Institute for Knowledge-Based Organizations

Where Work Happens: The Care and Feeding of Informal Networks in Organizations

by
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IBM INSTITUTE FOR KNOWLEDGE-BASED ORGANIZATIONS

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Abstract

With the rise of knowledge-intensive work and the trend toward de-layered, flexible organizations, how work gets accomplished is increasingly reliant on the health of informal networks. While often these groups are not found on any formal organizational chart, they frequently are the sources of both strategic and operational success within an organization. This paper describes our work using social network analysis (SNA), a rich set of analytic tools developed by social scientists, to help executives systematically assess the structure of a network as well as the roles of the individuals in the network. For example, social network analysis can indicate whether a network is cohesive or split into several sub-groups and identify the people central to the functioning of a network, those who are peripheral and often under-utilized, and those who are playing a brokering role either within a group or between sub-groups. An accurate diagnosis of a social network is a critical first step in targeting interventions to foster connectivity in areas where collaboration is critical.

Introduction

It is a well-worn cliché that it is not just what you know, but who you know that matters for success. Yet despite this accepted wisdom, most people think of networking as an activity that occurs over cocktails or by virtue of exchanging business cards at trade conferences. Rarely do we see managers systematically assess informal networks within their organizations even though they represent critical individual and organizational assets. We believe that supporting important networks within organizations is an increasingly critical managerial challenge today. Informal networks, such as those sitting across core processes or knitting together merger or alliance interfaces, can be critical to the effectiveness and efficiency with which work is done—yet, by virtue of not being part of the formal organization, are often starved of both resources and executive attention.

With the rise of knowledge-intensive work and the trend toward de-layered, flexible organizations, how work gets accomplished is significantly reliant on the health of informal networks. While these groups are often not found on formal organizational charts, they frequently are the sources of both strategic and operational success within an organization. Of course it is one thing to speak about the importance of networks in the abstract—it is another to systematically assess and support these groups which are often invisible. Social network analysis (SNA), a set of analytic tools with a long history in sociology, social psychology, anthropology and epidemiology, is increasingly being used in organizations to ensure that these important groups are working effectively. Executives are finding SNA valuable for visualizing internal networks and subsequently managing the extremely large and often physically, socially, and cognitively distributed groups of employees that they find themselves in charge of today.

SNA Example: A Global Consulting Practice

To illustrate the use of SNA, consider the management challenge for Scott Smith, Global Practice Executive in charge of IBM's Global Knowledge and Content Management Consulting Practice. Smith managed a group of over 200 professionals dispersed globally and composed of employees with very different specialties that frequently needed to be integrated in unique configurations to address client problems. Effective collaboration among people with unique expertise was key to the practice's ability to compete in sales initiatives. Staffing of the best expertise was critical to exceeding customer expectations and developing and sustaining long-term relationships. For both strategic and operational purposes, a top priority for Smith and his direct reports was to promote the ability of this global group of professionals to share their knowledge and integrate it rapidly in response to client needs.

Smith's group was so geographically distributed that it was difficult to even find a common time when everyone could participate in conference calls. Staff turnover, endemic to consulting as an industry, also made it a challenge to continually ensure that people with the relevant and best expertise were brought to bear on client issues. And the department's standard operational reports focused almost exclusively on financial status which, while important, did little to provide Smith with a balanced view of the practice as a whole. While knowing that collaborative technologies could help to support his practice, Smith also believed that attention would need to be paid to the social fabric of the group and the effect of organizational design decisions.

As a result, in the summer of 2001, Smith decided to conduct a social network analysis of his group to determine ways of promoting connectivity and to better create knowledge efficiencies across this global 'team.' A novel component of the network analysis focused on asking employees about information acquisition through their network of relationships as well as alternative electronic and paper repositories available to them. The results made it clear that most employees relied very heavily on their personal networks for information. All other sources paled in comparison. Smith indicated that: "It was fairly obvious that we would benefit heavily from working with the social connections in the network. While people in my position at other firms were focusing almost exclusively on technology, the results we found made it clear that we need to pay attention to the connections among the network as a key source of competitive advantage."

A high level mapping of those connections can be found in Exhibit 1 below. This network diagram is grouped to reflect the employees in various regions and is fairly busy due to the size of the group as a whole. With groups larger than 40 or 50 members it often becomes necessary to rely on quantitative metrics and to abstract out sub-networks for more detailed analysis.[1] Nevertheless, for Smith's group, it was quickly obvious that several things were positive about the level of connection within the network and the extent to which this information sharing was key to employees getting their work done. However, when we took a more granular look at the network by both assessing each region separately and more systematically considering the role of individuals within the network, we found several opportunities for promoting connectivity. Smith indicated: "While some of the things the social network analysis revealed I already knew, several things emerged that I was only partially aware of and that were having an impact on my business. Even with the things I knew about, the social network analysis provided me with some objective data that I could show others to support what I felt we needed to do. It wasn't just me on a soapbox? this was what members of the network were saying."

For example, one opportunity for improvement suggested by the social network analysis lay with decreasing the reliance on a few very central members. A small number of individuals were responsible for a very large percentage of the interactions within the group. As is typical with groups such as this, these people tended to be higher in the hierarchy. It quickly became obvious why this small group was working so hard and sending e-mails in the wee hours of the morning in response to client issues and employee concerns. Once some of these people were identified, steps were taken to shift certain of their responsibilities to others so that they were not so overloaded and so that the network as a whole did not experience them as a bottleneck. Further, to help create connectivity among those lower in the hierarchy, Smith put in place a series of forums for all members of the network so that individuals did not need to rely as heavily on the hierarchy for effective information sharing and decision-making.

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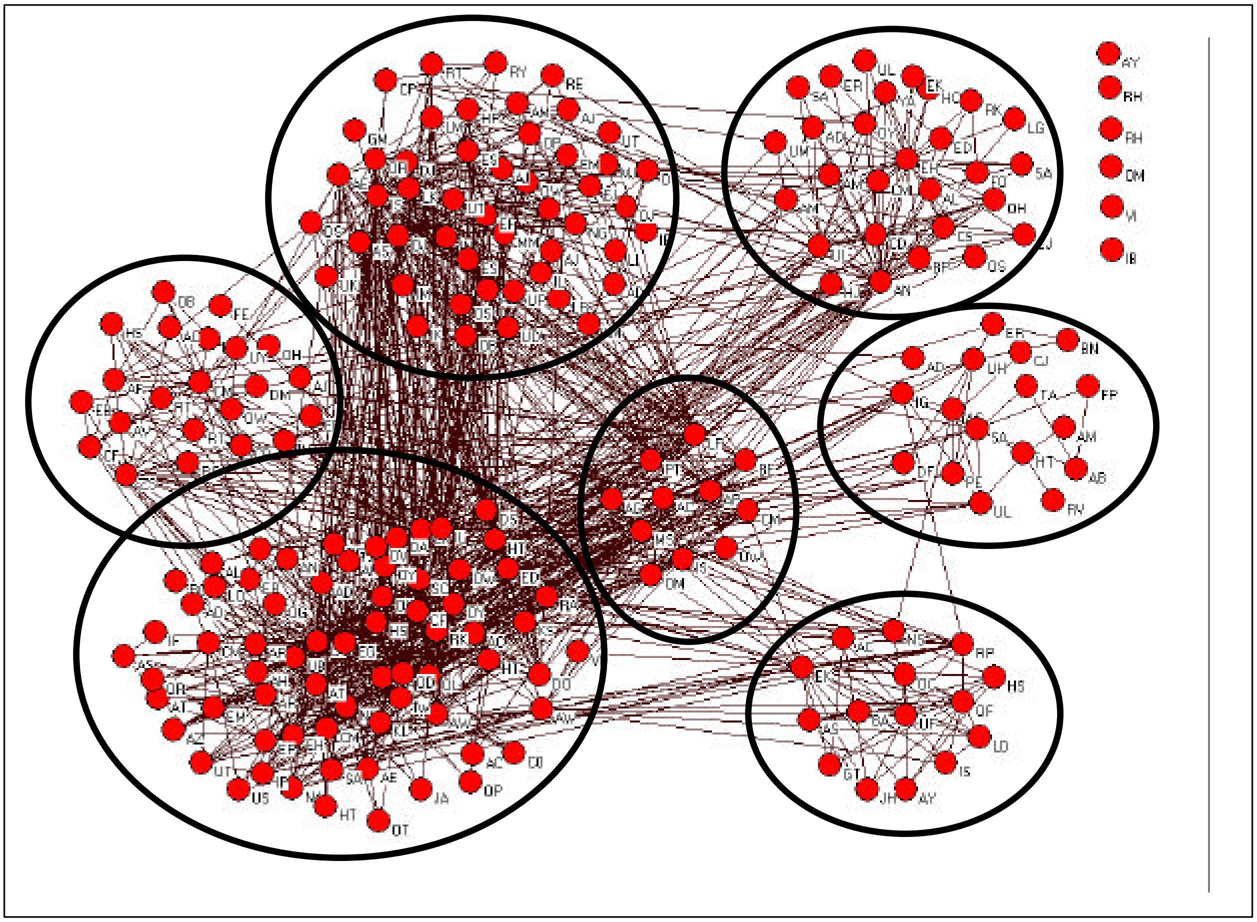
[1] For a primer on social network analysis and the more quantitative approaches that can be taken to assessing a network we recommend Stanley Wassermann and Katherine Faust's *Social Network Analysis: Methods and Applications* or John Scott's *Social Network Analysis 2nd Edition.* Though beyond the scope of this article, the typical report we prepare for companies that engage in research with us has 40-60 slides assessing the network from various angles to pinpoint strengths and opportunities for improvement.

Exhibit 1: Information Sharing in IBM's Knowledge and Content Management Practice



In addition, the social network analysis identified many highly peripheral individuals in the network. These people were important to focus on as they were under-utilized in terms of others using their expertise. Also, many studies have shown that peripheral members are more likely to leave the firm and are less satisfied than their more connected colleagues. Several steps were taken to target and then draw peripheral people into the network more effectively. For example, orientation practices were altered to help connect new people into the group as effectively as possible. Staffing on client and internal projects was used strategically when possible to help connect these people with more established members. Smith noted: "Using projects, both internal and external, as a means of integrating people into the network was critical. It's through joint engagement in work that people both learn what others know and so when to tap them for what, as well as create a social tie that allows them to pick up the phone and call someone when they need help."

In addition to central and peripheral people, the social network analysis also showed fairly clearly that effective collaboration was constrained by physical location. Smith indicated that, "The thing that concerned me most with the network was the heavy connectivity within, not between regions. We looked great across hierarchy and kinds of expertise, but our knowledge sharing was less effective across regions. I wanted to make sure this did not cause a problem in terms of our bringing our most updated credentials and expertise to bear on a client issue when that expertise resided outside of the region." As a result, Smith instituted a series of network building activities targeting those junctures—the 'white space' or points between regions—where collaboration was less effective than it could be.

In addition, on a more local level, each of the regional leaders took the social network diagrams of their own practices and used them in facilitated sessions with their groups. These sessions were designed to gain insight into covert impediments to connectivity and ways of overcoming these impediments by social, organizational or technical means. This was an important part of the process because locally these groups struggled with different issues. "If I had simply imposed a universal solution I would have missed the specifics that were at the heart of improving connections in each region. Taking a more granular approach allowed each region to more accurately work on issues of importance to them."

ASSESSING INFORMAL NETWORKS

Scott Smith's challenge is one that resonates with many executives we speak with today. Particularly in knowledge-intensive work, informal networks are essential to both innovation and the quality and efficiency with which services or products are taken to market. Getting an accurate understanding of these networks is a critical step to ensuring their health through targeted interventions.

When considering a social network analysis, one must first identify a group where investments made to improve collaboration are most likely to yield benefits, i.e., functions or departments where effective collaboration is clearly critical to the success of the broader organization. It is also important to push beyond the formal organizational chart in identifying groups for analysis. Networks are quite often fragmented at functional and hierarchical boundaries—frequently right where management is hoping for closer integration. Table 1 summarizes some of the less immediately obvious applications for SNA that have the potential to yield substantial results because, unlike

Table 1: High Leverage Applications for Social Network Analysis (SNA)

Supporting Strategic Partnerships and Alliances	Executives are increasingly employing cross-organizational initiatives such as alliances or other forms of strategic partnerships to leverage unique capabilities of organizations. SNA can illuminate effectiveness of such initiatives in terms of information flow, knowledge transfer and/or decision-making.
Strategy Execution in Knowledge Intensive Work	Core competencies or capabilities in knowledge-intensive work are usually a product of collaboration across functional or divisional boundaries. Alternatively, marketing strategies often seek to expand the breadth of offerings to an existing client base given the efficiency of working with existing clients rather than targeting new ones. In either case, SNA allows executives to determine if the appropriate cross-functional or departmental collaborations are occurring to support strategic objectives.
Strategic Decision-Making in Top Leadership Networks	A core function of top executive teams is to acquire information, make sound decisions and convey those decisions effectively to the broader organization. SNA, when done with both the top leadership team and the next layer down in an organization, can provide valuable diagnostic information as to the effectiveness with which this is done. Not only can this help assess connections within a top leadership team, but also how information is entering and leaving this group as it is embedded in the broader leadership network.
Integration of Networks Crossing Core Processes	Informal networks across core processes are often fragmented by functional boundaries. Both cognitive and organizational barriers often keep groups from effectively integrating unique expertise, which can negatively affect quality, efficiency and innovation of offerings. As the process map did for re-engineering, SNA provides a diagnostic assessment of information and knowledge flow both within and across functions critical to a core process.
Promoting Innovation	Most innovation of importance today is a collaborative endeavor --- both in the conception and then implementation of an idea. Whether concerned with new product development or process improvement initiatives, SNA can be particularly insightful in both assessing how a given team is integrating its expertise and the effectiveness with which it is drawing on the expertise of others within the organization.
Post-Merger Integration and Large-Scale Organizational Change	Particularly in knowledge intensive settings, large-scale change is fundamentally an issue of network integration. SNA, done before a change initiative, can help inform the intervention as well as central people within the network that a sponsor might want to engage in design due to their ability to convey information to others. SNA can also be done as a follow up 6-9 months after implementation. Quite often these assessments reveal significant issues that leaders are unaware of and need to address for the initiative to be successful.
Supporting Communities of Practice	Communities of practice are usually not formally recognized within an organization but can be critical to an organization's ability to leverage functional expertise distributed by virtue of physical location or organizational design decisions. SNA can be used to both uncover the key members of the community as well as assess its health in terms of connectivity.

important functional units or departments, these groups do not reside on the formal organizational chart and so tend to receive little executive attention or resource.

With a group identified, the second step in a social network analysis is to collect the information necessary to map a set of relationships. While the data can be obtained in a variety of ways, from tracking e-mails to observing people over time, the most efficient means is often to administer a 10-20 minute survey. A critical consideration in a network survey is what dimensions of the relationships one is interested in assessing. In most companies managers are very interested in assessing information flow in networks. In addition, they are also frequently interested in relationships that help to assess aspects of social capital within a given group. For example, we will often map networks of trust (e.g., "I trust each person in this group to keep in mind my best interests") or energy (e.g., "When you interact with this person how does it impact your energy?"). Alternatively, other organizations have chosen to map the activity-oriented aspects of networks such as decision-making (e.g., "Who do you turn to for input prior to making an important decision?") or innovation (e.g., "Who are you likely to turn to in order to discuss a new or innovative idea?"). In short, one's ability to map networks of relationships is limitless. However, it is critical to make sure that the relationships selected matter for the group's performance and/or other important outcomes such as job satisfaction or retention.

Information collected from social network surveys can then be used to create network diagrams that illustrate relationships between members of a group. For example, consider the information network in Exhibit 2a on page 10. This is a network of information flow within a new product development team. In this case each member of the team was asked '**Whom do you turn to for information to get your work done?'** The network has been grouped to differentiate between team members that are in manufacturing, finance and marketing.

There are several observations that can immediately be made about this network. First, although management hoped that the new product development team was operating as one cohesive unit, it is readily apparent that information sharing was occurring largely within the three sub-groups of manufacturing, finance and marketing. Very little information exchange occurred between the three sub-groups, which hindered the team's ability to effectively leverage its expertise in the development process. In addition to the lack of connectivity across the sub-groups it is also apparent that there were different levels of connectivity within each sub-group. The manufacturing sub-group was very tightly knit, whereas there were few connections between people within the finance or marketing sub-groups. The tight connectivity within the manufacturing sub-group could be having both a positive and negative impact on the product development

Exhibit 2a: Information Sharing in a New Product Development Team

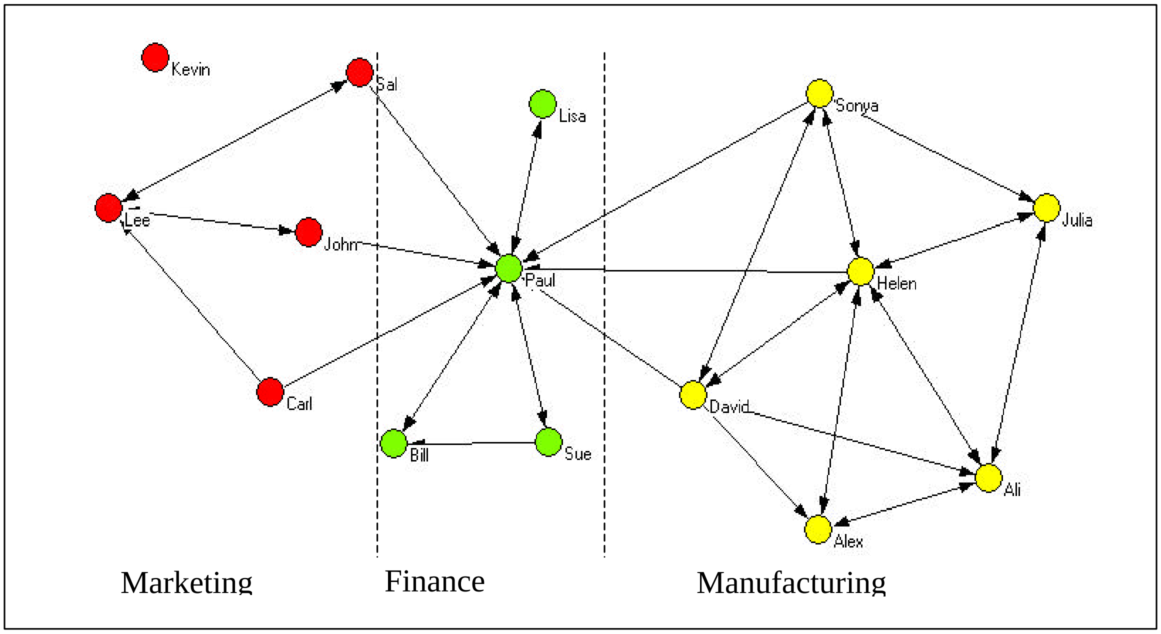
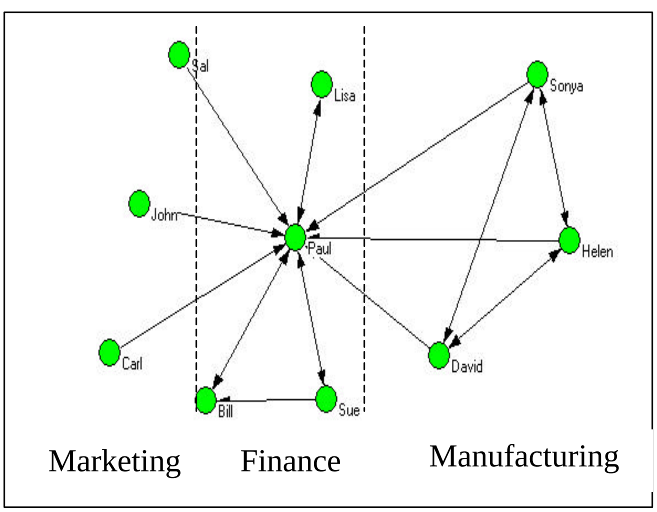
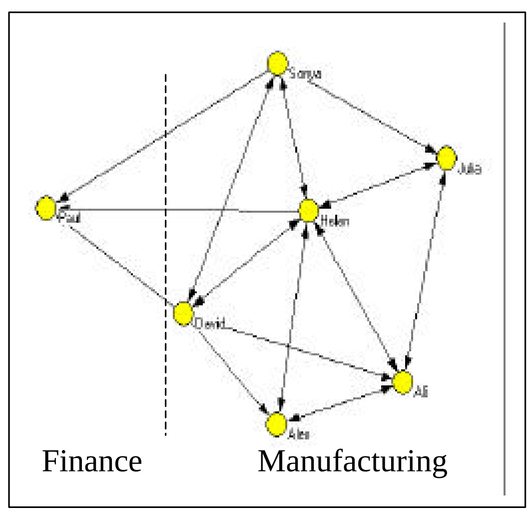


Exhibit 2b: Personal Networks

Paul



Helen



initiative as a whole—only by doing interviews could we know for sure. On the one hand, it is frequently the case that groups like this have developed effective communication practices that the whole team can benefit from employing. On the other hand, it is also frequently the case that dense connectivity such as this is a product of a "not-invented-here" syndrome or leadership practices creating an "us-them" mentality and precluding effective information sharing and problem solving. In short, richer connectivity is not always better.

In addition to assessing connectivity within and across important sub-groups, we can also use social network analysis to assess people's roles within the network. A first step is to consider the direction of the relationships as indicated by the arrowheads in the network diagram. For example, in Exhibit 2a we see that John sought information from Paul but Paul did not seek information from John. In contrast, other relationships were reciprocated, such as Paul and Lisa who sought information from each other. The directionality of relationships can help us understand a person's role within a given network. If they have mostly out-going arrowheads it means they turn to many other people for information. As a result, these people are often highly reliant on—and sometimes negatively effect the productivity of—the group. In contrast, a network diagram showing a person with many in-coming arrowheads tells quite a different story. It indicates a person whom the group as a whole is heavily reliant upon, either by virtue of expertise, job design, personality, or, on a negative front, information hoarding.

People with many arrowheads coming in to them tend to be fairly influential in terms of both the trafficking of information and decision-making. In the new product development group Paul had nine people in the team who indicated that they relied on him. He was a central person in the finance group, with each of the other three finance people coming to him for information. He was also a central person with people from manufacturing and marketing coming to him for information. People such as Paul are often highly valued for the information they possess and act as an important source of cohesion within a group. Should they leave, they not only walk away with valuable expertise but they also significantly change the overall effectiveness of a network that must now reconfigure itself to compensate for that person's departure.

Just as important as identifying the central or prominent people within a group, social network analysis can provide us with a sense of those people who are too loosely connected or even isolated. Such people can reflect under-utilized human capital. For example, Exhibit 2a illustrates that Kevin was completely isolated and Carl had no incoming arrowheads, both indicating that no one sought information from them. Integrating such people into a group can be critical for effectiveness and efficiency of a network, particularly in today's era of turnover where organizations do not have the luxury of waiting six months to a year for people to be effectively connected.[2]

Finally, from a different perspective, network diagrams can help individual employees assess the effectiveness of their personal networks. Up to this point we have presented network analysis as a group-level tool that can help leaders intervene in various ways to promote the health of a network. An equally powerful way to promote connectivity within a group is by providing people in a network diagram with a customized view(s) of their personal network. Most people intuitively know that their network is a critical asset to their careers. However, people rarely take the time to systematically assess and develop this asset.

Providing employees with a means of planning their personal network development is a very powerful way to promote connectivity within a network. Such feedback can allow employees to better understand biases in their network and ways that they might invest effort in developing certain kinds of relationships and decrease investments in others. For example, is a person only getting information from a certain hierarchical level and thus potentially not learning from those lower in the hierarchy (a very frequent occurrence)? Alternatively, is a person only leveraging colleagues who are physically close, or in the same functional unit, or are they actively reaching out to different people to benefit from diverse perspectives? Given the extent to which people acquire information and learn how to do their work from other people around them, these are important considerations in assessing the effectiveness of one's own network.

In Exhibit 2b we have extracted Paul and Helen's individual networks from the main network diagram. It can quickly be seen that Paul had a very diverse network but it consisted mainly of people who came to him for information. He actually only went to people within his own group (finance) for information. In an ideal situation Paul would perhaps be reaching out to people from the other two groups. In contrast Helen's relationships are all two-way but they are only with people in the manufacturing group. In this case both Helen and the group felt that it would be beneficial for her individually and for the new product development team as a whole if she were to collaborate more with people in finance and marketing.

[2] Of course, it could also be the case that these people are isolated for good reason—they may not have task-related or relevant social skills. Re-staffing, restructuring one' job or personal development might be undertaken in such scenarios depending on the specific issue at hand.

ASSESSING THE ROLES OF KEY NETWORK MEMBERS

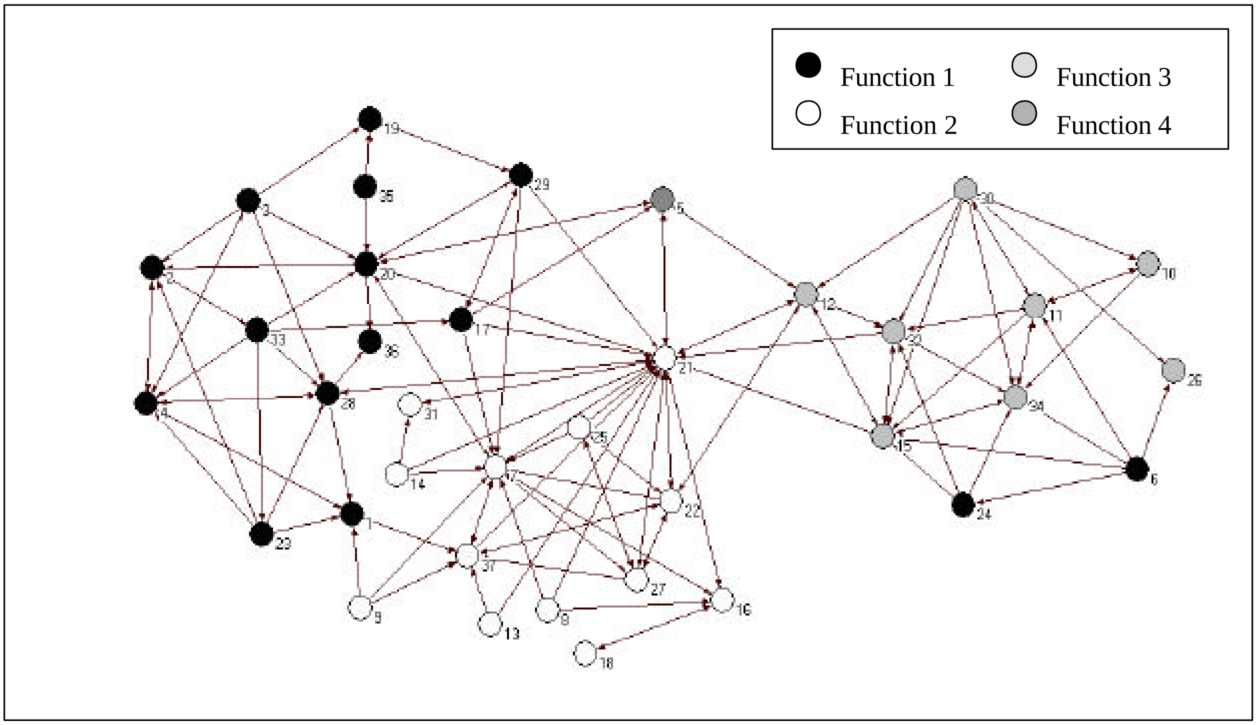
An important strength of social network analysis is that it allows managers to fix or develop sparsely knit networks as a whole when appropriate. Alternatively it allows managers to focus only on points where networks are fragmented at strategically important junctures (e.g., cross-functional connections or critical 'touch points' in an alliance). In only the smallest of groups would management ever want to ensure that each employee is in communication with each other employee—it is both inefficient and ultimately impossible in networks of any size. Rather, social network analysis offers the opportunity to identify and intervene on a targeted basis with four categories of people to improve work and learning within a network. These include:

- Overly central people who might be overloaded and holding the group back;
- Key brokers within a network who are disproportionately important in diffusing information and knowledge throughout a network;
- Influential boundary spanners who are critical in helping to connect networks across functions, divisions, hierarchical levels or physical locations; and
- Overly peripheral people who might be under-utilized assets.

As an example, Exhibit 3 below outlines a network of information flow within an information sciences department of a major global pharmaceutical company. Arrows in the diagram indicate who goes to whom for information in this group. The network nodes have also been shaded to differentiate between the various functions within the department. Although the information sciences department was formed to operate as one cohesive unit, it is readily apparent that information sharing occurs largely within two sub-groups. There is very little information sharing between the people in Function 3 and the rest of the network, which subsequently hinders their ability to provide holistic solutions to research scientists relying on their services. Furthermore, the network itself is relatively sparse, which subsequent interviews indicated was a product of cultural tendencies within the group to only seek information from others as a last resort and a robust 'not-invented-here' mentality.

Not surprisingly, the question from the executive sponsoring this project was: "So what should I do?" In addition to several recommendations involving organizational design, technology, leadership and culture, we suggest that managers systematically intervene with targeted individuals based on their position in the network. Too frequently managers seem to notice only a few of the potential intervention points. It is natural for our eyes to be tuned to what is confirmatory or what we want to see in a given network. However, by systematically assessing a social network and people's positions within in it managers can appropriately target and customize interventions that promote network connectivity.

Exhibit 3: Central and Peripheral People in an Information Sharing Network



Overly Central People

The existence of highly central individuals tends to be noticed first in a social network diagram. People's eyes are just naturally drawn to those with many connections in a network. For example, in Exhibit 3 the person with the most incoming ties is TJ on whom fifteen people in the department say they rely for informational purposes. In deciding whether and how to intervene with central people it is first important to understand the way in which they are affecting the group's performance. The immediate, and often incorrect, leap that most people make in viewing a network diagram is to assume that being highly central is always a good thing and indicative of a person's worth to the group. Sometimes this is true, but not universally so. As a result, we use interviews or facilitated sessions to develop a finer grained view of why someone is central and how they are affecting the network as a whole. From there we can identify targeted means of improving the group's performance by working with that central person. Typically two categories of central people are important to work with on this basis: (1) the unsung hero and (2) the bottleneck.

The Unsung Hero

Almost universally, there are individuals who, to the surprise of the managers we are working with, turn out to be much more central than had been anticipated. These individuals tend to engage in various aspects of their work selflessly and support the overall group in ways that often go unrecognized. They provide the "social glue" that holds networks together. Responding directly to informational requests, engaging in problem solving, providing personal support or helping put one person in contact with another are some of the ways that this kind of central person goes above and beyond the requirements of their job to help others. We call this 'invisible work.' It is generally critical to the effectiveness of an entire network—yet, despite frequently consuming hours each day, can go completely unrecognized by senior management. As a result, these people are often thrilled to be identified by the social network analysis as it is one of the first times that others outside the network see and appreciate their efforts and value.

The first thing managers can do with these kinds of people is recognize, encourage and perhaps reward their contribution to the network. Most organizations tend to acknowledge and reward individual-based accomplishments. Thus, people engaging in this kind of positive, citizenship behavior tend to do so of their own volition but often get worn down over time. Publicly acknowledging their contribution serves to both motivate them and encourage collaborative behavior among others. It can also be a first step to creating a norm for active cooperation in work. Executives often have the ability to go one step further by using a spot bonus or even altering aspects of performance management systems to more broadly encourage and reward for the behaviors exhibited by these central people. By delineating the collaborative behaviors that central people engage in and then incorporating them into various human resource practices, managers can encourage more collaborative environments and better connected networks.

With central people in general it is often important to understand the extent to which the network as a whole is reliant on them. This might be an individual person or it might be an entire class of people (e.g., a certain hierarchical level or functional group). Understanding how their departure might impact connectivity and information flow is critical to ensuring network resiliency. It is often not too difficult to find ways to create connections around a person via communication forums or staffing on internal or external projects. When warranted, this helps create a network that is much less reliant on a given person.

The Bottleneck

Another type of central person in networks also of great concern to managers is someone who has become a bottleneck and so in various ways is holding a group back. These people tend to take one of two markedly different forms. First they might be hoarding information and/or playing people off against each other for political gain. We have seen scenarios where people are playing central positions within a network to maintain an informational or power advantage. In these instances social network diagrams can provide a powerful form of diagnostic information to make this activity 'visible' and help facilitate a constructive coaching or developmental conversation about changing these patterns. Of course other interventions, such as job redesign, rotational staffing or action learning approaches, can also be employed to help connect people around such a person.

In our experience it is far more the exception than the rule that people have become bottlenecks because they are actively hoarding information. Generally we find that these people's jobs have simply grown around them and they are struggling to keep up. Far from being political, these people are working at a frenetic pace and have very little idea how they are affecting the work of those on the periphery. Re-allocating portions of such a person's job can be highly effective. For example, if a person is central due to technical expertise it may be important to take away some of their other workload so that they can continue being pivotal in a creative and collaborative role. Alternatively, if they are central because they own or monitor certain kinds of data or information that many others need, it is often possible to make that information more widely available via paper or electronic means.

A special case is what we call **the overly-connected leader**. Quite often one needs to look no further for bottlenecks in a network than the group's leaders, despite their usually having the best of intentions and trying just to keep up themselves. The situation is often due to a combination of leadership style and lack of clarity among followers regarding whom to turn to for information or to make various decisions. Such leaders rarely realize the extent to which they are bottlenecks in the network. The immediate world they experience is one of fast decisions and action—things always feel like they are happening at an incredible pace—and so the people who have waited weeks to get a meeting or even a simple answer go unnoticed. For leaders, the critical leverage point is typically identifying kinds of information that people come to them for as well as kinds of decisions they are required to make. Once delineated, these domains can be reallocated to others in the network thereby refocusing the leader's attention on more value-added work and promoting flexibility and responsiveness in the entire network.

Information Brokers

Social network analysis not only allows us to identify people in a network with a large number of direct connections, it also allows us to consider indirect connections[3] and so determine who is disproportionately important in holding the entire group together. By looking for people who sit on the shortest path between many others in the network, we can find employees who disproportionately affect information flow. Such people can be very influential parties to work with to expeditiously promote connectivity within an entire network.

The importance of information brokers can be seen in Exhibit 4 on the next page. The top diagram, Exhibit 4a, indicates the information network of a group of analysts within an oil and gas exploration company. We identified the four most prominent brokers within the group; in the diagram these people are identified with larger circles. Exhibit 4b, is the same network but with those four people removed from the diagram. As you can see their removal completely changes the dynamic of the network as it becomes much more sparse and fragments into several different sub-groups.

Information brokers can be disproportionately important people to target in trying to quickly diffuse certain kinds of information, such as in a large-scale change initiative, or to promote connectivity throughout an entire network. In the oil and gas company, management set out to develop a more connected network based around the information brokers. They first identified who the top brokers were in the network and clarified what expertise these people were providing to the group. Management then made explicit these people's expertise to the entire group and indicated to whom members of the community should turn for which kinds of information or expertise. Finally, they created bi-monthly virtual forums and provided a collaborative technology that helped to connect the brokers with each other and keep them integrated and current on who knew (or was doing) what in the network.

What management accomplished in this effort with very minimal effort was quite striking. When the social network analysis was conducted, members of this global community were on average four 'links' away from everybody else. With the steps management took via the information brokers community members were typically no more than two calls away (and never more than three). This is a degree of closeness important to build in a network where you are interested in effectively leveraging

[3] By indirect connections we mean connections that are not directed to or from a given person one is interested in. As a simple example, look at Exhibit 2a where an indirect connection exists between Julia and David since both are directly connected to Helen.

Exhibit 4a: Information Network with Four Key Brokers

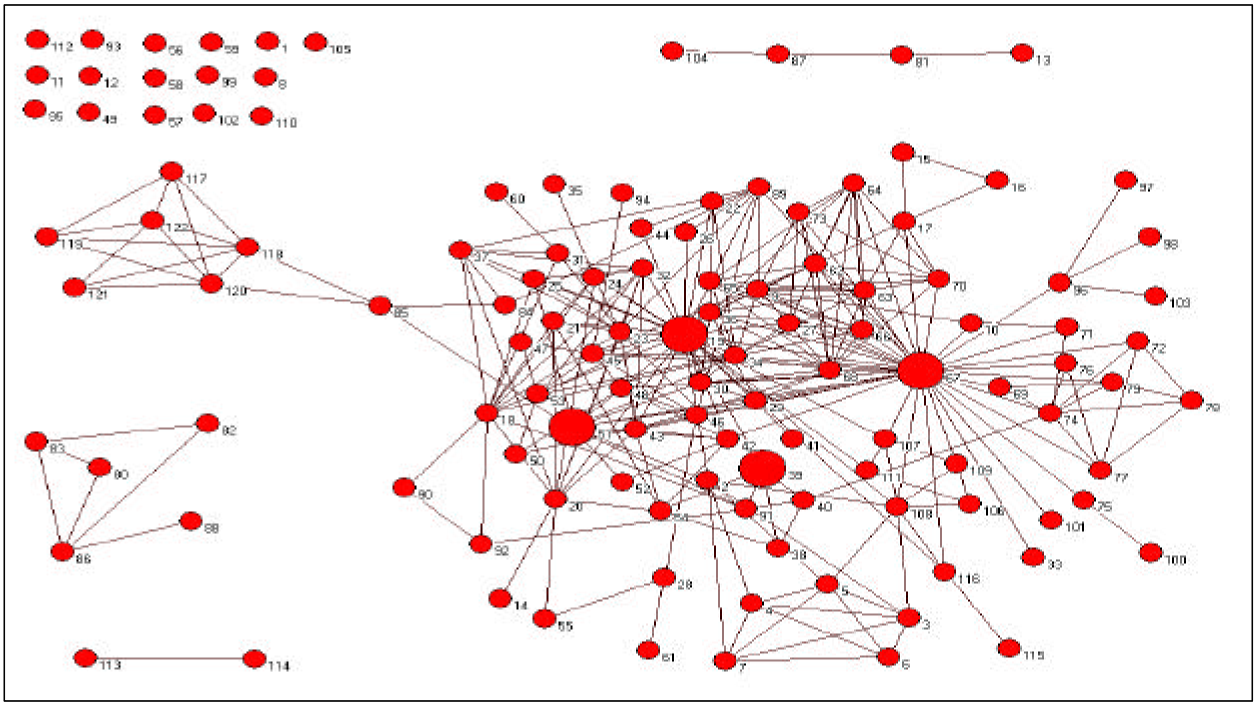
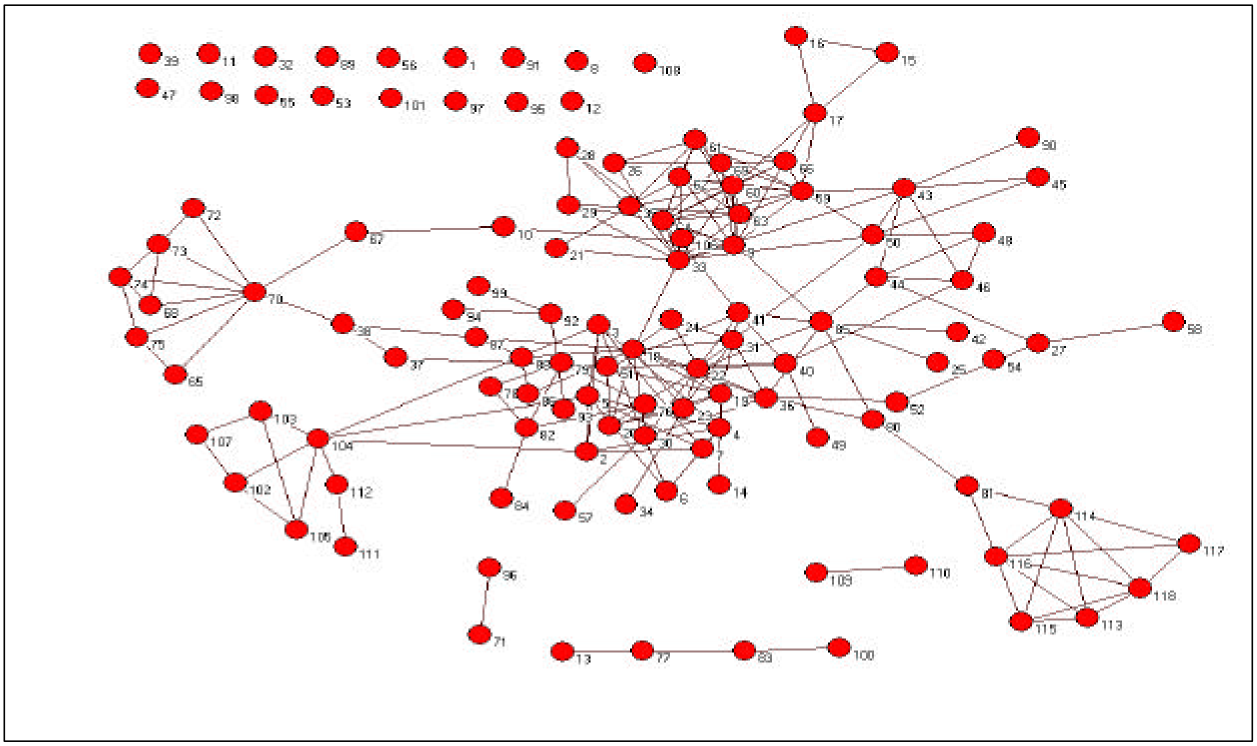


Exhibit 4b: Information Network without Four Key Brokers



disparate expertise. Consider your own behavior. You are sure to call a friend for and likely to call someone they refer you to; however, after that the odds of you continuing your search via referrals diminishes rapidly. This organization was able to increase the likelihood that members of the community effectively leveraged expertise housed in this network and did so with very minimal investment of time or energy on the part of the organization.

Boundary Spanners

Another important role within a network is that of a boundary spanner. This can be seen as a specific type of brokering role in relationship to some aspect of an organization's formal structure. In this case an individual is the link between two groups of people where the groups might be defined by such organizational characteristics as functional affiliation, physical location or hierarchical level. Social network analysis can enable people to see exactly where the splits are within a network as well as which people are acting as the boundary spanners. This can be a particularly important perspective when looking at networks across core processes or physically distributed groups. Quite often there are only a handful of people that serve as these types of human bridges across key boundaries in the organization and so are critical to the productivity of the entire group. In firms that are physically dispersed, often they are the only source of information others consider credible as to what is actually going on in other parts of the organization.

Looking back at Exhibit 3 (page 14) we can quickly see that person 21 is a very important boundary spanner between the two groups. She has people coming to her for information from both groups and also seeks out information from both groups. In some settings having a single point of contact between two groups can be an efficient and effective solution to network integration. Often this works as a better solution than promoting excessive connectivity with people spending too much time and energy developing and maintaining relationships.

In the case depicted in Figure 3, however, the over-dependence on one person was impeding information flow and the overall group's ability to leverage its collective expertise. Here more connectivity was needed across groups due to the pace and complexity of the work that made it difficult for any individual to have sufficient expertise to meet all project demands. This company used the network diagrams in a facilitated problem-solving session that pointed to cultural differences, technological deficiencies and organizational design impediments that were negatively affecting collaboration between the two groups.

Overly Peripheral People

Just as important as identifying central or prominent people, social network analysis can also help us understand who is loosely connected or even completely isolated. For example, in Exhibit 3 we see that person 13 has no incoming arrowheads, which indicates that no one goes to him for information. Other people such as 3 or 18 have only one incoming tie. In general, peripheral people tend to represent under-utilized resources for a group as their skills, expertise and unique perspectives are not leveraged effectively.

Recognition that a person is isolated from a specific group is an important first step. As with central people though, the critical question is how a given peripheral person is affecting the group. In the case of peripheral people, the immediate and often incorrect conclusion drawn is that being on the outside of a network is bad and indicative of the person’s worth to the group. Sometimes this is true, particularly when people’s skills, expertise or personality do not fit, such as in hiring mistakes or after a re-organization within a company. In such instances, a move to another group or training may be the best solution. But in our experience, it is generally not the norm that people are on the periphery due to inapplicable skills—typically people seem to be there either because they are stuck or because they want to be there.

Stuck on the Periphery

When we interview peripheral people, we generally find that they feel stuck on the periphery and are often desperately trying to find a way to get connected. Particularly with new people, the analogy to a deer in the headlights is not too far removed from the feelings experienced by being stuck out on the periphery and desperately trying to figure out how to get better connected. With the high rate of turnover today this is a significant problem. Organizations do not have the luxury of waiting six to twelve months for people to become integrated and learn to whom to turn for what. Further, since peripheral people are more likely to leave, they also represent a significant potential expense by virtue of the hiring and training costs incurred before an employee is productive.

Working with people stuck on the periphery can yield quick results as they are motivated to get more connected and often just need a little help. Putting them on internal or external projects with more networked or experienced colleagues can be one way to better leverage their expertise and help them develop connections with others. Creating mentoring relationships or systematically introducing people to others throughout the organization also helps create awareness of overlaps in interests and expertise—

whether by formal rotation programs or simply systematically arranging meetings. Orientation practices that are done with an eye to helping connect new people (rather than just introducing new hires to their computer and a policy manual) can also be highly productive, as can the simple expedient of physically moving peripheral people to place them closer to their colleagues.

Intentionally Peripheral

There are also always people who are on the periphery by choice. Typically experts fall into this category. The critical question that managers have to wrestle with here is how much to push these people into the activities of the group. Sometimes you can rejuvenate experts that have been around for some time by asking them to play a more central role. Often, these people have a strong institutional memory and can be critical assets for an entire network if identified and leveraged appropriately.

A perennial frustration for most managers lies with understanding how to best leverage experts. Quite often SNA identifies subject matter experts who should be contributing more to a group, providing opportunities for management to draw them in and make them more available to others. But this is tough balancing act. Push them too far into the fray and they begin to lose the time and space and focus that allowed them to develop the expertise upon which the group relies. Further, these people are frequently intrinsically motivated by the opportunity to be expert in a certain domain. Take that time and space away from them and they are likely to leave.

CONCLUSION: ATTENDING TO INFORMAL NETWORKS IN ORGANIZATIONS

Many new ideas and paradigms have been offered recently to either explain how organizations are changing or to suggest replacement models for traditional command-and-control organizations that were conceived in the late 19th or early 20th centuries.[4] For many managers and scholars, the idea of the network, in one form or another, is becoming a central organizing metaphor for 21st century firms. However, despite a plethora of research in the social sciences on the properties of social networks, there has been relatively little practical attention paid to how to develop and support network-based organizations. While many have claimed the importance of networks in organizations they have tended to do so without much rigor or focused exclusively on ways that organizations as a unit are networked within broader value chains.

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[4] For example, see C. Heckscher & A. Donnellon's *The Post-Bureaucratic Organization* (Thousand Oaks: Sage Press, 1994); S. Mohrman et al's *Tomorrow's Organization* (San Francisco: Jossey-Bass, 1998); S. Ghoshal & C. Bartlett's *The Individualized Corporation* (New York: HarperBusiness, 1997) and P. DiMaggio's *The Twenty-First Century Firm* (Princeton: Princeton University Press, 2001).

We believe it is increasingly critical for executives to attend to the health of informal networks within their organizations for both strategic and operational effectiveness. De-layering, reengineering, team-based structures and various continuous improvement initiatives have pushed decision-making and accountability down within organizations and presumably reduced functional 'silos' and hierarchical barriers to information flow. While these initiatives have likely made organizations more adaptive, efficient and innovative, they have also resulted in informal networks being an increasingly important location where work and innovation occurs.

Further, as we move more deeply into a knowledge-intensive economy, informal networks are taking on importance because they are critical conduits of information and they are where knowledge resides within the firm. Tom Allen of MIT found over a quarter century ago that engineers and scientists were roughly five times as likely to turn to a colleague as they were a database or file cabinet for information. Our own work across forty companies and government agencies has found that despite the proliferation of information and technologies, this is still the case. Who you know has a great deal to do with what you are likely to learn—a critical function in knowledge-intensive work. At the same time, who you know also seems to be increasingly important for job satisfaction, commitment and retention. People today join and commit to the local sets of relationships around them as opposed to committing allegiance to some global, dispersed and often virtual corporate entity.

Ultimately the power of a social network analysis is that it provides a clear picture of the inner workings of an organization. Particularly with the rise of virtual work and overall de-layering of organizations it is increasingly difficult for any one manager to know what is going on in their organization. Social network analysis provides a diagnostic tool with which to target interventions to specific areas within organizations where collaboration is critical. By virtue of making these important networks visible, it also gains executive attention for these increasingly critical, yet often invisible, structures.