Social Networks at Sempra Energy's IT Division Are Key to Building Strategic Capabilities

CHRIS CHEN

How does an IT division, faced with new and challenging strategic goals, get technical people to understand and appreciate the impact of human relationships on individual and organizational performance? It turns to social network analysis (SNA)—a nifty tool for quantifying and visualizing the number and strength of connections between people. Taking advantage of a large menu of SNA's analytical options, this organization learned how it could better identify succession candidates, build social capital, lessen dependence on the senior leadership team, and improve interdepartmental collaboration and communication—in short, move to the next level of organization effectiveness. © 2007 Wiley Periodicals, Inc.

For Sempra Energy, a *FORTUNE* 200 energy services company based in San Diego, California, its future continued success hinges heavily on its ability to leverage information technology to provide innovative services, streamline business processes, and meet the growing demands of an increasingly mobile workforce. For the IT organization that serves the company's two utilities, greater expectations to significantly contribute competitive advantage to the company means functioning at even higher levels of effectiveness—with communication, collaboration, speed, innovation, and leadership being just a few of the organizational capabilities critical to fulfilling its strategic role. But the social aspects of these capabilities are not always well understood, or comfortably addressed, in a technical organization with a penchant for hard data and concrete concepts. The IT organization turned to social network analysis (SNA)—a data-driven methodology with visual tools for quantifying and

clarifying the mysterious nature and magnitude of human interactions—to understand how individuals and the organization currently function and how they can improve their effectiveness.

The Impetus for Change

Sempra Energy employs a workforce of 14,000 and in 2005 generated revenues of nearly $12 billion. The holding company comprises two business units: Sempra Global, which houses its unregulated businesses such as energy generation and trading; and the Sempra utilities, which include two California regulated utilities, San Diego Gas & Electric and the Southern California Gas Co. The Sempra utilities boast the largest customer base of any U.S. energy utility, with an estimated 21 million customers.

Sempra Energy's strategic goal of leveraging information technology to create competitive advantage clearly influences the mission of the Sempra utilities IT division, whose 600 employees provide information technology and telecommunication infrastructure and application support to the utilities business unit. The division is organized into three application development groups, two infrastructure groups, and a group that develops and oversees strategy and governance as well as client relationships. The IT organization is led by the Chief Information Technology Officer (CITO), six directors reporting to the CITO, and approximately 70 managers throughout the organization.

The IT division was confident it had created a highly competent technical workforce adept at delivering

WILEY InterScience®
DISCOVER SOMETHING GREAT

when they wanted to discuss critical issues; who was making decisions with a broad range of inputs; who was helping bridge the gaps between the boxes on the organization charts. Armed with this information, the IT organization could approach its succession planning process with greater intelligence and confidence.

> Although the IT organization has smart, capable people (human capital) in its leadership positions, the leadership team wanted to understand and improve "social capital," the people and resources a person has access to through his or her relationships.

Leadership Development. SNA would help the IT division proactively identify and address staff development opportunities and needs, including

- Any isolated team members for whom developmental opportunities could help them become more integrated into the network
- Potential gaps in the network that the division could take action to close through staff reassignment, role redesign, or other organizational interventions

Creating Social Capital. Although the IT organization has smart, capable people (human capital) in its leadership positions, the leadership team wanted to understand and improve "social capital," the people and resources a person has access to through his or her relationships. Based on the belief that a person's social capital, or connections, is critical to effectiveness as a leader, one goal of the leadership team was to create more social capital, as well as make sure it was deployed efficiently throughout the organization.

Maintaining Strategic Focus. In analyzing Sempra Energy's strategic plans, along with employee and

client feedback, IT leadership had identified four key areas of focus for delivering the technology and services necessary to support the business strategy:

- Agile decision making
- Technology innovation
- Understanding and meeting internal client needs
- Strategic thinking

The flexibility of SNA would allow an analysis customized around these critical areas in order to determine whether the IT organization was focusing an appropriate amount of effort on each of them.

The SNA Project Methodology

The IT division's OCM group led the SNA project and action planning. The group's manager also sought the assistance of Valdis Krebs, a leading consultant in the SNA field who developed and licenses the InFlow 3.1 SNA software application, which allows users to create their own network maps, run network measures, and do "what if" analyses.[2]

The Networks

The IT leadership team decided to gather data on networks associated with six focus areas, with all managers, directors, and the CITO as the targeted participants (approximately 75 nodes in all). Four were the areas of strategic focus mentioned earlier. To provide some context for the results for these networks, the IT team included two additional networks in the analysis, the "task" and "grapevine" networks, both of which are common in SNA.

Each network under study generates its own map and analysis based on participants' answers to the following questions (one question for each network):

- *Task network:* "With whom do you exchange information, documents, schedules, and other resources to get your job done?"

- *Grapevine network:* "With whom do you discuss what is going on in the company—rumors, news, and organizational changes?"
- *Decision network:* "From whom do you seek inputs, opinions, and advice before making a key decision?"
- *Innovation network:* "With whom do you discuss new ideas and innovations in technology products and services?"
- *Client needs network:* "With whom do you discuss client needs, requests, and feedback?"
- *Strategy network:* "With whom do you discuss strategy and the outside technology/business environment?"

Each person (network node) specifies every other individual (other network nodes) with whom he or she interacts for the specified purpose, and how frequently interactions with that individual occur—daily, weekly, monthly, quarterly, or yearly. For a contact between two nodes to be counted as a connection in the network, it must meet two criteria:

- The connection must be confirmed by both parties.
- The frequency of the interactions between the two parties must be at least monthly.

Participants were apprised of the criteria ahead of time to discourage people from trying to "game" the process by claiming connections they knew did not exist.

The OCM manager developed the survey instrument using a Microsoft Excel spreadsheet, which was distributed to the participants in the targeted population. They, in turn, entered their responses into the spreadsheet and returned it to the OCM manager for data consolidation and input to the InFlow software licensed to Sempra Energy.

Key Measures
The InFlow application analyzes each node in a network and develops several key metrics. Three node-

level measures gauge an individual's *centrality*—how he or she is connected in relation to others in the network—which helps determine that person's importance to the network. One network-level measure indicates the overall health of the network.

> People with high closeness scores have good visibility into what is happening across the entire network.

Betweenness. This metric specifies how often a person is a bridge between others in the network. People with high betweenness scores often control the flow of information within the network.

Closeness. Closeness measures how quickly (fewest jumps between people) a person can access all the other people in the network. People with high closeness scores have good visibility into what is happening across the entire network.

Power. The betweenness and closeness measures are combined to produce a power score. People with high power scores have both access to information in the network *and* control over the flow of information, which represents a high level of informal organizational power. They are the key influencers in the network.

Weighted Average Path Length (APL). The APL indicates how easily and quickly everyone in the network can reach everyone else. Shorter APLs imply less distortion of information as it travels throughout the network. However, very short APLs imply too many connections (indicating redundant and likely wasted time and effort spent in overcommunicating). Overly long APLs imply too few connections, requiring excessive time for information to flow throughout the network. Historical SNA research provided the IT organization with a target range for APL based on a network's size.

Exhibit 1. Network Maps

A.
Prescribed Network

B.
Emergent Network

C.
Adaptive Network

● CITO   ▲ Director   ■ Manager
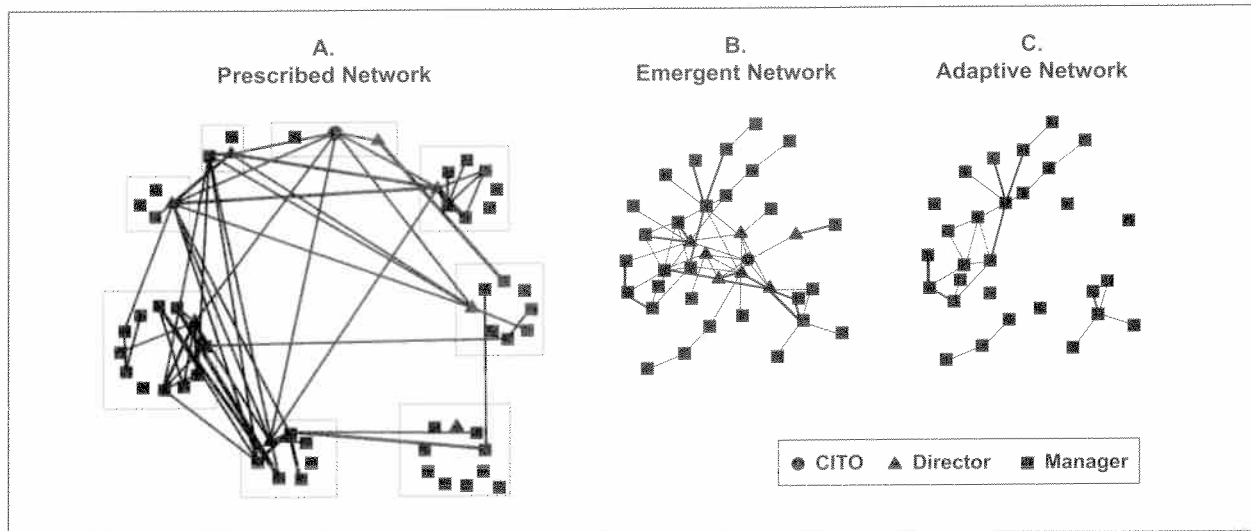
Network Maps

Visual diagrams produced by the InFlow tool depict maps of a network, as shown in the sample diagrams in Exhibit 1. The nodes, represented by individual points, can be coded by color and/or shape to designate organizational level—in this case, CITO, director, or manager. Each node can be further identified by the person's initials, except where an anonymous view is preferred. The connections between nodes are shown as lines joining the respective nodes, or as arrows if the information flow is in one direction only.

Each network was analyzed under three different conditions, each with its own map:

- *Prescribed network:* Nodes are organized/grouped by work unit according to the official, or formal, organization structure (View A in Exhibit 1).
- *Emergent network:* Nodes are organized by the centrality of their actual relationships as determined by the analysis of participants' input to the SNA survey (View B in Exhibit 1).
- *Adaptive network:* The nodes and connections belonging to the senior leadership team (CITO

and directors) are removed to reveal how dependent the remaining network is upon the organization's leadership team (View C in Exhibit 1).

The SNA "Pilot"

The IT organization launched its first use of SNA in 2002. Since SNA was a new concept and Inflow a new tool to everyone except the OCM manager, the initial objectives were modest and stated very broadly:

- To understand how managerial relationships and connections impact organizational effectiveness
- To identify ways to improve the organization

To keep the process and outputs as nonthreatening as possible and allow the staff to become comfortable with them, the results were kept anonymous for all but the senior leadership team. However, any participant interested in his or her own results could request them.

Following data collection and analysis, the results were shared at an annual manager all-hands meeting, beginning with a brief overview of SNA and the

metrics it generates. The leadership team made it a point to tell the attendees that this was not a contest, and that the results were not inherently right or wrong but rather a snapshot of the current condition, which would help the organization identify ways it could be more effective. Nonetheless, it was probably inevitable that some people would perceive high network scores and many connections as good and low scores/few connections as bad. (One director whose data, like that of the other directors and CITO, was identified by name did react adversely to the data.)

One significant finding revealed by the pilot's cursory view of the networks was that activity in the networks associated with the four strategic focus areas was weaker than desired. The average path lengths in the networks were longer than the size of the networks would warrant, indicating that too few connections existed, implying sluggish information flow.

Another finding pointed to an overreliance on the senior leadership team, revealed in the "what if" analysis illustrated in the adaptive network diagram (see View C in Exhibit 1). When the CITO and six directors were removed from the networks, along with their connections, most of the networks suffered significant deterioration—i.e., lengthened APLs, with some groups isolated from others.

Even though the 2002 pilot was largely to create a level of comfort with the tool (understand its power and credibility) and tapped only a few of the types of analyses available with SNA, the insights the project provided gave the leadership team clear direction for taking action to improve the organization's effectiveness. The leadership team added more organizational and individual goals to direct greater effort toward client needs and strategic thinking. To decrease the organization's dependence on the leadership team, it created cross-department manager teams and increased individual delegation, thereby empowering managers to make more decisions at the managerial level.

With even a limited application of SNA so aptly demonstrating its value, the manager of OCM took the opportunity to prepare the group for future uses of SNA by providing an overview of the many other "what if" analyses supported by the InFlow tool.

### Unleashing More of SNA's Power

In 2005 the IT division took its second plunge into SNA, this time with a more ambitious agenda. The same networks were studied and the same processes followed as in 2002, but since the staff now understood SNA and, for the most part, believed in the credibility of the process, names were visible on the network maps, giving maps greater value as organizational tools—and greater impact on the participants.

> One significant finding revealed by the pilot's cursory view of the networks was that activity in the networks associated with the four strategic focus areas was weaker than desired.

Many of the staff were surprised at the person-to-person connections that were *not* confirmed by the analysis. Much like one director's response in 2002, some individuals whose data indicated few connections were initially defensive, and although further discussion led almost everyone to conclude the data were accurate, some of these less-connected individuals felt even more threatened. One asked that "we never do this again." But others believed that their job did not require a lot of interaction and were quite comfortable with their lack of connections. Fortunately, those whom the analysis showed to have many connections were publicly gracious, if privately proud, about their network prowess.

The range of emotional reactions notwithstanding, the 2002 and 2005 social network analyses have

Exhibit 2. Example of Gaps in the Prescribed Network
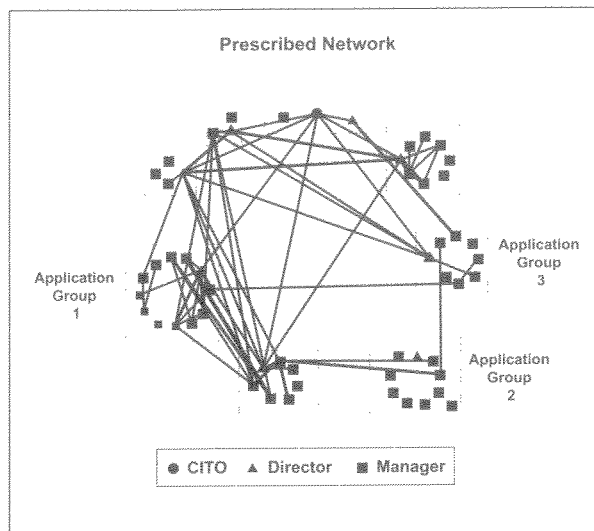
had a positive impact on the IT division. The benefits have been felt at both the individual and organizational level.

Improving Individual Effectiveness

Individually, the participants increased their understanding of whom they effectively connected with in the organization. Some had their perceptions validated, while others were surprised that people they thought they frequently connected with did not share that view. This has motivated some participants to change their behaviors to strengthen relationships that were not as strong as they believed.

The overall map of relationships represented in a network has also enabled people to identify who are the key links to certain parts of the organization. For example, one of the managers in an application development group was clearly the bridge between his department and the rest of IT. The maps also showed that enterprise architects and account managers played a liaison role between the infrastructure and application development departments. Individuals who saw gaps in their personal networks could begin to bridge those gaps by building connections with these and other key players.

Improving Organizational Effectiveness

The 2005 SNA analysis gave the IT division the ability to assess how much progress it had made since 2002 in addressing its key strategic focus areas—decision making, innovation, client needs, and strategic thinking. By examining the weighted average path length (APL) for the network associated with each area, the IT organization learned that its networks in all four key areas were stronger: The 2005 APLs were shorter than those in 2002, indicating more connections and a better flow of information. The measured degree of progress in each area was not equal, however, and the IT organization prioritized its action planning to focus on improving those areas with the greater need.

Another finding of the analysis confirmed that the organization had become less dependent on its senior leadership team in making decisions, completing tasks, and addressing its areas of focus. Although the 2005 "what if" analysis showed some deterioration in network health with the removal of the senior leadership team—but less than in 2002—the adaptive networks that remained were resilient enough to operate effectively.

The 2005 analysis also revealed some critical gaps in the prescribed (formal) networks. For instance, as seen in **Exhibit 2**, the strategy and innovation networks had almost no connections between the three application development groups—only one tie between application groups 1 and 3, one tie between application groups 2 and 3, and none between application groups 1 and 2. This indicated too little intergroup collaboration on important topics. It was a significant surprise to everyone who saw the data and has motivated the IT organization to aggressively address the issue. A "what if" analysis highlighted for the leadership team which specific connections, if strengthened, would produce the most improvement. This has enabled the leadership team to facilitate formal methods—e.g., cross-departmental teams, rotation of personnel—as well as informal actions—

e.g., luncheon meetings—to strengthen cross-department relationships and help participants build social capital.

A "what if" analysis also identified what new links, if created, would significantly improve network strength and information flow across all networks with less-than-optimal average path lengths. The leadership team then worked with the staff to encourage connections between these key people, including the creation of some functionally based dotted-line reporting relationships between departments.

> Perhaps the largest challenge the OCM manager faced in introducing SNA to the leadership team and IT managers was simply their lack of familiarity with the term and its concepts.

The IT organization used the power scores to identify key nodes/people in each of the networks. Many of the most powerful players would *not* have been predicted by their position title or place in the organizational hierarchy. The leadership team has used this data in succession and leadership development planning to include worthy candidates for promotion who would not have been identified through other processes.

SNA has been helpful in mitigating the effects of key people leaving the organization. Sempra utilities IT has experienced some turnover among the staff, and because of the network analyses, the organization understood what connections were lost, their importance to the network, and the degree of need to rebuild or replace them.

Additionally SNA analysis has facilitated leadership transitions. For example, the division welcomed a new IT director to the group shortly after the 2005

analysis. Using the latest network maps, he was able to quickly identify the key contacts who could help him connect quickly and effectively with various parts of the organization.

Challenges to Using SNA and Next Steps at Sempra Energy

Perhaps the largest challenge the OCM manager faced in introducing SNA to the leadership team and IT managers was simply their lack of familiarity with the term and its concepts. For most, the term "social network analysis" had little or varied meaning. (In some organizations the word "social" is viewed with suspicion, a problem that IBM, who has used SNA both internally and externally with clients since 1993, circumvented by calling the process "organizational network analysis," or ONA.) Recent events, such as media coverage of the National Security Agency's use of SNA to analyze phone records, has increased the visibility of SNA, but most people in organizations considering its use will still need to be educated on its application and value in the workplace.

Actual implementation of SNA is relatively straightforward. The only noticeable problem that the IT division encountered was having all members of the target population complete and return their survey—an issue certainly not unique to SNA. Executive sponsorship (pressure), a manageable number of participants, and constant reminder notes helped to overcome this issue.

Despite what they had been told to the contrary, many people naturally placed a value on their number of connections. As mentioned earlier, getting them to move past their defensiveness about the data posed a challenge in some cases. To avoid further exacerbating this dynamic, people's power scores were shared only with the senior leadership team rather than in the group sessions, and in a confidential feedback session with any individual wanting to know his or her own power score.

The challenges of using SNA are few, however, relative to its benefits. The IT division of the Sempra utilities has found SNA to be a worthwhile and insightful tool to drive productive organizational change. As a data-driven methodology, the tool has provided the division with a credible basis for assessing individual and collective effectiveness, and for testing alternative scenarios, in areas important to the division's—and the company's—future. The division hopes to further improve its ability to use SNA effectively and plans future analyses to periodically monitor changes in its networks, including modifying the networks it analyzes to reflect any changes to its mission, key initiatives, or environment. The IT division is also working with Sempra Energy's organization development department in the human resources division to make SNA available to all of Sempra Energy—testimony to the growing perception of SNA's value.

NOTES

1. [Editor's Note: For more information on social networks, see R. Cross & A. Parker, Charged up: Creating energy in organizations, Journal of Organizational Excellence, 23 (4), (2004), 3–14.]

2. InFlow 3.1 software is specifically designed for the business market. For more information online, visit http://www.orgnet.com/inflow3.html.

Chris Chen *is an organizational change manager with Sempra Energy in San Diego, California. He has led organization development functions in the shipbuilding and aerospace industries, has been a program manager for the Center for Creative Leadership, and is the author of four books.*

Global Business and Organizational Excellence