

## Identifying Subject Matter Experts: Knowledge Network Mapping

A Canadian federal department piloted peer-evaluated expertise identification and continuity planning with 379 of its IT staff. The generated lists of peer-evaluated experts presented both opportunities and risks.

### Core Topics

Social Capital, Knowledge Network Mapping, Capability Networks, Knowledge Transfer, Patterns, E-Workplace Systems and Technology, Knowledge Strategy, INFLOW™, KNETMAP™

### Key Issue

Knowledge Network Mapping as a Foundation for Continuity Planning

The notion of networks as a dominant organizing principle to explain how organizations work is attracting significant interdisciplinary interest. Senior managers are in the vanguard of those who are turning to knowledge network maps for usable insights into the dynamics shaping both risks and opportunities in the human resources sector.

Public service organizations function mostly on the basis of knowledge. Yet this knowledge is often not codified and frequently not valued until it begins to 'leak' through retirement. If knowledge network mapping can identify those individuals deemed by their peers to be subject matter experts in strategically important products, processes and services, then it could potentially be a useful decision support tool for continuity planning.

**Issues to be Addressed:** All organizations face issues related to reskilling, rehiring and retaining its staff; senior staff have decades of accumulated knowledge. Human resources have recently forecast 40% reduction of senior staff due to retirement in the next five years. Since the pilot was done for a group comprised mainly of technologists, not only will leadership abilities be lost, but also a significant portion of its knowledge base, including technical skills. There are many issues to address, three of which directly impact on client services delivery:

- Identification of critical skills and expertise (required to deliver the mandate established by the strategic plan);
- Mapping the source of that expertise (a recent reorganization of this department disrupted established task networks and access to known subject matter experts);
- Recognition of a need to establish practical knowledge transfer initiatives (by targeting retirees who are identified by their peers to be key resources in specific knowledge domains)

### Objectives:

- Identification of subject matter experts (i.e. where skills and knowledge reside across a recently reorganized workplace) in key disciplines;
- Analyze the dependence on these people for expert advice, and assess the risk to the organization if this resource were lost;
- Determine whether knowledge network maps provide useful decision support for continuity planning.

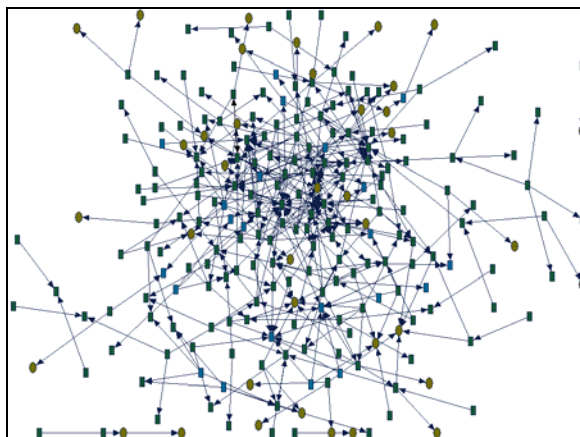
**Approach:**

- A query about expertise is sent by email
- Each recipient responds by selecting from a pick list of names that are recognizable as colleagues and co-workers in the organization.
- New names (including external contacts) may be added to the list; the pick list continuously grows.
- The data is displayed in a knowledge network map that is dynamic and updates after each submission.
- The data is exported and further analyzed in social network analysis software

The pilot needed to satisfy three criteria to justify further support:

- Would there be user acceptance of this method of gathering data?
- Would it create tangible value? For example, would the results provide meaningful data that reflects the known dynamics of the organization? Do the results confirm expected outcomes and additionally provide new findings?
- Would the approach fit the culture of the organization?

We used the data-gathering tool KNETMAP™ for this pilot. This application generates dynamic Web-based knowledge network maps in real-time after each submission by a participant.



*Figure 1: Screen shot of KNETMAP™ knowledge network map*

With the cooperation of 379 pilot participants who were requested to provide data in response to eight email queries over a period of two weeks, a series of web-based visualizations, or “knowledge network maps” (of people whose expertise was sought) were generated for each of the following domains:

Risk Management*	Requirements Analysis*
Market Trends in Technology	Database Issues
Desktop Tools	Document Management
Innovation*	

\*These three domains were deemed to be indicators of leadership; other domains related to technical skills. This mix of queries formed the basis of the pilot. Maps were made available for viewing by participants after each submission and were archived for retrieval, either for decision support, for location of expertise, or for monitoring changes in the knowledge networks. Specific attributes were assigned to all participants; these attributes were included in this ranked list generated by INFLOW™ analysis software:

Nodes are color coded by the following attributes. All names are pseudonyms.

<span style="color: cyan;">■</span> S -- eligible to retire short-term	<span style="color: yellow;">■</span> O -- eligible to retire in short-term
<span style="color: green;">■</span> L -- eligible to retire in long-term	<span style="color: magenta;">■</span> N -- not permanent employee
<span style="color: blue;">■</span> C -- consultant	<span style="color: gray;">■</span> X -- all others

Node	Attribute	
Don Topper	<span style="color: gray;">■</span> X	# of incoming links (10); # outgoing links (0)
Alan Rockford	<span style="color: cyan;">■</span> S	# of incoming links (15); # outgoing links (0)
Rick Laing	<span style="color: cyan;">■</span> S	# of incoming links (12); # outgoing links (0)
Cindy Chelsea	<span style="color: gray;">■</span> X	# of incoming links (11); # outgoing links (1)
Rand Mercer	<span style="color: gray;">■</span> X	# of incoming links (4); # outgoing links (0)
Glen Chester	<span style="color: gray;">■</span> X	# of incoming links (14); # outgoing links (1)
Dale Hart	<span style="color: green;">■</span> L	# of incoming links (6); # outgoing links (0)
Sally Bingam	<span style="color: gray;">■</span> X	# of incoming links (6); # outgoing links (0)
Lewis Miller	<span style="color: blue;">■</span> C	# of incoming links (9); # outgoing links (0)
Don Belisle	<span style="color: gray;">■</span> X	# of incoming links (5); # outgoing links (0)

**\*Definition of REACH:** Reach-In measures how influential a node is. The metric looks at both direct and indirect ties. By calculating how many unique nodes seek the advice/expertise/opinion of node X, the influence of node X can be determined. The influence of node X goes up if other influential nodes seek its advice/expertise/opinion. The sphere of influence for node X can be determined by viewing both direct and indirect in/out links surrounding node X -- incoming links show who seeks out node X, while outgoing links reveal who, if anyone, node X seeks for advice/expertise/opinion.

**Node Specific Data**  
 Don Topper: incoming link is Cindy Chelsea  
 Cindy Chelsea: outgoing link is Don Topper  
 Glen Chester: outgoing link is Rand Mercer

### **Results:**

- Network views of the knowledge domains queried
- Confirmation of known subject matter experts in the knowledge domains queried
- Evidence of up-and-coming subject matter experts in the knowledge domains queried
- Ranked list of nodes in the knowledge domains queried

### **Potential Benefits**

- Reduced subjectivity in identifying SMEs due to the peer evaluation approach
- Identification of individuals with deep corporate knowledge
- Disclosure of emergent communities of practice
- Exposure of vulnerabilities related to critical skills assets
- Decision support for targeted training
- Potential to reveal poorly integrated individuals who show up as 'isolates'
- Potential to reveal individuals with leadership potential who may not otherwise be identified

### **Future Considerations**

- Generating and archiving knowledge network maps of subject matter experts across a larger community of 2500 members, and making such maps and/or lists available to all participants;
- Using subject matter expert network maps as orientation tools for new staff;
- Using information sharing (making IT professionals aware of the larger context within which their work resides) as a compelling HR practice we can employ to increase employee commitment and decrease turnover;
- Identification of subject matter experts in strategically important knowledge domains, and formally involving these individuals as executive sponsors and/or facilitators of a community of practice in order to leverage their expertise;
- Launching communities of practice led by retiring SMEs as part of a program of continuous learning leading to capabilities development for a new wave of managers, thereby mitigating loss of expertise.
- Conducting a Privacy Impact Assessment to alleviate concerns over the unintended use of personal data (originally collected by the HR system for compensation and benefits purposes, but now being used for succession planning purposes).

## Conclusion

The data gathered in this pilot revealed many of the 'lynchpins' in the flows of knowledge instrumental to getting things done. Such individuals are generally only manifest in informal networks because information flows do not follow managerial lines. These informal links help circulate information and are responsible for significant activity that sustains the effective functioning of the organization.

Feedback from the pilot participants raised several significant cultural issues, such as whether knowledge sharing would be recognized in performance reviews. This was a particularly important issue for those "surprise" SMEs who surfaced as key resources. Some were reluctant to be publicly acknowledged as SMEs. (Knowledge practitioners generally hold the view that know-how is an organizational asset, not a private asset.)

The pilot feedback also raised privacy and security concerns which will change the approach for any future network mapping. As a result, a Privacy Impact Assessment was conducted, and revealed that participants must be asked to give their consent before their names are displayed, that their attributes (short- or long-term potential retiree, permanent or non-permanent employee, etc.) cannot be displayed even in coded form until such consent is received, that privacy statements must be available from the system screens, and that vendor contracts must include stringent privacy and security clauses due to the retention of personal data on their site.

In spite of these cultural and privacy issues, the results from this pilot study overwhelmingly confirm that network mapping is supportive of larger processes related to human resource management, including continuity planning. Network maps show the relationships based on information exchange between colleagues. They also provide a reliable snapshot of how work gets done in an organization. When attributes such as geographic location, years of service, or years from retirement are assigned to the population being mapped, these maps have significant potential for decision support related to HR planning.

## References:

Degenne, A. and Forse, Michel (1999), *Introducing Social Networks*, Sage Publications.

Agarwal, R. and Ferratt, T. (2002), *Enduring Practices for Managing IT Professionals*, Communications of the ACM.