



The Role of Social Networks in Tacit Knowledge Diffusion

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ABSTRACT

What is clear from work in the field of tacit knowledge management is the importance of social contact and the social context. This paper discusses the role of social networks in tacit knowledge diffusion. In addition to considering the literature in this area, we show how technology can support these networks via modelling tools.

1. INTRODUCTION

It has been shown that management in arriving at decisions, utilise a combination of almost equal amounts of tacit and explicit knowledge (Giunipero, Dawley and Anthony 1999). Evidence would seem to suggest that the two types of knowledge are indeed complementary, rather than alternatives (Lawson and Lorenz 1999). Typically tacit knowledge is precisely that, a form of knowledge that is not articulated. However, if we arrive at a definition of *articulable implicit managerial knowledge*, we have some means of conducting empirical work on this phenomenon. What is important for organisational strength is overcoming this hurdle and not only acquiring this knowledge as an individual, but also passing it on to other colleagues. A number of approaches to sharing tacit knowledge exist. Other than teamwork, 'expert networks' enable queries from employees to be redirected to specialists, within or external to the organisation (Bloodgood and Salisbury 2001). 'Knowledge maps' representing personnel with their areas of expertise have also been adopted in some organisations (Bennett and Gabriel 1999). Other approaches to tacit knowledge transfer exist based on Schoen's (1987) *reflective practitioner*, Senge's (1994) *5th discipline*, Lave's concept of *legitimate peripheral participation*, Wenger's *communities of practice* (Lave and Wenger 2001) and Snowden's (2002) use of stories to provide the context and stimulation that is often missing from more traditional forms of information and knowledge repositories such as manuals and databases. If we wish to 'measure tacit knowledge, we have Sternberg *et al.*'s (1995) use of workplace scenarios. Each of these approaches seeks to capture tacit "know-how" for the purposes of making the implicit become explicit or so that another person can acquire that knowledge without necessarily codifying the knowledge. A common theme that unites all approaches is the importance of social contact and the social context.

2. KNOWLEDGE AND HUMAN NETWORKS AS A MEANS OF KNOWLEDGE DIFFUSION

Given that "software may be appropriate for information transfer, but individuals are generally considered appropriate for knowledge transfer" (Jacob and Ebrahimpur 2001), human communication networks could thus be said to form vital infrastructure needed for knowledge and particularly tacit knowledge transfer. We may define a network as the "establish[ment of] social contact with particular people because it is thought that they may prove to be useful" (*Macquarie Dictionary* 1997:1446). Networks form social conduits (Ansell 1997) with a person's position in the network determining how effective knowledge transfer is likely to be. Other than counting the movements of highly skilled

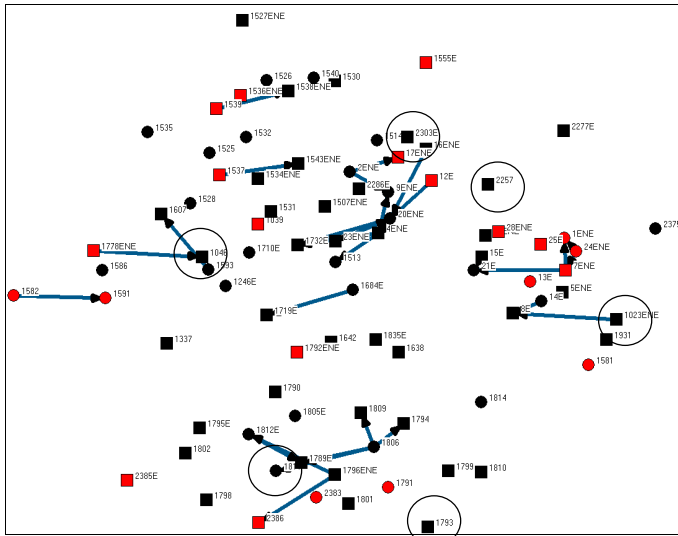
persons from one section of the organisation to the next (Stevens 1996), we are forced to examine the networks of relationships between individuals in an organisation to determine knowledge and particularly tacit knowledge flows. The questions then remain, firstly what roles do the *attributes* of these intra-organisational networks play? Secondly, are larger networks more effective than smaller ones? Thirdly what is the role of Information Technology in transferring the knowledge? It is not possible to answer every question in the space of this mini-paper, however in relation to the second question, Leonard and Sensiper (1998) stress the importance of factors such as body language and physical demonstrations of skill requiring personal intimacy, which can only be distributed in person.

3. MODELLING SOCIAL NETWORKS

We have used Social Network Analysis (SNA) to model the social connections between individuals in three separate IT organisations. There are four underpinnings of SNA. That actors or participants in the system are viewed as interdependent upon one another rather than independent. That relations among actors are considered as channels or thoroughfares of resources. That interaction among actors is directly constrained or aided by the structure of the relationships themselves, and finally that associations between actors determine all economic, political and social structures (Wasserman and Faust 1994). Given these principles, we can expect that if a relationship exists between people, then communication (including knowledge) is likely to flow from one person to the next. Details of the case studies, our research goals and methodology and findings are provided in Busch and Richards (2003). Very briefly however, what we conducted was an electronic questionnaire that included tacit knowledge scenarios along the lines of Sternberg *et al.* (1995), but specific to the Information Technology (IT) industry. Incorporated in the inventory was an SNA section with a series of questions asking personnel in three IT companies to identify colleagues they interacted with. What we wish to show here, is how SNA provides supporting technology that can be used by organisations to ensure that tacit knowledge is able and likely to flow, and to *begin* to answer the many questions posed above. Data collected from the questionnaire is then incorporated into SNA software (in this case UCINET™ with NETDRAW™ as a front-end). Using data from one of the organisations, we can see in figure 1 the individuals who have identified other individuals with whom they "must meet". We looked at many diagrams from different perspectives according to how often people met, the form of communication (formal meetings, coffee breaks, emails, etc) and the importance of that meeting, even including an option "try to avoid".

As part of our study, but outside the scope of this paper, we were interested in modelling the behaviour, characteristics and responses of peer-identified experts (symbolised with an E following their anonymous identification number) compared with novices (without an 'E') and finding individuals who had not been nominated by their peers as experts but who had responded to workplace situations in similar ways to the identified-experts (symbolised with an Expert Non-Expert (ENE) (i.e. *expert novices*) code following their anonymous identification

Figure 1. These individuals have to be seen, circled actors were noted to be difficult to find



number). From figure 1 we can see the key people that need to be seen are expert non-experts 1538ENE, 1543ENE, 17ENE, 4ENE, 9ENE, 20ENE, 1023ENE, 24ENE, 1ENE and experts 21E, 8E, 1796E. We would expect these types of people to be the most important ones given their classification. What is a little surprising is that we also have some extremely important 'novice' personnel, namely 1591, 2386, 1809, 1794, and 1513. Person 1591 is a 25 to 29 year old female contract business systems analyst, whereas 2386 is a 35 to 39 year old male application programmer. Person 1809 is a male 40 to 44 year old software engineer, whilst 1794 is a 35 to 39 year old male, Greek-speaking software engineer. Lastly actor 1513 is a 50 to 54 year old female Cantonese, Malay and Hokkien speaking technical analyst. Whereas communication paths with regard to less important person rankings ('can get by without seeing', 'moderately important', and 'very important') tend to cross (to some degree) from one clique to the next, with respect to 'having to see' the given individual, relationships tend to only occur within the given cliques. Notice also the circled individuals. These were people identified as difficult to find. It would appear there is a conflict only with regard to novices 1046 (middle left) and 1811 (bottom left), insofar as they have to be seen, but are difficult to find. One may surmise that this represents a tacit knowledge bottleneck, nevertheless the experts and ENEs identified as difficult to find are not represented here. What we seek to demonstrate from this snippet of our usage of SNA is the power and meaning it can provide in better understanding the social flows within an organisation.

4. SUMMARY

We know that tacit knowledge is either gained through self-experience or through working with people who possess "know-how" (Roberts 2001). The dissemination of tacit knowledge can be a problem where organisations rely too heavily on information technology (Koski 2001; Walsham 2001). What is understood is that although information technologies have empowered many organisations, they are precisely that, *information* technologies. *Knowledge* technologies tend to be embedded within the human context. Attention needs to be paid to understanding the tacit flows that take place within an intra-organisational context. Social Network Analysis is one technique that

shows the relationships between personnel. Where a relationship exists, it is assumed knowledge will flow. Given that much tacit knowledge can only flow in face to face settings (the alternative being knowledge that is gained through self-experience), we would expect that through using SNA we could see if soft knowledge is likely to flow from one staff member to the next. Research presented here has taken place at an intra-organisational level in three IT firms to date. We intend to extend this approach to other domains as well as at an inter-organisational level.

REFERENCES

- Ansell, C., (1997) "Symbolic networks: The realignment of the French working class 1887 – 1894" *The American Journal of Sociology* 103(2) September :359(32)
- Bennett, R., Gabriel, H., (1999) "Organisational factors and knowledge management within large marketing departments: An empirical study" *Journal of knowledge management* 3(3) :212-225
- Bloodgood, J., Salisbury, D., (2001) "Understanding the influence of organisational change strategies on information technology and knowledge management strategies" *Decision support system* Vol 31 :55-69
- Busch, P., Richards, D., (2003) "Building and Utilising an IT Tacit Knowledge Inventory" in *Proceedings 14th Australasian Conference on Information Systems (ACIS2003)* November 26-28, Perth, Australia.
- Giunipero, L., Dawley, D., Anthony, W., (1999) "The impact of tacit knowledge on purchasing decisions" *Journal of Supply Chain Management* Tempe; Winter
- Jacob, M., Ebrahimpur, G., (2001) "Experience vs. Expertise: The role of implicit understandings of knowledge in determining the nature of knowledge transfer in two companies" *Journal of intellectual capital* 2(1) :74-78
- Koski, J., (2001) "Reflections on information glut and other issues in knowledge productivity" *Futures* (London, England) 33(6) August :483-495
- Lawson, C., Lorenz, E., (1999) "Collective learning, tacit knowledge and regional innovative capacity" *Regional Studies* Cambridge; June
- Lave, J., Wenger, E., (1991) *Situated learning: Legitimate peripheral participation*. Cambridge, England: Cambridge University Press.
- Leonard, D., Sensiper, S., (1998) "The role of tacit knowledge in group innovation" *California Management Review* Berkeley; Spring 40(3)
- Macquarie Dictionary* (1997) 3rd. ed., Macquarie Library, Macquarie University, Australia
- Roberts, J., (2001) "The drive to codify: Implications for the knowledge – based economy" *Prometheus* 19(2) :99-116
- Schoen, D., (1987) *Educating the Reflective Practitioner* Jossey-Bass, San Francisco, CA.
- Senge, P. et al. (1994) *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*
- Snowden, D. (2002) "Narrative patterns: Uses of story in the third age of knowledge management", *Journal of Information and Knowledge Management* 00:1-5.
- Sternberg, R., Wagner, R., Williams, W., Horvath, J., (1995) "Testing common sense" *American psychologist* 50(11) November :912-927
- Stevens, C., (1996) "The knowledge-driven economy" *OECD Observer* June – July n200 (sic?) :6(5) (electronic)
- Walsham, G., (2001) "Knowledge management: The benefits and limitations of computer systems" *European Management Journal* 19(6) December :599-608
- Wasserman, S., Faust, K., (1994) *Social Network Analysis: Methods and Applications* Cambridge University Press Cambridge U.K.

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