

Managing Collaboration: IMPROVING TEAM EFFECTIVENESS THROUGH A NETWORK PERSPECTIVE

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“Not everything is or will be a team. Increasingly, we don’t have teams here so much as groups that need to form, get their work done, and disband or move on to the other three teams they are on. This flies in the face of a lot of the advice on building team harmony, vision, and other things that we just don’t have time for. Its like we call them teams but they aren’t really in the conventional sense of the word . . . we need new ways of working with these groups.”

—Executive in a Global Healthcare Organization

Many executives have turned to team- or matrix-based structures over the past 15 years,¹ and this trend does not appear to be slowing. A recent Gartner report concluded that in the future, “the primary work unit in the enterprise will be the virtual ‘matrixed’ team, which is composed of diverse competencies, knowledge, and capabilities, and assembled to meet specific project goals or ongoing process deliveries.”² Other research across a large number of organizations reveals that 63% of new product development teams will be geographically distributed within the next few years, with 22% expected to be globally dispersed.³ Still other studies show that more and more corporations are turning to teams as a way to organize white-collar and professional work.⁴

Yet although teams have become increasingly prevalent, evidence is mounting that they also generate hidden costs of collaboration, lengthy decision cycles, and diffusion of focus throughout an organization.⁵ A part of this problem is driven by the changing nature of work. Over the past two decades, waves of restructurings have pushed work and the coordination of work into informal networks within and between organizations.⁶ At the same time, globalization has substantially changed how and where work gets done as well as introduced

myriad cultural and logistical challenges for teams distributed around the globe. Although broadly available communication technologies support virtual collaborations, they also carry a cost in the myriad and instantaneous demands these technologies place on team members' time and attention.⁷

Against the backdrop of this new work environment, a core problem is emerging in that advice on team effectiveness comes from an era where people could commit substantial time and focused effort to one team. With sufficient boundaries protecting team members' time on specific projects, more traditional advice on team formation,⁸ leadership and roles,⁹ group process/dialogue,¹⁰ and organizational design¹¹ makes sense. Yet as this reality has passed, the utility of these ideas has fallen off. Teams today are frequently formed and disbanded rapidly, distributed across multiple sites, and composed of members simultaneously working on myriad projects, with different bosses competing for their attention. Further, these teams' work increasingly demands substantial coordination and integration of specialized expertise within *and* outside of the team.

In this context, shifting from interventions that create cohesive teams to ones that enable rapid formation and dissolution of networks at the point of need can produce dramatic performance impact. Instead of broad-brush interventions to improve overall team cohesion, a network lens enables managers to make changes at network inflection points to, for instance, re-align the flow of information and decisions with the strategic goals of the team, or to connect internal communication clusters with external sources of knowledge. Our work with 20 organizations and more than 50 teams has demonstrated consistent ways network analysis yields unique insights on team performance.¹² In this article, we introduce network analysis and then review six critical relational dimensions that enable team leaders to visualize their team and intervene in very different ways than conventional advice on team-building would suggest.¹³

Applying a Network Lens to Team Effectiveness

Organizational Network Analysis (ONA), also known as Social Network Analysis (SNA), is an established set of methods and statistics for eliciting and analyzing relationships between people such as "who obtains information from who," "who trusts who," or "who is aware of who's expertise." Data are typically collected through surveys in which each person in a team is asked questions such as, "Please indicate the degree to which you typically turn to each person below for information to get your work done." A single survey might ask one or several of these kinds of questions along with demographic information such as hierarchical level, company tenure, work location, job function, and other

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TABLE 1. The Changing Face of Teams

Team Levers	Traditional View	Network View
Are the right voices influencing team trajectory?	Leader as ultimate decision maker and direction setter. Process and content roles in team provide structure.	Decision making and direction setting influence shifts based on expertise. Leader and followers set climate for shifts in responsibility.
Is the team "appropriately" connected for the task at hand?	Information and decision-making networks either over-connected or hierarchical.	Information and decision-making networks are focused on an archetype for success based on point in process.
Has the team cultivated important external relationships?	Not heavily emphasized either to others within an organization or to experts outside an organization.	Heavily emphasized and targeted both within and outside organization to bring the best expertise to bear.
Are value-added collaborations occurring in the team network?	Principally just information and decision-making interactions.	A focus on value added interactions in terms of both performance and team members' engagement.
Do underlying relationship qualities yield effective collaboration?	Communication focus on joint commitment to goals, benevolence-based trust and group process and harmony.	Information focus on awareness of expertise, timely accessibility, competence-based trust, and execution of commitments made to teammates.
What organizational factors are key to effective collaboration?	Matrix reporting structures, 360-degree performance feedback, team-based collaborative technologies, and flexible organizational affiliation.	Positive organizational network momentum, supported by consistent meaningful exposure to others' expertise, organization-wide collaborative technologies, and flexible workflow.

individual descriptors of teammates. For each network question, an analyst can generate a diagram showing where there are connections between people and conversely, where those connections are lacking. In addition to visualizations, a highly advanced body of statistics can be used to measure group cohesiveness, dispersion of information or level of reliance on a small number of people (see the Appendix for a summary of steps entailed in a typical ONA).

By focusing on the right internal and external networks, this perspective gives leaders a very granular means of promoting team effectiveness. Below (and as summarized in Table 1), we outline six key questions a network perspective enables teams to address to improve effectiveness.

Are the right voices influencing team trajectory?

Traditional advice suggests that performance results when the right expertise is on a team with strong leadership and well-defined process and content roles.¹⁴ With sufficient time and predictable problem domains, leaders can cultivate and gain commitment to a team vision as well as match content and process roles and accountabilities with team member expertise. Yet few team leaders have this luxury anymore. Most are dealing in very nebulous problem domains

with little surety on the outcome or ability to even predict who will be on or off the team in coming weeks and months. Rather than designing a vision, process, and structure for a known future, team leaders are better served by applying a network lens to ensure that the right expertise is being brought to bear at the right point in time—a difficult challenge as teams have become larger, virtual, cross-functional and frequently staffed with members not dedicated to one effort.¹⁵

There are two basic challenges to team effectiveness on this front. First, how does a leader in a distributed or large team know who is influential and if the right expertise is being brought to bear? All too often, certain people—typically those who are loud, who have the leader’s ear, or whose expertise was good for past purposes—become too prominent in myriad but seemingly invisible collaborations. Typically, many interactions occur outside of formal meetings and drive a team on a solution trajectory that undermines results possible from more balanced collaboration leveraging the full team’s expertise. Cliques also rapidly form and preclude integration of expertise—creating an invisible barrier to innovation and execution that the team was formed to bridge in the first place. In these cases, mapping information flow and problem-solving collaborations—and then coloring nodes in the network by technical competencies—allow a leader to ensure the right expertise is influential in ideation and execution.

Second, how does a leader ensure the right balance of reliance on formal structure (to ensure consistency and efficiency) and informal structure (to ensure innovation)? Although climate or team development surveys can indicate that a team has become too rigid or hierarchical, these assessments often do not give sufficient insight on what to do outside of platitudes on participative leadership and delegation. Network analysis lets a leader see where a team is falling into a routine of relying on roles—whether the team leader or others—and so potentially not leveraging the best expertise or running into invisible bottlenecks. Now more than ever, leaders need to ensure that influence and decision authority flows to the right people in a network, depending on needs at a given point in time. A network view helps determine if this is happening, provides insights on where role redesign or coaching can decrease the team’s reliance on voices good for past purposes, and ensures that leaders are letting go and followers are taking courageous action (rather than elevating all things up the hierarchy) when they need to be influential.

Is the team “appropriately” connected for the task at hand?

Although executives acknowledge the importance of collaboration, the tendency is to take either a “more is better” or “ad hoc” approach to collaboration. Both philosophies can hamper team effectiveness via unproductive network patterns. First, one of the legacies of the advice industry built up around teams lies with a heavy emphasis on consensus and participative leadership. These approaches were intended to expand the pool of ideas and expertise brought to bear as well as to encourage member’s personal commitment to

team goals. However, rather than the *right* voices being heard, excessive consensus building too often results in slow decision making, too many meetings consuming people's time, and a sense of entitlement to participate in all aspects of decision making. A network perspective can allow leaders to visualize information flow and time spent in collaborations in order to make targeted decisions on where excessive collaborations are draining group effectiveness.

The second problem arises from allowing collaboration to occur in an ad hoc way that can lead to invisible barriers to team effectiveness. Research over the past 20 years has consistently shown that people who make targeted investments in relationships perform better than those who simply build ever-larger networks.¹⁶ The same general results apply to teams as well.¹⁷ Yet unfortunately, team leaders too often do little to build the right patterns of connectivity and so allow team networks to fall into unproductive collaborations constrained by formal structure,¹⁸ demographic similarity (or homophily),¹⁹ and personality.²⁰ Although leaders cannot make people become friends, they can use network information to change staffing, team meetings, and a range of communication vehicles to ensure that homophily, lack of time, organizational pressures, and inertia do not drive teams into biased or ineffective networks.

A network perspective helps ensure that the right collaborations are occurring rather than allowing overly connected or ad hoc networks to evolve. To do this, leaders (often in conjunction with the team) first identify the ideal network that needs to be in place at a given point in a team's lifecycle. Then, by comparing existing collaborative patterns to the desired network, they can make targeted shifts that both build out needed relationships and decrease time spent on unproductive collaborations. The ideal network can be identified in several ways: in smaller teams, a leader can run a facilitated exercise to brainstorm the network that needs to be in place at a given point in time; in larger or distributed groups, a leader can embed survey questions into a network diagnostic to identify the ideal pattern; and more systematically—as some pharmaceutical and electronics companies have done in their new product development efforts—organizations can profile high-performing team networks at key points in a process and so provide teams with a model for success. Regardless of process, the ability to adjust connectivity in a targeted fashion can dramatically improve team effectiveness.

Has the team cultivated important external relationships?

Another legacy from decades of focus on team process and roles is that most advice on teams is inward-focused and promotes insularity. Of course, leaders intuitively know that teams live in a context demanding effective coordination with key stakeholders. They also all know that there are better ideas and practices outside the team and organization that they need to find and leverage. However, when the rubber meets the road, the pervasive tendency is to focus inside the team on tasks, roles, and process. More recent research has shown that effective teams pay targeted attention to external relationships critical for expertise, decision making, resources, and political support.²¹ A network

perspective—applied in a way that enables a leader to see key external ties—helps ensure the right range of relationships are developed and that a team is not overly focused on specific constituencies.

First, an external view of collaboration can improve ideation and the quality of solutions a team generates by ensuring the right external ties are cultivated and the best and most relevant expertise is brought to bear. This is a process of building networks that enable a desired innovation to occur. It begins by ensuring that the right external ties have been created and that no substantial gaps exist in the external network to make sure that the right kind and caliber of expertise is being sought. Far too often, external sourcing of expertise is done in an ad hoc way through personal relationships, which dramatically sub-optimizes both the creativity side of an innovation as well as the implementation where resources and other partners can speed execution and time to market.

Second, a network lens helps ensure coordinated effort in execution. For example, consider a common problem most organizations have that results from multiple touch points and lack of coordinated effort in delivering offerings to key accounts. In the traditional view of key account management, an account manager acts as a central coordinator of an account team, which is composed of specialists who represent different products, services, or divisions across the organization. However, misaligned priorities and diverse reporting lines mean that communication is often poor and that account strategies are frequently not well executed or understood. A network perspective to account management recognizes that appropriate resources across the entire organization need to be accessed and brought to bear, often on an ad hoc basis, to capitalize effectively on opportunities that emerge at the client. Taking a network approach to account teams also facilitates the balancing act between sufficient team communication and over-communication. Team members must be familiar with each other's activities on the client account in order to present a coordinated approach to the client and to offer relevant products and services; however, excessive meetings and other traditional approaches to account team structure result in inefficiencies and can affect morale.

Finally, an external network focus ensures efficiency in execution via knowledge transfer from similar projects. Transfer from external groups is best accomplished through a combination of weak ties to search for new knowledge and strong ties to facilitate the transfer of complex knowledge.²² Similarly, people who straddle multiple groups are in an advantageous position from which to select and then transfer good ideas from external sources.²³ An external focus is as important for routine project execution as it is for innovation. Thus, although it may be tempting to have teams be internally focused to meet deadlines, in the long run too few external connections can put the team at a disadvantage for obtaining important information. Instead of leveraging existing knowledge, internally focused teams may turn to published sources that may not be as relevant or may be harder to associate with the team's work. Alternately, in an attempt to be focused on the work, they may ignore other information, ultimately reducing the quality of the team's work.

Are value-added collaborations occurring in the team network?

Traditional team advice focuses on building commitment to a goal and then relies on roles, process, and structured meeting formats to ensure information flow and decision making are occurring as required in a team. In general, the tendency is to believe that more communication is better—but there is rarely any focus on the quality of the information or knowledge moving in the team. As outlined previously, a network perspective can be specifically applied to these dimensions (information and decision making) to help a team leader target inefficiencies. However, network analysis can also help a leader go a step further in assessing and then promoting effectiveness of collaborations within a team.

First, from a pure performance perspective, strengthening networks isn't about simply increasing interactions; it's a product of increasing productive interactions and reducing unproductive ones. By applying a network lens to their teams, leaders can assess where value and costs from collaboration reside and improve connectivity at points that add economic value. Depending on the kind of team and its focus in the organization, this typically occurs in one of two key ways. First, team leaders can assess value creating interactions with network questions that: identify and facilitate productivity via best practice transfer and/or knowledge sharing; and uncover collaborations that underlie revenue growth and can be replicated at targeted points to generate greater value. Second, and just as importantly, team leaders can assess time spent in interactions and convert this into an understanding of collaborative costs and their drivers. Natural solutions emerge with this lens that let leaders see where decision rights, accountabilities, and meeting format shifts can move a team from costly gridlock to execution.

However, beyond ensuring that interactions in a network are value-added from a performance perspective, a network lens is also very powerful in showing where interactions with teammates serve to either engage or disengage people from team goals and objectives. To this end, team leaders often will map at least one more emotional aspect of a network—aspects such as personal support, career advice, a sense of purpose, or, most commonly, enthusiasm in a group. Spend some time in most any organization and you are sure to hear people talk about the level of enthusiasm or energy associated with different people or projects. In some instances, a team in which ideas flow freely and its members build effortlessly on one another's work will be described as "high energy." In others, a particularly influential person may be known as an "energizer"—someone who can spark progress on projects or within groups. On the flip side, of course, are the people who have an uncanny ability to drain the life out of a group.

Applied to this concept of enthusiasm or energy, a network perspective provides a vantage to help leaders take the pulse of their group by simply asking a network question to the effect, "When you interact with this person, how does it typically affect your energy level (positive, neutral, or negative)?" In this way, leaders can find those people who energize a group and/or find where enthusiasm for a given course of action exists. As a team leader vying for people's time and attention, it provides a non-trivial way of understanding those who are

capturing the hearts (as well as the minds) of the team, those who are becoming less engaged, and those who may unintentionally be having a negative impact by virtue of how they interact with the group. Importantly, this is not just an interesting concept, but something that team leaders can and have had an impact on. It turns out that managing energy comes down to a set of finite behaviors that can be developed in a team and that can have a substantial impact on performance and innovation once a leader can visualize where opportunities for improvement exist by taking a network perspective.²⁴

Do underlying relationship qualities yield effective collaboration at the point of need?

Traditionally, team communications have focused on face-to-face and virtual communications that first serve to build harmony and joint commitment to team goals and then serve to ensure execution against a project plan. Early on, team-building activities such as ropes courses or falling into teammates' arms are meant to inspire trust and commitment to colleagues. Although important to creating relationships, outside of the general term of team- or trust-building, we have little evidence of what they actually build into a network that improves collaboration. By mapping the dimensions of relationships that precede or lead to effective knowledge sharing, team leaders have a much better view of ways to improve collaboration at the point of need. Specifically, a network lens can help team leaders focus on development of two relational characteristics: awareness of teammates' expertise; and trust in teammates' abilities.

First, newfound teammates can be useful in solving problems only if the team develops an awareness of their expertise. This awareness determines whether and how expertise on a team is leveraged when a new problem or opportunity comes along. Creating awareness of "who knows what" and "who knows who knows what" helps a team respond to opportunities more seamlessly.²⁵ Importantly, rather than increasing communications or the volume of meetings, once a leader knows where lack of awareness of colleagues' expertise is hurting team collaboration, the team can take very targeted and efficient actions to improve. Rather than consume everyone's time in more meetings, assessing and then building awareness of expertise through staffing, skill profiling, and other vehicles create a latent network of awareness where people can tap relevant expertise at the right point in time.

Second, in addition to meta-knowledge of expertise in a group, another key determinant of whom a person seeks out and listens to in the face of a new problem is trust. Research shows that trust leads to increased overall knowledge exchange,²⁶ makes knowledge exchanges less costly,²⁷ and increases the likelihood that knowledge acquired from a colleague is sufficiently understood and absorbed so that a person can put it to use.²⁸ In a team context, two dimensions of trust are important to knowledge creation and sharing: benevolence ("You care about me and take an interest in my well-being and goals"); and competence ("You have relevant expertise and can be depended upon to know what you are talking about").²⁹ Benevolence-based trust is what most of the

team-building activities actually build and is important in a network because it allows one to query a colleague in depth without fear of damage to self-esteem or reputation. In addition, though—and frequently overlooked by traditional team-building activities—people must also trust that the person they turn to has sufficient expertise to offer solutions. Competence-based trust allows one to feel confident that a person that was sought out knows what he or she is talking about and is worth listening to and learning from. Mapping this dimension of trust in a network allows leaders to identify gaps and then consider a range of behavioral interventions to improve connectivity on this front.³⁰

Does organizational context support collaboration and momentum?

With minimal fixed-asset or geographic constraints in knowledge-based work, teams and team-based designs often seem a natural and easy solution for improving collaboration and productivity. However, experience has proven the transition to teams a difficult one, requiring infrastructure realignment and development of appropriate cultural values and leadership skills. Drains on productivity and morale will occur if a team-based design is inconsistent with an organization's strategy, information and performance management systems, leadership style, or employee skill base. Yet altering any of these elements requires significant time and cost to develop, implement, and administer.

The single greatest factor driving the degradation of organizational networks is staff turnover. However, morale, overwork, internal competition, and other factors largely driven by leadership can also negatively impact people's ability or willingness to connect with others in the support of organizational objectives. Factors and initiatives that support network development include formal structure, work processes, development activities, and culture, as shown in Table 2. Effectively implementing the relevant initiatives will create positive network development and team execution.

A Network View of Three Prevalent Types of Teams in Organizations

In the following vignettes, we have relied on ONA to highlight a different means of visualizing team improvement opportunities. In Table 3, below, we summarized the key drivers and actions typically taken for the three types of teams.

Sales Teams

Since the 1980s, many industrial and professional services organizations have implemented account team structures to serve key clients. Typically, these teams cross divisions, product groups, service lines, geographic location (often across multiple countries), industry specialization (for complex clients), and levels of seniority, and they are considered the center of complex business-to-business sales.³¹ Clearly, multiple and diverse resources need to be brought to bear to make sales and build relationships. Yet traditional account team

TABLE 2. Organizational Context Supporting Positive Network Momentum

Element of Organizational Context	Examples that Support Positive Network Momentum
Formal Structure	<ul style="list-style-type: none"> • Decentralized decision rights • Latitude for work to be performed outside formal reporting lines • Recognized broker or liaison roles
Work Processes	<ul style="list-style-type: none"> • Diverse team structures designed to fill network gaps • Flexible workflow • Use of collaborative technologies
Development Activities	<ul style="list-style-type: none"> • Systematic exposure of capabilities across organization • Social and professional development activities facilitate relevant relationships • Supports the development of external relationships
Culture	<ul style="list-style-type: none"> • Supports ad hoc collaboration • Recognizes external ideas and relationships • Promotes development of personal expertise

TABLE 3. Summary Issues Driving Team Performance

Team	Issues Driving Team Performance	Management Actions Based on Network Approach
Sales	<ul style="list-style-type: none"> • Identify opportunities that lead to new sales • Build strong client relationships • Optimize sales of existing and new product lines 	<ul style="list-style-type: none"> • Identify key people who may be getting overloaded and find alternatives, such as emerging high performers, who can relieve the key person and develop their own skills • Identify key influencers and target with retention programs • Build better lateral connections within the team and between the team and client
Innovation	<ul style="list-style-type: none"> • Create new offerings and process improvements • Streamline approval and development process 	<ul style="list-style-type: none"> • Actively support key brokers who provide access paths to other groups and who are internal promoters of ideas and reputation with internal 3rd parties • Ensure links exist for broader buy in and decision acceptance outside the team
Execution	<ul style="list-style-type: none"> • Timely coordination of technical knowledge across distributed sites to avoid costly re-work • Access to expertise inside and outside the team • Acquisition of clear and consistent customer requirements 	<ul style="list-style-type: none"> • Provide team members with tools that support the strategic use of technology for collaboration across remote sites. However, make it a priority to hold face to face meetings with remote team members to build awareness and commitment • Leverage the personal networks of team members as access points to external knowledge and make connections visible

structures and account planning practices have somehow not matched the complexity of identifying and exploiting emerging opportunities in the highest potential accounts. In fact, research has shown no correlation between the use of teams and sales performance on key accounts.³²

We typically find that the difference between high- and low-performing account teams in an organization is not a result of product knowledge, sales behaviors, or more traditional account planning practices. In most organizations, key account teams have the same training and avail themselves to the same technologies. As a result, team-building or sales-training interventions often pale in comparison to the improvement potential uncovered by visualizing network drivers of account team success. Instead, our results more generally show that the difference between high- and low-performing account teams can be traced to the pattern and quality of the teams' relationships with others inside and outside the team.

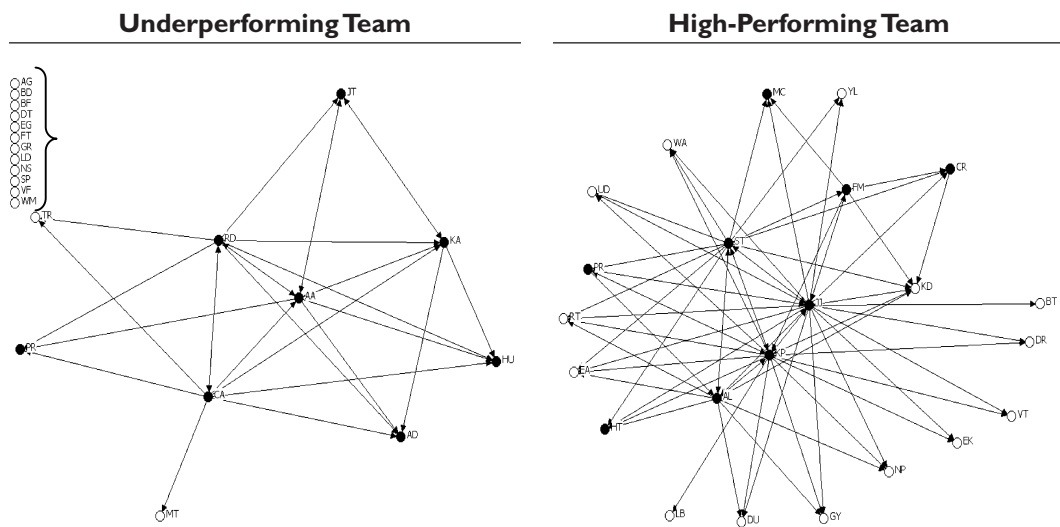
On a network pattern level it turns out to be very important that teams not evolve into "cliques" or subgroups, that they not over-rely on a given person (either expert or leader), and that they manage a balance of external ties bridging to key stakeholders. On a network content level, our results show that high-performing teams are distinguished not just by more active information flow networks, but also networks showing greater awareness of other's expertise, more fluid decision-making interactions and competence-based trust. While individual competency and training matter to keep teams from landing in the bottom 20% of performers, it is almost always the above network dimensions that turn out to be key predictors in distinguishing the top 20% of performers.

With account teams, ONA helps leaders assess three high-leverage points for performance improvement:

- **Quality of relationships between the account team and client.** The *appropriate* level of high-quality client connections across relevant team members allows for better client service, discovery of cross-selling opportunities, and decreased susceptibility to departure of key individuals on both sides of the relationship.
- **Quality of relationships within the account team.** A team fluidly connecting key expertise and roles is much more efficient and effective in identifying and capitalizing on sales and delivery opportunities.
- **Quality of relationships connecting the team with the host organization.** A broad network of connections back into the organization allows an account team to leverage scale in a large organization and so materialize the right products, services, and expertise for clients in a timely and efficient fashion.

Consider one *Fortune 250* company's efforts to raise the effectiveness of low-performing account teams by assessing and replicating networks that high-performing teams naturally cultivated. In this organization, cross-functional teams were assigned to top accounts, with the mission of improving customer satisfaction and increasing sales by optimizing existing product lines, introducing

EXHIBIT 1. High- and Low-Performing Account Team Information Flow



"Please indicate the extent to which you turn to each person listed below for market or product expertise or information to service this customer." Responses of somewhat frequently to very frequently.

new products, and improving processes between the organization and its key clients. These teams were assigned to the top 18 accounts at this company, each of which generated 2% to 5% of total firm revenues. In this case, a sales-effectiveness program focused on defining network differences of high- and low-performing account teams and putting in place tools (e.g., collaboration analysis processes, technology) and support mechanisms (e.g., training, account planning processes) to replicate important networks dimensions in lower-performing teams.

Here we compare the network of one account team generating top revenue and consistently strong customer satisfaction ratings with the network of another that underperformed significantly across most performance measures. First, when evaluating the relationships between the account teams and the client, in each case, client contact was heavily dependent upon two salespeople. However, in the more successful account, there were several supporting relationships with other members of the team. As seen in Exhibit 1, the high-performing team had formed collaborative relationships with multiple clients, frequently turning to them for support or product information. In stark contrast, the underperforming team reached out to only two clients regularly for informational purposes (the 12 clients identified along the upper left-hand side had informational relationships with the account team only on a very infrequent basis).

It was more than just the volume of connections that distinguished the high-performing team. This unit also had qualitatively better relationships with

the client, which could be seen with a network lens. The most significant benefit that both account teams received from their extended networks (people outside of their team) was the ability to assist with specific sales opportunities. However, an almost equally important benefit cited by the successful team was “contacts to other relevant parties in the organization.” Not only were the members of the higher-performing team better connected among themselves and with their clients, but they also relied much more heavily on their networks to make connections that provided access to additional sales opportunities within the client.

Second, moving from the client interface to the internal network within the team, the ONA revealed that the underperforming team was much more formal and structured, with interactions conducted via telephone and planned meetings, whereas the successful team communicated much less formally, through impromptu meetings, e-mail, and instant messages. This more seamless collaboration in the high-performing team was enabled by members having greater awareness of colleagues’ skills and expertise. Although both teams were small, the ONA revealed that very few people on the underperforming team were aware of the knowledge, expertise, and capabilities of others on the team. In contrast, the successful team had extremely high levels of awareness across all roles and so naturally morphed to client sales opportunities much more effectively.

On both teams, the two most central people were important in holding the network together. However, the higher-performing team had greater lateral connectivity, which helped to better serve the customer. These non-hierarchical networks also decreased susceptibility should highly connected team members leave or be promoted. For example, on the underperforming team, if the two most central people left the team, connectivity would fall off by 76%. The effect on the successful team is less pronounced—losing the two most central people would reduce connectivity by 55%.

This is a common predicament for account teams that focus too heavily on leaders or certain experts and unwittingly create susceptibilities and hurt overall performance. For example, take the case of a global information technology (IT) services company that used ONA to optimize touch points with a key client across dimensions such as seniority, roles, functions, and expertise. In this case, the ONA surprised the IT services account executive on two important fronts. First, client contact was spread across many more people than expected, at all levels of the team. In fact, the account executive was astonished at the number of people with client relationships and the urgent need for an effective communication plan to ensure that everyone was aligned with the client’s objectives and delivering a consistent voice. In this case, the very externally focused players turned out to be desktop technicians who provided support to key client stakeholders—revealing a lever of influence that was entirely unknown to the account manager and a lack of influence at more senior levels on his team that dramatically concerned him.

A second point of interest for the IT services account manager lay with the networks of the seven project managers charged with cultivating

relationships with other areas of the IT services organization and helping to cross-sell services and deepen account penetration and revenue. Of these seven leaders, two were barely connected back into the IT services organization, and four were clearly overloaded by demands from internal team members but did not realize the impact their workload and accessibility were having on the rest of the team. In this case, when the account manager saw who one of his top network enablers was, he panicked, as this person was about to go on a leave of absence. With the ONA, however, he was able to avoid disruption by understanding this person's relationships and the benefits she provided through them and then pairing her with several "high-potential" team members ready to take on client responsibilities during her leave.

Innovation Teams

History teaches us that most breakthrough innovations are re-combinations of existing ideas or technologies, the integration of which occurs through teams and informal networks.³³ Although traditionally these networks have formed in very serendipitous ways, it is increasingly important to cultivate and "manage" lateral and external connections for more effective innovation. Success often comes from targeted initiatives ensuring connectivity among those with the right expertise in a given domain and those with the right influence in the organization—the people who have a unique ability to get things done by virtue of their position in the network. Rather than sequestering small teams with a charge to generate a blinding insight or engaging in yet another corporate restructuring to break down silos, leaders can use ONAs to mobilize networks of relevant expertise. Network dimensions such as the following can dramatically improve innovation success:

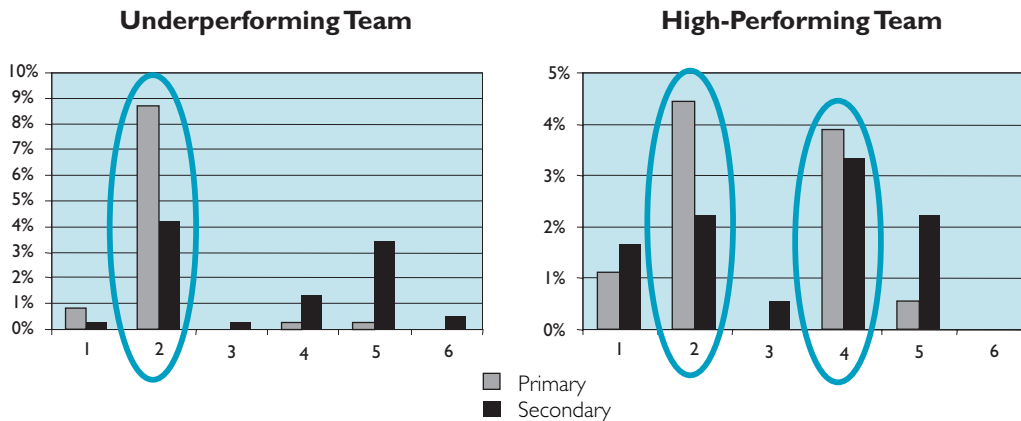
- ***Staffing innovation teams with brokers from broader informational networks.*** By mapping networks of groups charged with innovation (e.g., R&D units or learning-oriented alliances) we can staff innovation teams with brokers—those well positioned to be able to take an idea from one domain and see its potential for application in another domain—and greatly facilitate integration of expertise in breakthrough innovations.
- ***Targeted development of external ties for decision purposes.*** Obtaining relevant buy-in and decision acceptance from both formal and informal leaders in the broader organizational network dramatically improves speed and fidelity of execution as an innovation evolves from ideation to implementation.
- ***Team networks that produce creative friction and innovation breakthroughs through recombination of existing expertise and resources.*** Mapping the quality of ties among those with core expertise ensures that the right combinations of knowledge and resources are integrating to generate new product or service offerings.

Consider a leading food organization that produced a dramatic innovation breakthrough by working through networks more effectively. Producing substantial innovation in the confection category is a real challenge, as the top 20

EXHIBIT 2. Primary Network Benefits from Relationships Outside the Account Team

Please identify up to 15 people who are not within the specified core account team or key customer contacts, but who are important in providing a high quality of service to the customer. Of these people, please indicate the primary and secondary benefit you receive.

Primary and Secondary Benefit Received From People in Personal Network



Benefits:

1. Industry or market trends that suggest opportunities with the customer
2. Specific opportunities that exist (or could exist) at this customer
3. Political awareness in terms of who is influential or things to avoid in conversation
4. Contacts to other relevant parties in the organization
5. Activities of organizations similar to the customer
6. Activities of competitors to the customer

brands in the category have remained remarkably consistent over the last 35 years. It is rare for a new confection to last past 3 to 5 years. It is even more rare for a new business model to be introduced into the category. The MyM&Ms business of Masterfoods—the group that has developed and now markets customized M&Ms—provides an example of how mobilizing internal and external networks can efficiently produce such breakthrough innovations.

The spark for this innovation occurred in the Advanced Technology team in R&D, which was charged with developing new technologies for the Chocolate Business Unit. The team was intrigued by the opportunity to innovate the appearance of the unit’s products, inspired by the legendary “m” printed on M&Ms. The first innovation came with learning how to ink-jet a picture onto a tablet of chocolate. The team was successful in developing a food-grade system to print digital photos directly on the surface of a chocolate bar. However, although a technical success, beta testing with consumers did not show enough volume to justify launching the product on a large scale.

In parallel, though, another group within the same team was charged with printing the faces of the M&M characters onto M&Ms. The “faces” were printed on M&Ms by the use of offset lithographic technology. This technology is traditionally used to print onto confections, but not to the level of resolution required to print high-quality faces on the curved M&M surface. In this case the market tests showed high interest in the product, but the cost of creating new print wheels prohibited small runs, keeping the approach limited.

Each team had an incremental success that was not viable in the market; yet their combined insights had the potential to generate a substantial breakthrough. However, although co-located, the teams did not communicate in a way that allowed them to share their work in sufficient detail to see the connection between the new technology and the opportunity to print different logos on M&Ms. The “ah-ha” moment on the technology side of MyM&Ms came with the realization that the ink-jet technology from chocolate tablet printing could be combined with the concept of printing on M&Ms. This created the ability to print text on M&Ms at low volumes, allowing the company to cheaply customize the print on the M&Ms piece and create the innovative business concept of selling custom-printed M&Ms direct to consumers. The catalyst for the breakthrough occurred when the manager, a broker in network terms who was familiar with both projects, brought the two groups together by “translating” how the technology innovation could be applied to printing on M&Ms.

Several other networks needed to be built before the product could enter the sales pipeline. First, the development team needed an external network of suppliers to provide key elements of technology. To address this issue, the team created a unique external partnership network composed of an ink-jet print head supplier, an ink company, and a printer frame fabricator. Two of these partners were already working with Masterfoods in other areas; one was completely new. Getting the innovation accepted and to market would not have been possible without this external network that helped to make the technical dream a reality. Second, an additional internal business network was created at Masterfoods that would take the technical innovation from prototype to market. Most innovations falter getting from prototype to a marketable product. However, several factors made this case a success. While the technology was being developed, the Masterfoods management team was looking for a new venture to be an example of business model innovation for the rest of the firm to emulate.

MyM&Ms was a completely new type of business model for Masterfoods, one that promised high profit potential. However, resistance to the new business model from the financial community in this firm was deep and well entrenched, as the financial model was completely different to the firm’s core business. Traditionally, the CEO would have had to dictate that all functions support the initiative; however, the team knew that this sort of mandate often entrenched resistance. Instead, the team took a different approach to implementing the innovation, one that leveraged individual networks. The executive sponsor of the venture deliberately avoided a hierarchical dictate and reached out to the personal network he had created with the finance leadership to get buy-in.

Specifically, he asked them to lead beta teams throughout the enterprise in testing out the new business model internally. The use of the finance network as part of the effort to test the new business resulted in reduction of internal barriers and enabled the beta test of the new business to be implemented in 60 days, a breathtaking improvement over the normal 2.5-year new product introduction time.

Execution Teams

Execution teams can include project teams in professional services, software development teams in technology, and service teams designed to provide technology support to internal IT customers. These teams generate value through the creation and delivery of services and so depend on effective and efficient coordination to execute on time and within budget.³⁴ In most cases, coordination issues are addressed by developing and applying a process that governs how work will be done across individual roles and responsibilities. Yet process maps alone do not accommodate the informal collaboration necessary for coordination and are often inflexible when it comes to exceptions or unexpected changes. As a result, a network perspective applied to execution teams helps to reveal opportunities for improvement on key network dimensions, such as the following:

- ***Building mutual awareness of current work and expertise.*** Greater awareness of skills and expertise helps in execution and also informs members of colleagues' work, speeding coordination of effort.
- ***Formation of cohesive, specialized subgroups knit together by technical brokers.*** Large execution teams form into largely autonomous subgroups to focus on specialized work. In these cases, broker roles evolve and are critical to bridging sub-teams to allow for efficient execution and then integration of highly specialized work.
- ***External relationships for product/service adaptation.*** External ties provide a way to get independent evaluation and calibration of the work to improve acceptance and satisfaction of the product.

Effective networks are especially important for software development teams, who need to coordinate work smoothly to build a single coherent system whose parts fit seamlessly together. Increasingly, these teams are staffed globally by people from multiple countries to take advantage of cost structure and available expertise. Traditional approaches to software teams utilize software development processes and tools that decompose the work and work assignments to manage the complexity of the project and accommodate work being done in multiple locations. As a result, the overall structure of the software is handled through a high-level design and architecture, but responsibility for the detailed coordination is often handled by individual team members. Despite the use of these processes and technologies, software development teams turn in poor performance resulting from costly rework, reduced quality, and lower customer satisfaction. Taking a network approach to team structure and team dynamics provides a perspective into the factors that help to make a team successful.

Consider a technology company where software teams develop custom application and web projects for internal and external clients. We observed three teams that used common software development processes and tools but that managed to also deliver their projects on time, on budget, and with a high level of both client and team satisfaction. Several network factors helped these teams succeed.

First, the people on these teams were aware of the knowledge and current work of a large number of their teammates. Awareness is an important relational concept because it is a necessary condition for communication and coordination. In large software development teams composed of disparate expertise, we find it common for people to be aware of the knowledge and skills of 25% to 35% of others on their team. In contrast, the ONA from the teams we studied revealed a much higher level of awareness; team members were aware of the knowledge and skills of approximately 56% of their teammates and they were aware of what approximately 50% of their teammates were working on (in teams ranging in size from 23 to 83 members). This level of awareness meant that people had ready knowledge of where to find the right expertise within the team and could more easily coordinate their work than if they relied on written documentation, which is often out-of-date and incomplete. Several factors contributed to the high level of awareness. First, several people on each team had previously worked together on projects that allowed them to become familiar with each other's knowledge and skills. Second, these teams placed a lot of emphasis on face-to-face meetings that brought in people from another site. Third, they made extensive use of communication technologies, especially instant messaging, which promoted both local and remote collaboration.

The ONA also revealed unique ways that structuring work into smaller, largely autonomous, cohesive subgroups (to execute specialized tasks while also maintaining bridging relationships across subgroups) ensured efficient execution *and* coordination/ integration. Teams often make the mistake of increasing the amount of communication without thinking through who really needs to be involved in decisions, who needs to send information, and who needs to receive it. Two of the software teams in this organization used the ONA to achieve a good balance of communication by grouping themselves into small subgroups; this allowed them to complete a lot of work in parallel and meet some aggressive schedules. One of the teams, however, had a more centralized structure, in which communication went through the project manager rather than through lateral connections and within subgroups. When we presented the results to this project manager, he was not surprised that his team was different because he had noticed several recent communication problems. Seeing the results from the other teams led him to reorganize his team around a more modular structure by reassigning some of the development roles.

A third factor setting these teams apart was that individuals had strong ties with people outside the team that they used to get technical information and feedback to improve the quality of their work. The individuals were especially likely to go outside the team for specific technical information and help related

to programming rather than for general information. In some cases, people sought information from outside to avoid the embarrassment of revealing ignorance to their teammates. However, in other cases, they were reaching outside the team to augment the internal knowledge or to canvas a wide range of people for information. When it comes to staffing projects, many managers focus on acquiring people with the best skills for the work, forgetting that knowledge is just as often acquired from other people and that it is not necessary for those other people to be part of the team for the knowledge to be useful.

As with other teams, both internal and external connectivity is critical to overall effectiveness in execution teams. Internal relationships, especially awareness of others' work, facilitate the informal coordination necessary for rapid and high-quality development. Team members also mined their personal external relationships as a source of valuable knowledge and information beyond what they could or were comfortable getting from team members. We observed several management practices that facilitated awareness and self-organization, but one stands out. Despite the challenges of being distributed, the project managers of one of the teams made a point of arranging for the developers to visit the client, who was in another country, at the client's site to witness the project requirements firsthand and to develop a stronger relationship and allegiance with the client. To further strengthen that commitment, the project managers also arranged for members of the client team to visit the developers at their site. These mutual face-to-face meetings had a profound effect on clarifying the context of the requirements and created a level of trust that resulted in much richer and more productive communications between the development team and the client.

Conclusion

Today, teams are more important than ever in generating and delivering value for an enterprise. However, changes in the economy, organizational structures, work practices, and technologies require rethinking traditional approaches to managing successful teams. This article has highlighted how a relational view taken by sales, innovation, and execution teams in a range of industries offers unique insights into team effectiveness that traditional advice on teams would miss. Of course, the network lens is not just analytic; it creates actionable insights that are practical and make a difference to the team and its performance. Armed with new knowledge and insights about their teams, leaders can and do take a range of actions that better position their teams to deliver on key goals. In sum, the network perspective uniquely enables leaders to position for success via actions targeting networks at the point of execution rather than excessive reliance on team development, process, and roles that were more effective in times gone by.

APPENDIX

Conducting a Network Analysis

An Organizational Network Analysis (ONA) is conducted to collect data that reveal the normally invisible relationships between people. These relationships bind people together in ways that impact a team's performance. A typical ONA can be divided into 4 phases.

Step 1: Determine the Key Strategic Issues and Identify the Audience

- **Sponsorship.** Before embarking on an ONA, it is important to identify a sponsor preferably a high-level executive responsible for the team. This person provides the rationale for the assessment, linkages to other on-going initiatives and resources.
- **Translate Key Strategic Objectives into Specific Network Questions.** An ONA begins by identifying the key business objectives for the team. For example, a sales team looking for ways to increase revenue might ask whether the right people are connected to form solutions. Alternatively, an innovation team looking to develop new products might ask whether people from different business units are collaborating sufficiently. These key objectives are translated into specific network questions that form the core of a survey administered to everyone in the team.
- **Select the Audience.** One of the key decisions in conducting an ONA is selecting the people who are going to participate in the data collection. In the case of an ONA done with a team, the decision focuses on how broadly the team is construed. Should ONA only include the core members of the team or be broadened to include extended team members? Should executives or even clients outside the team be included? Answers to these questions depend on what information needs to be acquired to address the key business challenges faced by the team.

Step 2: Construct Survey and Administer Assessment

- **Compose Survey Questions.** The key business problems are translated into questions that are asked of everyone on the team about everyone else (bounded network questions) or about people outside the team whose names are provided by the respondents themselves (personal network name generator). Each of these questions represents a different relationship that holds between people and it is important to make these questions reveal actionable relationships. In seeking to understand whether a sales team is structured to create cross-product solutions, the survey might include the following questions:
- **Bounded Network.** These questions are accompanied, in the survey, with a roster of names against which the respondent will provide answers to questions like the below.
 - *How often do you talk with the following people regarding <solution>?*
 - *Please indicate how likely you are to turn to each of the following people before making a decision about <solution>?*

The pattern of answers to these questions reveals whether the right people are communicating effectively with each other or if there are strategic gaps in communication that can impact the ability of the team to create an integrated solution.

- *Personal Network Name Generator.* Personal network questions are especially useful for extracting information about people who are outside the team or organization. In these questions, respondents generate names of people in response to questions such as:
 - *Please provide the names of up to 10 additional people who you regularly communicate with to develop <solution>?*
- *Personal Network Name Interpreter.* The elicitation question is followed by additional questions about the relationships and characteristics of each person listed. Common interpreter questions may include:
 - *Please indicate where each of these people is located.*
 - *Please indicate the hierarchical level of each person.*
 - *Please indicate the primary benefit that you obtain from interactions with each person.*
- *Attributes.* Finally, the survey includes a range of relevant demographic and attribute questions such as:
 - *Please indicate your primary office location.*
 - *Please indicate which business unit you are in.*
 - *Please indicate how many years you have been in your current job.*

Taken together, the responses to the network and attribute questions provide actionable insights into the patterns of communication and information sharing by people in different locations and business units.

- **Administer Survey.** The completed survey may be administered in paper form, or, increasingly, using a survey tool that lets users take the survey online. Unlike traditional surveys, ONA surveys need a high response rate—we typically shoot for at least a 75% response—to ensure accurate representation of the network.

Step 3: Analyze and Interpret the Data

- **Analysis.** The response data from the survey are analyzed using a combination of tools to generate the network diagrams and perform statistical analyses.³⁶
- *Quantitative Measures: Team Level.* The statistical analysis is used to compute the extent to which everyone in the group is closely connected and information is readily and easily transferred using measures which include:
 - *Density.* Density measures the number of ties (connections) that exist divided by the total number of ties possible if everyone on the team were connected to everyone else.
 - *Cohesion.* Cohesion is a measure of the average number of ties that are traversed from any person in the group to any other person.

- **Quantitative Measures: Individual Level.** Individual measures typically include *degree centrality* (which identifies which people are central to the team) and *betweenness* (which identifies those that sit on the shortest information path between team members).
 - *Degree Centrality.* Degree centrality measures the number of ties into each person (in-degree centrality) and the number of ties from each person out to others in the team (out-degree centrality)
 - *Betweenness Centrality.* Betweenness measures how often each person lies on the shortest path from any person to any other person in the team
- **Interpretation.** Network analysts use these quantitative measures to identify potential problems in the network. Is too much information going through one person who could become a bottleneck preventing the efficient flow of information or decisions? Is there a group of people who have lots of connections with each other but few connections to anyone else? If these people also have some attributes in common such as all belonging to the same geographic location or the same business unit, it could signal that there are barriers preventing people from sharing what they know or supporting people to share within their group.

Step 4: Create Recommendations for Remedial Action

- The network analyst highlights the strengths and shortcomings in the team based on team members' interpretation of the data. However, when it comes to taking action, a plan is best developed with the participation and input from the team and the sponsor as well as the network analyst. Remedial actions can range from ones taken by any individual in the team (such as making a point to reach out to people in other locations) to actions taken by the team leader (such as re-aligning roles and responsibilities to take advantage of network connectivity or more comprehensive changes in the overall incentive and reward structure).

Notes

1. Specifically, a number of influential practitioner books emerged in the early to mid-1990s after the reengineering craze with advice on how best to manage and support teams in organizations. Examples of this work include J. Katzenbach and D. Smith, *The Wisdom of Teams: Creating the High-Performance Organization* (New York, NY: Harper Business, 1993), pp. 11-19, 98-104; D. Mankin, S. Cohen, and T. Bikson, *Teams and Technology: Fulfilling the Promise of the New Organization* (Boston, MA: Harvard Business School Press 1996); S. Mohrman, S. Cohen, and A. Mohrman, *Designing Team-Based Organizations: New Forms for Knowledge Work* (San Francisco, CA: Jossey-Bass, 1995); G. Parker, *Cross-Functional Teams: Working with Allies, Enemies, and Other Strangers* (San Francisco, CA: Jossey-Bass, 1994); R. Wellins, W. Byham, and G. Dixon, *Inside Teams: How 20 World-Class Organizations Are Working through Teamwork* (San Francisco, CA: Jossey-Bass, 1994).
2. M.A. Bell, "Leading and Managing in the Virtual Matrix Organization," *Gartner Research Report*, 2004.
3. E. McDonough, K. Kahn, and G. Barczak, "An Investigation of the Use of Global, Virtual, and Collocated New Product Development Teams," *The Journal of Product Innovation Management*, 18/2 (2001): 110-120.
4. J.A. Espinosa, J.N. Cummings, B.M. Pearce, and J.M. Wilson, "Research on Teams with Multiple Boundaries," *Proceedings of the 35th Hawaii International Conference on System Sciences*, 2002.

5. Bell, op. cit.
6. R. Cross and A. Parker, *The Hidden Power of Social Networks* (Boston, MA: Harvard Business School Press, 2004).
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9. J.R. Hackman, *Groups that Work (and Those that Don't): Creating Conditions for Effective Teamwork* (San Francisco, CA: Jossey-Bass, 1990); E. Sundstrom, *Supporting Work Team Effectiveness: Best Management Practices for Fostering High Performance* (San Francisco, CA: Jossey-Bass, 1999); P. Goodman, *Designing Effective Work Groups* (San Francisco, CA: Jossey-Bass, 1986); J. Orsburn, L. Moran, E. Musselwhite, and J. Zenger, *Self-Directed Work Teams: The New American Challenge* (New York, NY: Irwin, 1990).
10. A. Donnellon, *Team Talk: Listening between the Lines to Improve Team Performance* (Boston, MA: Harvard Business School Press, 1996); D. Dougherty, "Interpretive Barriers to Successful Product Innovation in Large Firms," *Organization Science*, 3/2 (June 1999): 179-202; A. Edmondson, "Psychological Safety and Learning Behavior in Work Teams," *Administrative Science Quarterly*, 44/2 (1998): 350-383; P. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York, NY: DoubleDay Currency, 1990), pp. 198-202.
11. Mohrman, Cohen, and Mohrman, op. cit.; Hackman, op. cit.; D. Denison, S. Hart, and J. Kahn, "From Chimneys to Cross-Functional Teams: Developing and Validating a Diagnostic Model," *Academy of Management Journal*, 39/4 (August 1996): 1005-1023.
12. In our research, we applied network analysis to 53 teams coming from the following industries: (12 teams) consumer products; (8 teams) software development/technology; (11 teams) consulting; (9 teams) manufacturing; and (13 teams) pharmaceuticals/bio-tech/healthcare. In this process, we employed a case-based logic in data collection by doing semi-structured interviews guided by a pre-existing theoretical model [per R.K. Yin, *Case Study Research: Design and Methods* (Newbury Park, CA: Sage, 1994).] that we held "loosely" to allow for inductive theory development [per B. Glaser and A. Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Hawthorne, NY: Aldine de Gruyter 1967); Y. Lincoln and E. Guba, *Naturalistic Inquiry* (Beverly Hills, CA: Sage, 1985)]. Our initial framework was informed by streams of research on teams, social capital, social network analysis, transactive memory/distributed cognition, and communication studies. With each team, we first applied a network survey that obtained background information and then data on each respondent's unique set of relationships [per P. Marsden, "Network Data and Measurement," *Annual Review of Sociology*, 16 (1990): 435-463]. In the surveys, we followed a standard two-step name generator/interpreter methodology to elicit and then characterize respondents' relations both within and outside of each team [per J. Scott, *Social Network Analysis* (Thousand Oaks, CA: Sage Publications, 1990); S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications* (Cambridge, UK: Cambridge University Press, 1994)]. To ensure reliability, questions were specific and provided detail as to the construct of interest while also assessing typical interactions [per L. Freeman, K. Romney, and S. Freeman, "Cognitive Structure and Informant Accuracy," *American Anthropologist*, 89 (1987): 310-325], as research has demonstrated respondents to be poor at accurately recalling interactions occurring in specific time intervals [per H.R. Bernard, P. Killworth, and L. Sailer, "Informant Accuracy in Social Network Data V: An Experimental Attempt to Predict Actual Communication from Recall Data," *Social Science Research* 11 (1982): 30-66]. Interviews were then conducted with team leaders and/or executives to assess key interventions. These 30-90 minute interviews used in-depth and semi-structured techniques to allow informant latitude in responses [per M. Miles and A. Huberman, *Qualitative Data Analysis*, 2nd Edition (Thousand Oaks, CA: Sage, 1994).; M.Q. Patton, *How To Use Qualitative Methods in Evaluation* (Newbury Park, CA: Sage, 1987); C. Marshall and G. Rossman, *Designing Qualitative Research* (Thousand Oaks, CA: Sage, 1998)].
13. Cross and Parker, op. cit.; D. Krackhardt and J.R. Hanson, "Informal Networks: The Company behind the Chart," *Harvard Business Review*, 71/4 (July/August 1993): 104-111.

14. Katzenbach and Smith, op. cit., pp. 11-19, 98-104; Mankin, Cohen, and Bikson, op. cit.; Mohrman, Cohen, and Mohrman, op. cit., pp. 63, 82-87, 181-185, 231.
15. Bell, op. cit.
16. For some of the more classic references to this research, please see D. Brass, "Being in the Right Place: A Structural Analysis of Individual Influence in an Organization," *Administrative Science Quarterly*, 29/4 (December 1984): 518-539; R. Burt, *Structural Holes* (Cambridge, MA: Harvard University Press, 1992); R. Burt, "The Network Structure of Social Capital," in B. Staw and R. Sutton, eds., *Research in Organizational Behavior* (New York, NY: JAI Press, 2000), pp. 345-423; M. Gargiulo and M. Benassi, "Trapped in Your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital," *Organization Science*, 11/2 (March/April 2000): 183-196; A. Mehra, M. Kilduff, and D. Brass, "The Social Networks of High- and Low-Self Monitors: Implications for Workplace Performance," *Administrative Science Quarterly*, 46/1 (March 2001): 121-146; J. Podolny and J. Baron, "Resources and Relationships: Social Networks and Mobility in the Workplace," *American Sociological Review*, 62 (1997): 673-693.
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 29. In their 1995 article ["An Integrative Model of Organizational Trust," *Academy of Management Review*, 20/3 (July 1995): 709-734], Roger C. Mayer and his colleagues, James H. Davis and F. David Schoorman, identify a third dimension of trustworthiness: integrity, defined as consistently adhering to a set of principles that the trustor finds acceptable. Integrity is clearly important in many situations. Parties to a market exchange, colleagues counting on each other to complete certain tasks, or subordinates committing their efforts and career progression to a superior are surely affected by the perceived integrity of others. Yet it is not clear that seeking a person out for information or advice is contingent on that person following a particular set of principles consistently. For example, malevolent integrity—a condition of low benevolence and high integrity—might apply to situations that are purely competitive, such as two boxers trying to hurt each other but still playing by the rules. However, it is unlikely that *knowledge seekers* would make much distinction between someone who is out to harm them versus someone who is honest and consistent about an intention to harm them.
 30. Prior research has shown that those who are seen as trustworthy sources of knowledge tend to: act with discretion; be consistent between word and deed; ensure frequent and rich communication; engage in collaborative communication; and ensure that decisions are fair and transparent. Under organizational factors, we identified two ways to promote interpersonal trust: establish and ensure shared vision and language; and hold people accountable for trust. Under relational factors, there is some overlap with the trustworthy behaviors mentioned above, but we also identified two new behaviors: create personal connections; and give away something of value. Finally, under individual factors, a person's own judgment of his or her abilities (self-efficacy) also matters, a trust-promoting behavior identified in our interviews we characterize as "disclose your expertise and limitations." L. Abrams, R. Cross, E. Lesser, and D. Levin, "Nurturing Interpersonal Trust in Knowledge-Sharing Networks," *The Academy of Management Executive*, 17/4 (November 2003): 64-77.
 31. See for example M.A. Moon and G.M. Armstrong, "Selling Teams: A Conceptual Framework and Research Agenda," *Journal of Personal Selling and Sales Management*, 14/1 (1994): 17-41; C. Homburg, J.P. Workman, Jr., and O. Jensen, "A Configurational Perspective on Key Account Management," *Journal of Marketing*, 66/2 (April 2002): 38-60.
 32. J.P. Workman, Jr., C. Homburg, and O. Jensen, "Intraorganizational Determinants of Key Account Management Effectiveness," *Journal of the Academy of Marketing Science*, 31/1 (Winter 2003): 3-21.
 33. G. Basalla, *The Evolution of Technology* (New York, NY: Cambridge University Press, 1988); W.E. Bijker, *Of Bicycles, Brakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (Cambridge, Mass.: MIT Press, 1995); T.P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1890* (New York, NY: Viking, 1989); F. Kodama, *Emerging Patterns of Innovation: Sources of Japan's Technological Edge* (Boston, MA: Harvard Business School Press, 1991).
 34. R. Dawson, *Developing Knowledge-Based Client Relationships: Leadership in Professional Services*, Second Edition (Burlington, MA: Elsevier Butterworth-Heinemann, 2005).
 35. The tools in common use by practitioners include UCINET [S.P. Borgatti, M.G. Everett, and L.C. Freeman, *UCINET for Windows: Software for Social Network Analysis* (Harvard, MA: Analytic Technologies, 2002)], NetDraw, InFlow, and Pajek. More information about these tools and the process of conducting an ONA can be found in Cross and Parker, op. cit.
 36. Ibid.

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