

INFLUENCES ON KNOWLEDGE PROCESSES IN ORGANIZATIONAL LEARNING: THE PSYCHOSOCIAL FILTER

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ABSTRACT

This paper reports a segment of broader theory-building case study research exploring organizational learning and knowledge processes in a bio-medical consortium. Its focus is the individual-level factors that influence knowledge processes associated with organizational learning. As we explored how organizational learning occurred, the underlying knowledge processes came forward as complex and idiosyncratic. In an unanticipated finding, micro-processes emerged as highly influential, with individual perceptions of approachability, credibility and trustworthiness mediating *knowledge importing* and *knowledge sharing* activities. We introduce a model – *the psychosocial filter* – to describe the cluster of micro-processes that were brought forward in the study. Firstly, scientists filtered knowledge importing by deciding whom they would approach for information and from whom they would accept input. The individual's confidence to initiate information requests (which we termed social confidence) and the perceived credibility of knowledge suppliers both mediated knowledge importing. Secondly, scientists mediated knowledge sharing by actively deciding with whom they would share their own knowledge. Perceived trustworthiness – based on perceptions of what colleagues were likely to do with sensitive information – was the factor that influenced knowledge-sharing decisions. Significantly, the psychosocial filter seemed to constitute a heedful process with high functionality. Its effect was not to block knowledge circulation, but instead to ensure that knowledge-sharing decisions were made in a thoughtful and deliberate way. The psychosocial filter suggests an initial framework for conceptualizing the role that individual-level processes play in organizational knowledge sharing. Building on this, the model provides a platform for more focused exploration of knowledge processes and social relationships in organizational learning.

INTRODUCTION

Organizational learning is now accepted as a central, rather than peripheral organizational variable, with its competitive value widely recognized (Dodgson, 1993;

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Hamel and Prahalad, 1994; Miner and Mezias, 1996; Quinn, 1992). The concept of organizational learning is seen to have broad analytical value, because of its emphasis on dynamic, changing relationships (Dodgson, 1993) and emergent phenomena (Miner and Mezias, 1996). Whilst learning has long been part of the texture of organizational life (see March and Simon, 1958), its emergence as a significant economic variable has been fuelled by factors such as the speed of technological change, trends towards globalization and growing corporate competitiveness (Easterby-Smith et al., 1998). Furthermore, organizational learning is seen as a critical complement to managerial theory, because it is through learning that complexity is managed (Argyris, 1996). These factors combine to propel learning to the forefront of corporate competitiveness (De Geus, 1988), and have contributed to the explosion of research interest in the topic.

Organizational knowledge is a key component of organizational learning (see Dodgson, 1993; Huber, 1991), with organizational learning processes seen as specifically concerned with the growth and changes to knowledge (Duncan and Weiss, 1979, p. 87). Building on this, Huber (1991) described four knowledge constructs – knowledge acquisition, information distribution, information interpretation and organizational memory – as integrally linked to organizational learning.

More recently, there has been some concentration on factors related to what Huber termed knowledge distribution and acquisition. Specifically, knowledge contributing (sharing one's own knowledge) and knowledge adopting (importing knowledge from another source) have been nominated as core organizational learning processes (Goodman and Darr, 1998, p. 438). Turning initially to knowledge sharing, decisions to contribute knowledge were seen as related to the complexity of the problem on which information was sought, and related to this, the difficulties in articulating information (Goodman and Darr, 1998). Goodman and Darr also nominated factors that inhibited discretionary knowledge importing, including the time and effort involved, and the willingness to admit the need for help. Whilst Goodman and Darr have identified a range of factors which mediate knowledge exchanges, there has been little attention to the specific role psychological and social elements play in influencing knowledge transactions.

Also of interest to the present study is that Goodman and Darr's research focused on discretionary knowledge exchanges. In contrast, knowledge importing and sharing are essential features of one contemporary organizational form – the knowledge-creating company. The central characteristic of knowledge-creating companies is their dependence on significant incidences of problem solving using non-standardized knowledge (Alvesson, 1995). Consequently, in knowledge-creating companies knowledge is primarily related to individuals rather than built-in to organizational routines, work practices, machines or technologies (Alvesson, 1995). Furthermore, the problem solving and innovation that characterize knowledge-creating companies are unsolvable by any one person, instead requiring continual insights from a variety of perspectives (Cicourel, 1990). Knowledge-creating companies depend on collaborative and ongoing learning that involves the integration of multiple and differentiated forms of expertise (Tenkasi and Boland, 1996). Clearly, in contrast to the discretionary exchanges elaborated by Goodman and Darr (1998), knowledge importing and sharing are defining features of knowledge-creating companies. Factors that influence knowledge importing and sharing therefore emerge as of significant interest to organizational learning researchers.

Some recent research has contributed to understanding the issues affecting the collaborative problem-solving required in knowledge-creating companies. Specifically, McDonald and Ackerman (1998) studied the sourcing of expertise, and identified a two-stage process (expertise identification and expertise selection). From this work, and earlier contributions by Cicourel (1990), knowledge processes in knowledge-creating companies emerge as complex and highly differentiated. However, again there has been little emphasis on the micro, psychological and social processes that underpin knowledge-importing and knowledge-sharing activities.

The data analysed and the results reported in this paper were part of a larger project which conducted qualitative, theory-building research to explore organizational learning in a knowledge-creating company. Quite unexpectedly, individual-level factors emerged as exerting a strong influence on company knowledge processes. These unanticipated results related to the specific activities of knowledge importing and knowledge sharing. Thus the focus of this paper is the individual-level factors that influence knowledge processes associated with organizational learning.

THE STUDY SITE AND DATA

The study took place at Bio-Medical Consortium,^[2] a partnership conducting research in areas such as growth factors, receptors and signal transduction, and clinical cytokine factors. The consortium comprised five joint-venture partners (medical research institutes, government scientific organizations and a commercial partner). Consortium projects allowed scientists to undertake biomedical research that extended beyond the capability of the partner organizations operating independently.

At the time that the research reported in this paper was conducted the consortium drew around 130 scientific staff from the partner organizations. Scientists collaborated on specified projects, but remained in the employ of their primary organizations, each of which operated within walking distance of the others. The consortium was founded on fluid project teams and scientists typically worked on one or more consortium projects whilst still retaining separate project responsibilities in their partner organization.

The data reported here was gathered in 15 individual semi-structured interviews with scientific staff representing the five partner organizations. As part of a broader organizational learning study not the subject of this paper, a specific example of actual organizational learning had previously been identified. The focus of the individual interviews was to explore how the specific incidence of organizational learning had occurred, as well as how organizational learning usually occurred in the consortium.

Seven senior scientists/managers, five scientists and four technicians/assistants comprised the interview sample. Interview duration ranged from 40 minutes to 90 minutes, with an average length of 70 minutes. Interviews were audio recorded, transcribed verbatim and content analysed. Data analysis and interpretation drew on the specific interview questions, as well as the unanticipated issues that emerged from the data itself.

RESULTS

The results reported in this paper were unanticipated in the study's design, but emerged quite clearly from the interview data itself. As scientists described their experience of organizational learning, knowledge circulation (comprising knowledge importing and knowledge sharing) came forward as mediated by a series of processes. We have constructed a tentative, descriptive model to capture our observations of the mediating processes that arose from the interviews. We propose the term *the psychosocial filter* to describe the factors which appeared to affect knowledge-importing (knowledge which the scientist obtained from an external source) and knowledge-sharing (personal knowledge which a scientist shared with someone else) decisions.

In deciphering and explaining the structure of the psychosocial filter, the present analysis was able to identify three areas of commonality in the themes brought forward by interview participants. The three clusters have been labelled *social confidence*, *perceived credibility* and *perceived trustworthiness*. The first two clusters were related to importing knowledge, and the third cluster described processes which influenced the scientists' knowledge sharing. Previewing the results to be discussed, figure 1 shows the three components of the psychosocial filter. The discussion will now move to the themes extracted from the scientists' discussions that suggested the psychosocial filter concept. The first area of discussion will be the two clusters of factors that appeared to influence knowledge importing.

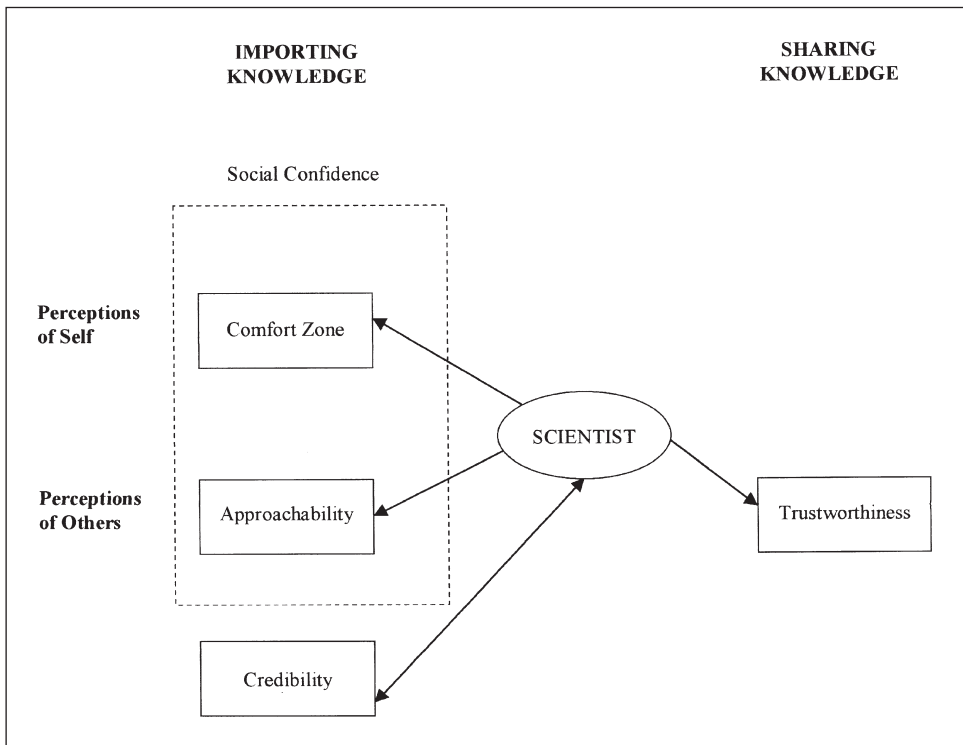


Figure 1. The psychosocial filter

Factors Mediating Knowledge Importing

As scientists discussed the knowledge importing which underpinned organizational learning, several themes emerged. Firstly, they described an active process: they deliberately mediated the knowledge acquisition process by deciding from whom they would seek out potentially useful information, and whose information inputs they were willing to accept. From the data, a model representing knowledge-importing processes has been derived. As shown in figure 1, knowledge importing comprised the social confidence of the prospective importer and the perceived credibility of potential knowledge sources.

Social confidence. Turning to the first factor that appeared to mediate knowledge importing, the term *social confidence* is used in the present research to describe an individual's ability to initiate working relationships with others. Social confidence itself seemed to comprise two overlapping constructs: the individual's personal *comfort zone* and the *perceived approachability* of information sources.

Scientists clearly identified difficulties in seeking out information when this involved moving outside the personal contacts with which they felt comfortable (i.e. moving outside their *comfort zone*). Initiating working relationships was not necessarily an expected competency of scientists: *people don't find it very easy* and the *whole practical side* of initiating potentially useful contacts was thought to be difficult.

When you have to go to another institute and talk to strangers or ask opinions from people you don't know, you feel a bit out of your comfort zone. (Senior Scientist/Manager 3)

It's very hard just to ring somebody up cold and say look, you know, 'I'm *x* from *y* and I'm having a problem with this. Can you help me?' And really they've got no obligation to help you, you're somebody they don't know. But it's a matter of having the gumption to just do that cold when you don't know these people. (Scientist 4)

Maybe some people don't find it very easy, that whole thing of interacting with people that you don't know. I wonder sometimes if people do actually find just the whole practical side of the environment perhaps a bit harder than most. (Scientist 2)

In summary, the term *comfort zone* was used to describe the personal ease scientists felt in initiating working relationships. Those comfortable in a broad range of working relationships would be expected to have access to wider knowledge sources than peers who were less at ease initiating contact. However, additional factors further mediated decisions about which knowledge sources to pursue, and the discussion will now move to other aspects of the filter.

Scientists also regarded the perceived approachability of potential information sources as important in deciding from whom knowledge would be imported. The personal style and status of the potential information source was seen as a possible barrier to establishing linkages.

If you've met a person you've got some idea of how approachable they are. Because not everyone is approachable. I'm sure that there are people who think, 'Oh well, they're good, but I'll go and ask someone else.' (Scientist 1)

Sometimes they are intimidated by the specialists in the field. With a lot of the professors and the doctors, you feel a bit intimidated, like 'I can't go up to him or talk to him and ask him that.' (Scientist 3)

In contrast, knowing scientists on a personal level was thought to lubricate the knowledge-sharing process.

If you get to know people on a personal level, it's easier to deal with them on a business level at a later stage . . . it makes it a lot easier to contact people. (Technician/Assistant 3)

Of course, these preceding statements also indicate some covariance between perceived approachability and comfort zone, with scientists feeling more comfortable with those they regarded as approachable.

In summary of factors mediating knowledge-importing decisions, scientists described a range of processes that seemed to influence their ability to initiate working relationships with others – which was a necessary step in gaining access to information. The term social confidence has been used to describe the first factor, which clustered in two areas: the individual's personal comfort zone and the perceived approachability of the knowledge source. In this study, comfort zone seemed to reflect the individual's self-perception, while approachability was predominantly their perception of a second party (see figure 1). Whilst the two factors might be expected to co-vary, with feelings of comfort related to perceptions of approachability, at this early stage in theory development social confidence and perceived approachability have been retained as separate variables. Clearly, however, the texture of this factor is overtly interpersonal, and the interleaving of social and intellectual processes came forward quite clearly.

Scientists also described a second factor – the perceived credibility of the knowledge source – as affecting knowledge-importing decisions, and this is discussed in the next section.

Credibility of the knowledge source. The second psychosocial factor that appeared to impact on knowledge importing was the credibility of the information source. In the complex and dynamic environment that characterized this knowledge-creating company, differentiating useful from irrelevant knowledge was a problematic process that required active engagement. Reflecting this, scientists spoke of the need to filter information that may turn out to be *wrong or misleading*. Importantly, finding the *right person* was seen as fundamental, because the *quality of the information* depended on the *quality of the individual*.

It is the quality that does really count. I know for example there are individuals here that you would go to with a problem because you know that they are going to give you the right answer. Whereas another individual may give you an answer to it, [but] down the track it's going to be wrong or misleading or not as precise as you really looked for. You may not have confidence in it. And

that to me is the big difference – the quality of the individual, and how good they are, and how good the information is that you get off them. (Scientist 4)

Another issue is, and again this is a judgement issue, if you want to learn a technique you have to know who to go to . . . they'll ask somebody who may be very happy to give them an opinion, but is it the right person to give that opinion? You have to be able to filter information you get in. If you want to learn something you have to know where to go. You have to be able to make that judgement. And that's something that is difficult to get. (Senior Scientist/Manager 4)

Judging where to go for information was reported to be a difficult, personal decision. Others may have reached different judgements about a knowledge source's credibility, because it's a *very personal thing*.

There are certain techniques that I would give little credence to as good ways of doing science at a technical level. So I would be less likely to collaborate with those people. But other people may say that very same group offers a fantastic opportunity. You know, it's a very personal thing. (Senior Scientist/Manager 4)

What seemed to come forward quite distinctly from these descriptions was that the credibility of knowledge was very much tied up with the credibility of the 'knower'.

In summary of the factors that mediated knowledge-importing decisions, receiving information inputs was an active process. Knowledge seekers deliberated about whom they should approach, a decision which seemed to rely on the two psychosocial constructs of social confidence and credibility of the source. Because the two processes appeared to mediate knowledge importing, their impact on the organizational learning process needs to be understood.

To date, the discussion has focused on micro-processes associated with importing knowledge. The focus now moves to the second element of the psychosocial filter, that of knowledge sharing.

Factors Mediating Knowledge Sharing

In the previous section micro-processes mediating knowledge importing were discussed, and the interleaving of social and intellectual factors came forward with some clarity.

Knowledge sharing was also a complex process, with knowledge holders actively making decisions about what knowledge they would share with whom, when. In fact, in the intensely competitive environment that characterized the research setting, knowledge was a valuable commodity that should not be shared casually. Whilst scientists worked collaboratively in multi-disciplinary, multi-partner teams they clearly recognized that individual reputation, status, career prospects, research grants and income were dependent on which ideas were attributed to them. Reflecting these factors, scientists spoke of the enormous personal impact of sharing knowledge unwisely: they could be *swallowed up*, *cut out of the chain*, and risked *losing credit*, *visibility*, *first authorship*, and a place on the patent. Therefore, *where does the glory go?* was an important consideration.

You get swallowed up so you may not get credit for the idea that you produced. So that's always the worry. (Senior Scientist/Manager 4)

'Am I going to lose my visibility in this project? Am I going to lose my first authorship?' – very important. (Senior Scientist/Manager 1)

I think people are still very scared of giving their things away where they'll get cut out of the chain if something is patented. Where does the glory go? (Technician/Assistant 2)

Because knowledge was seen as commercially valuable, and its ownership could be contested, knowledge sharing was not an automatic process. Instead, decisions on knowledge sharing needed to be made wisely. In the context of the rewards system in the present knowledge-creating company, being cautious about knowledge sharing was recognized by interviewees as commercially prudent: *a healthy selfishness*.

It's a healthy selfishness in some ways, and they have to keep their eyes open. (Technician/Assistant 2)

There is a lot of money riding on these things. So confidentiality obviously is a critical thing . . . I mean so often our patents are being written and there is money hanging on it so you've got to be careful about what you say to whom. (Scientist 4)

Sometimes it's better to look after your own narrower interest. (Senior Scientist/Manager 2)

Thus what knowledge to share with whom, and when, arose as recurring and complex decisions. As the next section demonstrates, the perceived trustworthiness of colleagues was the important factor in making knowledge-sharing decisions.

Perceived trustworthiness. In the previous section, personal knowledge emerged as a valuable commodity that should not be shared casually. When faced with decisions about what knowledge to share with whom, scientists made judgements about the trustworthiness of their peers. The role of trust was seen as central: without trust, regardless of any formal knowledge-sharing requirements in place, scientists would not share knowledge.

If you haven't got trust and confidence then it doesn't matter what else you've put in place, or what other structures you put in place to try and encourage co-operation, it's not going to happen. (Senior Scientist/Manager 1)

When scientists spoke about trust, they clearly described it as an issue that centred on the ownership of ideas. It was important for scientists to be able to trust others not to *radiate off* similar projects, or *reproduce work*. Defining trust in these terms was certainly congruent with the context in which the scientists operated, mirroring the commercial value of personal knowledge that was discussed earlier.

I guess trust the person that they're giving it to, that they're not going to radiate off their own little science project. (Technician/Assistant 2)

You know I think of all the factors it's that level of trust, that confidence that there's no backstabbing going on, there's no reproduction of work unnecessarily. (Senior Scientist/Manager 4)

Thus in this environment perceived trustworthiness emerged clearly as the psychosocial factor which determined with whom scientists were willing to share their own knowledge. Trust was more important than formal collaborative processes, because in the absence of trust, knowledge sharing would not have occurred. The way scientists defined trust was anchored in the commercial context. Specifically, believing that a potential knowledge recipient would respect the ownership of ideas emerged as the foundation of perceived trustworthiness.

In summary, the psychosocial filter can be imagined rather like a bubble around each individual, acting as an invisible buffer that influenced knowledge processes on the basis of whom scientists were comfortable approaching, whom they regarded as credible, and whom they were willing to trust. Scientists actively sought out potential information sources, and made judgements about the credibility of potential collaborators. In these ways, social confidence (the scientists' ability to initiate information requests), and perceived credibility of the knowledge source mediated the knowledge-importing process. Furthermore, decisions about to whom to release knowledge were also complex. Trusting a potential knowledge recipient to respect the ownership of ideas emerged as the critical factor that mediated knowledge sharing.

DISCUSSION

In the present study psychosocial micro-processes unexpectedly emerged as influential in the knowledge-sharing processes that underpinned organizational learning. In this section, the potential utility of the psychosocial filter will be discussed, along with associated literature.

From the perspective of the individual, the effect of the psychosocial filter appeared to be complex. The first element, social confidence, mediated the pool of potential knowledge contributors, with those comfortable initiating working relationships having access to a larger network of contacts. A larger pool of potential contributors would give a scientist access to wider possible sources of expertise. It is important to emphasize, however, that approachability was not enough: scientists made further deliberate decisions to evaluate a particular knowledge source from the pool of potential contributors.

The remaining components of the filter – abilities to judge credibility and trustworthiness – appeared to have strong functionality for the individual. In this study, quality of information appeared to be assessed on the basis of the second facet of the psychosocial filter, the credibility of the information source. The ability to judge credibility 'accurately' would be likely to lead to better outcomes for the individual's knowledge-creation efforts. Significantly, assessments of credibility appeared founded on evaluation of the knower, rather than of knowledge.

The study therefore provides strong support for earlier work (see Cicourel, 1990) noting that information value depended on the perceived credibility of the source. Extending this idea, it may be that the more equivocal the knowledge, the less reliance is placed on judging it in its own right, and concomitantly more weight is given to the perceived credibility of the knower. This would mean that making judgements about credibility would be an issue of particular importance in the conditions of uncertainty and long feedback cycles which characterize knowledge work (Kelley, 1985; Lockett and Legge, 1993) and knowledge organizations (Blackler, 1995). In Bio-Medical Consortium, personal judgements regarding the credibility of the information source were powerful determinants of that information's influence.

Turning to the final element of the psychosocial filter, the requirement for trustworthiness also appeared to have strong utility in the environment under study. Because knowledge had clear commercial value, it should not be shared casually. Instead, it was considered highly prudent to share knowledge only with trustworthy recipients. As Burt and Knez (1995) suggested, the past relationships between the parties was an important foundation for trust, and flowing from this, the anticipated outcomes of further dealings between them were brought forward as significant in the present study.

The emergence of trust as a component of the psychosocial filter echoes the growing research interest in trust itself (for example, see Chan, 1997; Coopey, 1998; Zaheer et al., 1998). The criticality of trust to co-operative social relationships has been recognized (see Lewis and Weigert, 1985), with interpersonal factors established as important (Moorman et al., 1993). McAllister (1995) distinguished trust that was cognition-based (determined by perceptions of reliability, dependability and competence) from affect-based trust (underpinned by care and concern). In the present research, perceptions of trust were very clearly anchored in the commercial context, being based on what people were seen as likely to do (and not do) with commercially sensitive information. This suggests it is cognition-based, and within the ambit of what Ring and Van de Ven (1994, p. 93) described as a 'risk-based view' of trustworthiness.

Boisot (1995) drew the link between trust and environmental ambiguity and uncertainty, suggesting that where ambiguity and uncertainty existed, trust resided in the quality of the relationship rather than the plausibility of the message. In a similar vein, Daft and Weick (1984, p. 290) argued that the less analysable the perceived external environment, the greater the tendency for managers to use external information gained from personal contact with other managers. Drawing these threads together with the present findings emphasizes the role of trust in complex organizational environments, and specifically, its criticality in knowledge-sharing processes.

An important characteristic of the psychosocial filter was its high functionality for individuals in the present study. The filter did not preclude knowledge sharing, but ensured that it occurred in a deliberate and thoughtful way. Ryle (1949, p. 151) described 'heedful' performance as more or less careful, critical, consistent, purposeful, attentive and vigilant, and this seems to resonate with the characteristics of the psychosocial filter. Perhaps the most successful learners and knowledge creators are those whose technical excellence is supplemented by psychosocial skills comprising social confidence (capacity to develop working relationships) and the

ability to make impeccable personal judgements of credibility and trustworthiness. It may be that at the individual level, this psychosocial skill set sits around the technical skills of knowledge creators, with both skill sets directly influencing the knowledge-creation process. Our analysis suggests that making assessments of credibility, competence and trustworthiness are predictable and beneficial features of the work setting, rather than indicative of unwarranted blockages or impediments to knowledge sharing.

Turning specifically to the concept of a filter, the psychosocial filter introduced in this paper extends and refines models proposed elsewhere. For example, St Onge (1996) described a mental grid of tacit knowledge through which experience was filtered and interpreted. However, St Onge conceptualized the grid as an idiosyncratic set of beliefs and assumptions that operated as an autopilot to delimit performance and results. In contrast, the processes described in the present study are active rather than habitual. Of more relevance may be Szulanski's (1996) concept of internal stickiness. The idea of a psychosocial filter provides one explanation of the arduous relationship between a knowledge source and recipient, as well as the recipient's absorptive capacity.

Wagner and Sternberg (1987, p. 309) also described a filtering process based on selective encoding of tacit knowledge, which was used to sort information from the environment on the basis of its relevance to needs. As is the case for the psychosocial filter that has been described in the present study, Wagner and Sternberg saw the filtering process as functional, preventing overload. However, these authors did not explain how filtering occurred, apart from noting that good selective encoders knew which information was worth attending to, and poor selective encoders did not. In the present study, the psychosocial flavour of the filter emerged clearly, with decisions on the usefulness of information interwoven with interpersonal assessments of credibility.

Also of interest is the work of Hansen (1999) which examined the role of weak ties in sharing knowledge. Hansen suggested that weak ties enrich the search for useful knowledge but impede the transfer of knowledge. The research reported in this paper suggests that when importing knowledge, individuals operate within a comfort zone and also gauge the approachability of a possible source. These two components of a psychosocial filter may limit the probability of an individual accessing weak ties. Secondly, the necessity to assure oneself of the other party's trustworthiness is likely to amplify resistance to sharing knowledge through weak ties. Additionally, the distinctive psychosocial texture of the filter lends some initial empirical support to the proposed interconnectedness of intellectual capital and social relationships (see Nahapiet and Ghoshal, 1998).

This paper concentrated largely on the actions of the individual in importing and sharing knowledge. Researching the links between the psychosocial filter and other concepts in social network analysis (see for example Scott, 1991) such as connectivity, network size, cliques, structural equivalence and blocks may produce further insights. Of particular interest are the findings of Burt (1992) on structural holes. Burt suggests actors are in a better position to profit from their interactions when they connect to others who are not connected or well organized. This view suggests potential research in examining structural holes as another component of the psychosocial filter when an actor is contemplating the importation of knowledge. Finally, the relationship between the highly task-related function of social

confidence and more general concepts such as emotional intelligence (Goleman, 1996) and social skills (for example, Johnson and Johnson, 1994) is worthy of detailed exploration.

CONCLUSION

Our research selected a knowledge-creating company as a rich setting for the investigation of organizational learning and its associated knowledge processes. Knowledge-creating companies can be seen as pioneers, given their everyday emphasis on knowledge creation and learning. This paper reported findings from our broader qualitative, theory-building research in a bio-medical consortium.

Quite unexpectedly, the knowledge processes underpinning organizational learning emerged as complex and idiosyncratic, with micro-processes emerging as influential. Specifically, processes associated with knowledge circulation (comprising knowledge importing and knowledge sharing) were actively and personally mediated. We have introduced the term 'the psychosocial filter' to describe the cluster of micro-processes that came forward as mediating knowledge-importing and knowledge-sharing decisions.

Focusing initially on knowledge importing, individuals intuitively adopted filtering strategies as they made personal assessments about which scientists they would approach, and the credibility of potential suppliers of knowledge. Secondly, turning to knowledge sharing, scientists did not share their own knowledge unreflectively. Perceived trustworthiness – which was based distinctly on perceptions of what colleagues were likely to do with commercially sensitive information – emerged quite clearly as the psychosocial factor which determined with whom scientists were willing to share their own knowledge. The psychosocial filter can be imagined rather like a bubble around each individual, invisible but nevertheless influencing knowledge processes on the basis of whom the scientist was comfortable approaching, whom they regarded as credible, and whom they were willing to trust.

Significantly, the psychosocial filter seemed to constitute a heedful process with high functionality in the company under study. Its effect was not to block knowledge sharing, but instead to ensure that knowledge-sharing decisions were made in a thoughtful and deliberate way. We concur with Cicourel's (1990) proposition that these attributions of an interpersonal and professional nature, and judgements about others' competence, are normal rather than undesirable aspects of this type of work setting.

Finally, the psychosocial filter that emerged in this analysis suggests an initial framework for conceptualizing the role that individual-level processes play in organizational knowledge sharing. Building on this, the psychosocial filter provides a platform for more focused exploration of knowledge processes and social relationships in organizational learning.

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- [2] Names have been changed.

REFERENCES

- ALVESSON, M. (1995). *Management of Knowledge-intensive Companies*. New York: Walter de Gruyter.
- ARGYRIS, C. (1996). 'Prologue: towards a comprehensive theory of management'. In Moinjeon, B. and Edmondson, A. (Eds), *Organizational Learning and Competitive Advantage*. London: Sage.
- BLACKLER, F. (1995). 'Knowledge, knowledge work and organizations: an overview and interpretation'. *Organization Science*, **16**, 6, 1021–46.
- BOISOT, M. (1995). *Information Space: A Framework for Learning in Organizations, Institutions and Culture*. London: Routledge.
- BURT, R. S. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- BURT, R. S. and KNEZ, M. (1995). 'Kinds of third-party effects on trust'. *Rationality and Society*, **7**, 255–92.
- CHAN, M. (1997). 'Some theoretical propositions pertaining to the context of trust'. *International Journal of Organizational Analysis*, **5**, 3, 227–48.
- CICOUREL, A. V. (1990). 'The integration of distributed knowledge in collaborative medical diagnosis'. In Galegher J., Kraut, R. E. and Egido, C. (Ed.), *Intellectual Teamwork: Social and Technological Foundations of Cooperative Work*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- COOPEY, J. (1998). 'Learning to trust and trusting to learn'. *Management Learning*, **29**, 3, 365–82.
- DAFT, R. L. and WEICK, K. E. (1984). 'Towards a model of organizations as interpretation systems'. *Academy of Management Review*, **9**, 284–95.
- DE GUES, A. P. (1988). 'Planning as learning'. *Harvard Business Review*, **Mar.–Apr.**, 70–4.
- DODGSON, M. (1993). 'Organizational learning: a review of some literatures'. *Organization Studies*, **14**, 3, 375–94.
- DUNCAN, R. and WEISS, A. (1979). 'Organizational learning: implications for organizational design'. In Staw, B. (Ed.), *Research in Organizational Behavior* (Volume 1). Greenwich, CT: JAI Press.
- EASTERBY-SMITH, M., SNELL, R. and GHERARDI, S. (1998). 'Organizational learning: diverging communities of practice?'. *Management Learning*, **29**, 3, 259–72.
- GOLEMAN, D. (1996). *Emotional intelligence*. London: Bloomsbury.
- GOODMAN, P. S. and DARR, E. D. (1998). 'Computer-aided systems and communities: mechanisms for organizational learning in distributed environments'. *Management Information Systems Quarterly*, **22**, 4, 417–40.
- HAMEL, G. and PRAHALAD, C. K. (1994). 'Competing for the future'. *Harvard Business Review*, **Jul.–Aug.**, 122–8.
- HANSEN, M. T. (1999). 'The search-transfer problem: the role of weak ties in sharing knowledge across organizational sub-units'. *Administrative Science Quarterly*, **44**, 1, 82–99.
- HUBER, G. P. (1991). 'Organizational learning: the contributing processes and the literatures'. *Organization Science*, **2**, 88–115.

- JOHNSON, D. W. and JOHNSON, F. P. (1994). *Joining Together: Group Theory and Group Skills*. Boston, MA: Allyn & Bacon.
- KELLEY, R. E. (1985). *The Gold-collar Worker*. Reading, MA: Addison-Wesley.
- LEWIS, J. D. and WEIGERT, A. (1985). 'Trust as a social reality'. *Social Forces*, **63**, 967–85.
- LOCKETT, G. and LEGGE, K. (1993). 'Epilogue – an agenda for research'. *Journal of Management Studies*, **30**, 6, 1017–20.
- MARCH, J. G. and SIMON, H. A. (1958). *Organizations*. New York: John Wiley.
- MCALLISTER, D. J. (1995). 'Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations'. *Academy of Management Journal*, **38**, 24–59.
- MCDONALD, D. W. and ACKERMAN, M. S. (1998). 'Just talk to me: A field study of expertise location'. Paper presented at the Computer Supported Cooperative Work (CSCW), Seattle, WA.
- MINER, A. S. and MEZIAS, S. J. (1996). 'Ugly duckling no more: pasts and futures of organizational learning research'. *Organization Science*, **7**, 1, 88–99.
- MOORMAN, C., DESHPANDE, R. and ZALTMAN, G. (1993). 'Factors affecting trust in market research relationships'. *Journal of Marketing*, **57**, 81–101.
- NAHAPIET, J. and GHOSHAL, S. (1998). 'Social capital, intellectual capital, and the organizational advantage'. *Academy of Management Review*, **23**, 2, 242–66.
- QUINN, J. B. (1992). *Intelligent Enterprise*. New York: Free Press.
- RING, P. S. and VAN DE VEN, A. H. (1994). 'Developmental processes of cooperative interorganizational relationships'. *Academy of Management Review*, **19**, 90–118.
- RYLE, G. (1949). *The Concept of Mind*. Chicago: University of Chicago Press.
- SCOTT, J. A. (1991). *Social Network Analysis*. Newbury Park, CA: Sage.
- ST ONGE, H. (1996). 'Tacit knowledge: the key to the strategic alignment of intellectual capital'. *Strategy and Leadership*, **Mar./Apr.**, 10–14.
- SZULANSKI, G. (1996). 'Exploring internal stickiness: impediments to transfer of best practice within the firm'. *Strategic Management Journal*, **17** (Winter Special Issue), 27–43.
- TENKASI, R. V. and BOLAND, R. J. (1996). 'Exploring knowledge diversity in knowledge intensive firms: a new role for information systems'. *Journal of Organizational Change Management*, **9**, 1, 79–91.
- WAGNER, R. K. and STERNBERG, R. J. (1987). 'Tacit knowledge in managerial success'. *Journal of Business and Psychology*, **1**, 4, 301–12.
- ZAHNER, A., MCEVILY, B. and PERRONE, V. (1998). 'Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance'. *Organization Science*, **9**, 2, 141–59.