or her unit. These efforts form a set of three lessons that can be applied by other organizations.

Lesson One: Build Awareness of Expertise for Network Responsiveness

Innovation and best practice transfers often result from the ability to use organizational networks to fluidly capitalize on new opportunities no matter where they arise in the organization. Ideally, networks enable organizations to “surge”: to sense opportunities or problems in one area and rapidly tap into the expertise of others in different areas to coordinate an effective response. This is not achieved by pushing a greater volume of information onto employees but rather by creating networks that can be exploited to solve new problems. Building awareness of who knows what in a network is critical for employees to be able to tap the right expertise at the right time.17

Various initiatives can help increase awareness of who knows what. On a technical front, skill-profiling systems, social network technologies and even well-structured wikis can generate awareness of expertise throughout a group without overloading employees with information or meetings. To be most effective, technologies like a skill-profiling system are built into the organization’s workflows so that people keep their expertise profiles up to date and relevant. These systems also become more valuable when organizations include information in employee profiles that inspire trust.18 An employee consulting a colleague who is a complete stranger will be looking for some reason to trust the person’s expertise and ability. The elements that rapidly generate trust differ across organizations. For example, in some places, academic degrees matter, while in others, experience is all that counts.19 What’s important is including information that creates legitimacy in a particular organization.

Lesson Two: Improve Network Balance for Collaboration Efficiency

Within organizations, it is common to find that 5% to 10% of the people central in a given network account for 25% to 35% of value-added collaborations in that network.20 Often, these people are overloaded and slow the work of others. Further, they frequently represent significant susceptibilities in the network. Should they get frustrated and leave, they take more than just their individual expertise with them—they also hurt the group’s performance by disrupting networks in various ways.

Unfortunately, in groups of any size or geographic dispersion, leaders are often unable to accurately identify these valuable individuals. When asked to name key players in advance of an ONA, leaders are usually only about 50% correct.21 Leaders’ knowledge of the network diminishes further when asked about those employees on the fringe of the network. Rather


than relying on intuition, the MWH case shows how the systematic use of ONA can help IT leaders attain more balanced and thus more responsive networks. Informed actions that simultaneously reduce overload points in the network and draw in newcomers, experts, and rising stars can have a substantial effect on network responsiveness and business results.

Lesson Three: Address Silos for Best Practice Transfer and Innovation

Organizational networks frequently break down across functional and geographic boundaries. One of the strengths of ONA is its ability to reveal the specific collaboration silos that, if not addressed, will undermine strategic objectives. Collaboration silos often emerge for local reasons—incentive schemes may be driving parochial behavior between two units, people in one unit may not be aware of the expertise of those in another, or two leaders may not like each other and create silos many hierarchical layers beneath them. Global solutions like an organizational redesign or collaboration tool often never address these subtle barriers to collaboration deep within the organization. But leaders who can see the trouble spots are then able to identify relatively simple solutions. For example, instituting short rotation programs or staffing a project with well-connected people on either side of a network divide.

CONCLUDING COMMENTS

CIOs in most organizations are continually under pressure to improve efficiencies while delivering more holistic and reliable services. Instead of promoting collaboration in an ad hoc fashion, MWH used organizational network analysis to first understand the characteristics of its collaboration networks, assess existing versus optimal linkages within the organization, and intervene in the networks to promote appropriate connectivity. As a result, the management team at MWH made informed decisions both to decrease unproductive collaborations and to invest in supporting targeted collaborations that provided business impact. By enabling specific cross-function and cross-location collaborations, MWH’s CKO and CIO were able to retain their core organizational design while obtaining the benefits of a truly global enterprise. Overall, the results—as reflected in both efficiency and effectiveness improvements—show that these investments yielded substantial returns and helped align the IT function with core strategic objectives in ways that a formal organizational redesign alone could not have accomplished.

APPENDIX: THE ONA METHODOLOGY USED AT MWH

The study reported in this article was initiated and progressed via an annual survey over a five-year period entirely as an action-learning project. During this timeframe, MWH’s Chief Knowledge Officer, Vic Gulas, and a key member of his staff, Christie Dowling, carried out analytical work and provided the academic co-authors of this article with contextual knowledge of MWH via interviews and personal experience and access to qualitative and quantitative data. The academic co-authors provided guidance on study design, analysis of longitudinal results, and insight on research methods.

Organizational network data at MWH was collected via an annual survey of all iNet employees beginning August 2003. Two specific network relationships were assessed. The first, awareness of expertise, was measured by asking respondents to read the following statement and rate individuals on a seven-point scale, from strongly disagree to strongly agree:

“For each person below, please indicate your agreement with the following statement: ‘I understand this person’s knowledge and skills.’ This does not necessarily mean that I have these skills or am knowledgeable in these areas but that I understand what skills this person has and areas they are knowledgeable in.”

The second network measure assessed information flow. In contrast to the awareness measure, which provided a view of the latent network that might be tapped when projects or demands shifted, this measure revealed activated information linkages amongst members of the iNet group. Again, respondents were asked to read the following statement and rate individuals on the same seven-point scale:

“Often we rely on the people we work with to provide us with information to get our work done. For example, people might provide


23 A teaching case on MWH’s transformation of its IT function, prepared by Rob Cross and supported by the Batten Institute at the University of Virginia’s Darden School of Business, is available from Darden Business Publishing: “Strategic Connections: Using Social Networks to Restructure the IT Department at MWH,” Case A: UVA-S-0112, Case B: UVA-S-0153.
Both statements had been established in prior research and yielded asymmetric ties. This means that we were able to identify both advice seekers and advice providers and so analyze network roles much more precisely than if we simply asked about a symmetric or reciprocated relationship, such as who communicates with whom.

Data collected in this way can be used to create a map of the connections between group members. The graphic below shows a high-level example network of hypothetical marketing and finance teams.

**Lines and Arrows.** Each line indicates a relationship—an information tie—between two individuals. The arrow points away from the advice seeker and toward the advice provider. A double-headed arrow indicates that the individuals go to each other for information. For example, Donna only receives information from Charlie, but Donna and Gail get information from each another.

**Central People.** The network diagram identifies who are the most prominent people in the group. In this network, four people rely on Gail and Charlie for information, but these two rely on very few individuals. All of the individuals who depend on Charlie for information are in marketing, but individuals from both marketing and finance rely on Gail.

**Peripheral People.** The network diagram also reveals the most isolated individuals; some people may be loosely connected to the network, and others may appear to be completely isolated. In this diagram, Justin is completely isolated, and no one goes to Ian for information. Note that the diagram does not indicate anything about the value of the peripheral people; they might be under-used resources, who need to be integrated into the group, or they might be isolated because they lack the skills necessary for their jobs. By identifying such individuals, ONA enables the appropriate action to take place.

**Subgroups.** Groups within a group often appear along the lines of location, function, or hierarchy. In this case, the group is separated along functional lines—very little information passes between the finance and marketing groups, and all information that does pass between them goes through Donna. Donna may be a bottleneck for information transfer between the groups, and efficiency might be improved by creating more links between the groups. Follow-up interviews would be necessary to determine if additional links would improve efficiency. In addition, the diagram shows there are more communication linkages within the finance group than there are within the marketing group.

**ABOUT THE AUTHORS**

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Rob Cross (robcross@virginia.edu) is Associate Professor of Management at University of Virginia’s McIntire School of Commerce and Visiting Research Professor Grenoble Ecole de Management. Cross has worked directly with more than 300 organizations in research on collaboration networks. Ideas emerging from this program have resulted in four books, five book chapters, and 38 articles, several of which have won awards. In addition to top scholarly outlets, his recent book, *The Hidden Power of Social Networks* (Harvard Business School Press), has been featured in *Business Week*, *Fortune*, *Financial Times*, *Time Magazine*, *The Wall Street Journal*, *CIO, Inc.*, and *Fast Company*.

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Christie Dowling, PE, PMP (christie.l.dowling@us.mwhglobal.com) is an environmental engineer at MWH with a passion for enhancing connections between people and groups to streamline work processes and increase re-application of knowledge. She uses network analysis to expose key connections and identify sectors in need of support, both on projects within MWH and for external clients.

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Vic Gulas
Vic Gulas (vgulas@comcast.net) is the former Chief People and Knowledge Officer at MWH. In that role, he led the knowledge management, IT, and HR strategies along with key global implementations, garnering numerous awards and positive citations for the company from *The Wall Street Journal, Business Week, American Productivity and Quality Council, Data Management Review*, and Linkage International. Recently retired from MWH, he works with other non-profit and for-profit companies to help them leverage their knowledge for measurable business impacts.

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