

**UNDERSTANDING THE INFLUENCE OF INTERPERSONAL
RELATIONSHIPS, INTERPERSONAL COMMUNICATION PATTERNS
AND CONTEXTUAL FACTORS ON TACIT KNOWLEDGE TRANSFER
EFFICIENCY IN BUSINESS NETWORKS**

Ms. Leanne Bowe, Dr. Mary T. Holden and Dr. Patrick Lynch

Waterford Institute of Technology

TRACK: Marketing

POSTGRADUATE PAPER

Address correspondence to second author:

Telephone: +353 51 845600

Fax: +353 51 302688

Email: mtholden@wit.ie

ABSTRACT

Over the last decade, there has been an upsurge in interest among scholars on the importance of tacit knowledge transfer in firms, due to the belief that tacit knowledge represents a major source of sustainable competitive advantage (Darr and Kurtzberg, 2000). Despite this interest, factors affecting knowledge transfer at the micro level of analysis, namely a firm's interpersonal relationships and communication patterns, have been largely ignored, leaving a significant gap in substantive knowledge. This study will combine the foregoing micro level aspects of knowledge transfer with important contextual factors of the network environment: the geographic proximity of businesses in the network, the structural equivalence of network actors, network structure and a firm's absorptive capacity. A conceptual model is presented that depicts these variables as influencing tacit knowledge exchange efficiency. It is perceived that the contextual factors enhance the association between interpersonal relationships, their communication patterns and tacit knowledge transfer, while the nature of the interpersonal relationship (that is, close) has a positive impact on their communication patterns and, in turn, both of these variables have a positive influence on tacit knowledge transfer efficiency.

A mixed method approach will be carried out on three business networks of small and medium sized enterprises in the south-east region. Through an incorporation of network theory with the interpersonal relationship and communication literatures, it is perceived that this study will make a significant contribution to academic knowledge.

INTRODUCTION

In today's competitive business environment, the attainment of tacit knowledge has been argued to occupy a central place in the development of a firm's sustainable competitive advantage (Ambrosini and Bowman, 2001). Many authors have drawn on this view (Bresman et al, 1999; Gertler, 2001; Zander and Kogut, 1995), citing tacit knowledge as a critical and intangible resource that has the ability to improve firm performance, as well as the quality and innovativeness of a firm's products (Leonard and Insch, 2005; Batt and Purchase, 2003). Further, Sobol and Lei (1994) argue that firms operating in highly competitive markets require resources which are distinctive and not easily replicated by rival firms in the industry; as tacit knowledge is idiosyncratic and not easily codified, it results in a higher performance that is more sustainable in the longer term (Kogut and Zander, 1992). Further, it is perceived that a firm's competitive position can be further enhanced when tacit knowledge is transferred efficiently, as the less time and effort that is required, the more likely that a transfer will be completed successfully (Hansen, 1999). Nonaka (1994: 20) argue that the attainment of tacit knowledge, held by individuals, also lies at the heart of a firm's knowledge creating process. Creating new knowledge means that the personal tacit knowledge held by an individual is externalised into objective explicit knowledge that is then shared and synthesised by others in the organisation (Nonaka and Toyama, 2005). Hence, understanding the factors the influence tacit knowledge transfer efficiency is a focal part of this study.

Evidence from the literature suggests that the acquisition of tacit knowledge is enhanced by a firm's participation in business networks (Batt and Purchase, 2003). Indeed, scholars interested in network relationships have recognised this knowledge

dimension and its link with competitive success (Hakansson and Ford, 2002; Harryson and Timlon, 2006). A key argument is that, through membership of a business network, the potential for knowledge acquisition by the members is created through repeated and enduring exchange relationships between network actors (Inkpen and Tsang, 2005; Podolny and Baron, 1997).

A review of the literature to date has identified numerous factors that facilitate tacit knowledge transfer within networks, including: social cohesion and network range (Reagans and McEvily, 2003), motivation of the knowledge source and recipient (Kang and Kim, 2010) and tie strength between organisations within the network (Uzzi, 1997; Granovetter, 1973; Burt 1992). In the context of tacit knowledge, social network researchers have demonstrated the benefits of close interpersonal relationships in facilitating fluid transfer and acquisition. Indeed, communication has been referred to as the glue that binds together network interrelationships (Johnston et al, 2005) and represents an important conduit for knowledge transfer. Despite this, factors impacting knowledge transfer efficiency at the micro level of analysis, namely a firm's interpersonal relationships and their ensuing communication patterns, have been largely ignored; hence, a major gap exists in academic knowledge involving the foregoing.

This study will combine these relational aspects of knowledge transfer with important contextual factors of the network environment: the geographic proximity of businesses in the network, the structural equivalence of network actors, a firm's absorptive capacity and network structure. The geographic proximity of businesses within a network is linked to the frequency of contact between network actors and

allows for a better quality of two way communication between individuals through direct observation (Kraut et al, 1987). Structural equivalence refers to the extent to which two individuals occupy the same position within a network. It is perceived that these individuals will have more knowledge in common, making transfer more efficient (Reagans and McEvily, 2003:244). Network structure refers to the configuration of a network and determines the pattern of linkages among network members (Inkpen and Tsang, 2005). The structure of these linkages impacts the frequency of contact between network members, which in turn impacts their interpersonal relationships and communication patterns. Absorptive capacity is largely a function of the existing endowment of prior knowledge, which leads to better communication and understanding of the relevant knowledge. This, in turn, reduces costs of acquiring new capabilities and the speed of time to transfer (Cohen and Levinthal, 1990).

This study's model (see Figure 1) positions these micro level and contextual variables as determinants of tacit knowledge transfer efficiency. It is perceived that the contextual factors enhance the relationship between interpersonal relationships, interpersonal communication patterns and tacit knowledge transfer efficiency, while the nature of the interpersonal relationship (that is, close) has a positive impact on their communication patterns and, in turn, both of these variables have a positive influence on tacit knowledge transfer efficiency.

This study will combine network theory with communication and interpersonal literatures in order to answer the overarching research objective: to understand the influence that interpersonal relationships, interpersonal communication patterns and

contextual network factors have on knowledge transfer efficiency in a network. Due to the significant gap in the literature, it is perceived that this study will contribute to existing understanding of achieving efficient knowledge transfer in three ways: (1) contribute substantively to academic understanding on how the efficiency of tacit knowledge can be streamlined, (2) highlight the importance of the relational and communication aspects of network research and, (3) provide insights into the relationships between the previously identified contextual factors and interpersonal relationships and communication patterns among network actors.

KNOWLEDGE TRANSFER AND INTERPERSONAL RELATIONSHIPS

Knowledge is understood as the combination of data, skills, facts and experience, values and contextual information, which enables the evaluation and absorption of new experiences and information (Argote and Ingram, 2000: 151). Indeed, knowledge is related to human action (Tsoukas and Vladimirou, 2001) and is created and transferred through individuals who interact with each other within and beyond organisational boundaries (Nonaka and Toyama, 2005). There is a distinction made in the literature between tacit and explicit knowledge. Explicit knowledge is codified and easily understood. This knowledge can be communicated from its possessor to another person in symbolic form in which the recipient of the knowledge becomes as much in the know as the originator (Ambrosini and Bowman, 2001). On the other hand, as previously discussed, tacit knowledge is uncodified, idiosyncratic and not easily transferred verbally, making its successful transfer difficult (Polanyi, 1967).

In the context of tacit knowledge transfer and acquisition, social network researchers have identified the importance of strong interpersonal relationships, often referred to

as 'strong ties' (Burt, 1992; 2005; Granovetter, 1973; 1983; Krackhardt, 1992; Borgatti and Foster, 2003). Having a strong interpersonal connection is believed to affect how easily knowledge is transferred between individuals as the more emotionally involved two individuals are with each other, the more time and effort they are willing to put forth on behalf of each other, including effort in the form of knowledge transfer (Reagans and McEvily, 2003). Specifically, in his network study of new product development projects in the electronic industry, Hansen (1999) found that the transfer of complex knowledge requires strong ties between the transferring units. Similarly, Uzzi (1997) describes the importance of close ties in facilitating the transfer of proprietary, tacit knowledge within the US apparel industry. As a consequence, Uzzi terms these close ties as 'special relations' characterised by critical information exchanges. The presence of close interpersonal relationships in a business network also reduces the risks of opportunistic behaviour as a result of mutual investment, leading to more open communication and a greater sharing of information, ideas and knowledge (Wilkinson and Young 2002).

The knowledge transfer literature highlights the vital role of trust as a distinguishable character of strong ties between network actors. Specifically, strong ties harbour higher levels of trust among actors making relationships more effective (Tsai and Ghoshal, 1998; Andrews and Delahaye, 2000). Additionally, Inkpen and Tsang (2005) believe that as trust develops over time, opportunities for knowledge transfer between network members increases. Past cooperation becomes a basis for future cooperation as trust is correlated with the strength of a relationship (Burt, 2005).

At the other end of the relational continuum are weak ties, also referred to as acquaintances (Granovetter, 1983). Weak ties have been shown to impact knowledge transfer in a different way by providing access to non-redundant, unique information from individuals in socially distant regions. Weak ties can override the problem of redundancy, the overlapping of superfluous information, that often results from strong ties (Burt, 2004; Granovetter, 1973), making them a source of rich information exchange (Burt, 2005; Monge and Contractor, 2003).

Although the literature clearly points to the importance of interpersonal relationships on a firm's knowledge transfer opportunities, the depth and types of interpersonal relationships, that is, casual acquaintances, friendships and close relationships (Simmel, 1950; Sias and Cahill, 1998; Granovetter 1983) has received scarce academic interest overall.

KNOWLEDGE TRANSFER, INTERPERSONAL RELATIONSHIPS AND COMMUNICATION PATTERNS.

Indeed it is almost impossible to talk about interpersonal relationships without also discussing the interpersonal communication patterns between people. The process of communication and the forms it takes are basic to how interpersonal relationships develop, grow or fail (Gabarro, 1978). Further, Gabarro (1978) argues that relationships are themselves the consequence of repeated communication and interactions among individuals. From tentative initial exchanges, people move to familiarity and from there to more significant exchanges (Burt, 2005). According to Altman and Taylor (1973: 129), "The growth of interpersonal relationships is associated with a greater depth and value of communication, an opening up of more

intimate areas of exchange and more intimate areas of personality", hence, in turn, the nature of the interpersonal relationship has a significant impact on whether or not an individual communicates with another individual as well as the content and flow of the interactants' communication patterns. For example, Gabarro (1990) found that weak, acquaintance type relationships are associated with restricted disclosure of socially acceptable topics, whereas close interpersonal relationships exchanges exhibited more depth and richness of information. In terms of efficiency of communication, in close interpersonal relationships intended meanings are transmitted and understood rapidly, accurately, and with a greater sharing of information and ideas (Nonaka, 1994; Kraut et al, 1987; Doring and Schnellenbach, 2006). Similarly, Sias and Cahill (1998) assert that the relationship development stages of 'acquaintance' to 'friend' to 'almost best friend' are associated with comparable changes in communication, including decreased caution, marked by increased intimacy and an increased discussion of work-related problems. Further, Altman and Taylor (1973) associate close interpersonal relationships with a state of 'stable exchange' involving richness and spontaneity of communication whereby individuals engage in a deeper level of communication involving core areas of personality. Similarly, Knapp and Vangelisti (2005:20) believe that just as strong relations between individuals are associated with increased accuracy, speed and efficiency in communication, the early stages of relationships (i.e. acquaintances) hold greater possibilities for less accurate communication and rely heavily on stereotyped behaviours and fewer channels of communication.

Based on the foregoing, it is apparent that in order to comprehend the impact that interpersonal relations play in the efficient transfer of knowledge, both the

interpersonal relationship type as well as the interpersonal communication patterns of interactants' should be examined.

KNOWLEDGE TRANSFER, INTERPERSONAL RELATIONSHIPS, COMMUNICATION PATTERNS AND CONTEXTUAL INFLUENCES

Contextual factors include influences exerted by the context in which the interpersonal relationships develop. According to Sias and Cahill (1998), contextual factors of the work environment are perceived to influence the development of working relationships and the resulting communication processes between individuals. In a similar thread, the following sections of this paper aim to show how the contextual factors of the network environment, i.e. geographic proximity, structural equivalence, absorptive capacity and network structure influences the interpersonal relationships and interpersonal communication patterns of individuals within a network, and, in turn, how these variables influence the process of tacit knowledge transfer efficiency.

Absorptive Capacity

Cohen and Levinthal (1990:128) describe absorptive capacity as a firm's level of prior related knowledge which confers an ability to recognise the value of new information, assimilate it and apply it to commercial ends. Absorptive capacity has been frequently cited as a facilitating factor of effective knowledge transfer and acquisition (Lofstrom, 2000; Cohen and Levinthal, 1989; 1990; Tsai, 2001). One of the most important ways that people learn new ideas is by associating those ideas with what they already know. As a result, individuals find it easier to absorb new knowledge in areas in which they have some expertise (Reagans and McEvily, 2003; Cummings

and Sheng Teng, 2003) – new skills are learned more quickly when they share elements with knowledge that an individual has already acquired (Kogut and Zander, 1995).

Absorptive capacity is important both at the individual as well as the organisational level and can influence the fluidity of communication between individuals. An individual's level of prior knowledge is accumulated through experience and becomes embedded in their capabilities and practices (Lofstrom, 2000). According to Boisot (1995), these high levels of related knowledge, or cognitive proximity between individuals, provide common rules for communication and ease the process of cognitive interaction (Grandinetti and Camuffo, 2006). When the absorptive capacity of the individuals is high, the transfer process under way can easily be concluded. In his study on US strategic alliances, Lofstrom (2000) found that high levels of absorptive capacity between individuals was positively related to learning within the alliances. In this study, a high level of absorptive capacity is perceived to have a positive influence on the interpersonal communication patterns of network actors and tacit knowledge transfer efficiency.

Structural Equivalence

Different network positions represent different opportunities for organisations and individuals to access new knowledge (Tsai, 2001). Structural equivalence refers to the extent to which two individuals occupy the same network position. For instance, two actors are considered structurally equivalent if they have identical ties to and from all others actors within a social network (Kang and Kim, 2010). It is perceived that these individuals share common knowledge, increasing the efficiency of transfer through

cognitive similarity and, as a result, these individuals will come to communicate more readily and easily (Reagans and McEvily, 2003). Kang and Kim (2010) found that structural equivalence significantly influences knowledge transfer at the dyadic level, even when the effect of strength of ties is controlled. Similarly, structural equivalence also facilitates communication between shared contacts (Burt, 1987) since the likeness of positions may result in the comparable flow of information and knowledge from the common sources (Friedkin, 1984). Consequently, structurally equivalent actors are social equals and should have related attitudes and behaviours as a result (Burt 1987:199).

Structural equivalence has rarely been used in knowledge transfer research and it is perceived in this study to influence tacit knowledge transfer through impacting the interpersonal relationships and interpersonal communication patterns of network actors.

Geographic Proximity

Sias and Cahill (1998) found that the transition of relationship development, from acquaintance to best friend, is accelerated by individuals working together in close proximity. Proximity between individuals leads to frequent exposure, thereby increasing the likelihood of developing close interpersonal relationships (Knapp and Vangelisti, 2005). When people are co-located, it takes less effort for them to start interacting. In addition, the frequency of contact afforded by geographical proximity also increases the quality of two-way communication between individuals (Kraut et al, 1987). Further, frequent communication holds together the threads of interpersonal

relationships over time (Grandinetti and Camuffo, 2006; Doring and Schnellenbach, 2006).

If there is one assertion on which there is widespread agreement in the literature, it is that tacit knowledge transfer is not easy. Its' un-codified nature requires human action and successful transfer often depends on close and deep interaction between the individuals involved (Von Hippel, 1994). In some cases, tacit knowledge can only be transferred through up close observation, demonstrations or hands on experience (Hamel 1991). The intensively human context of tacit knowledge therefore reinforces the importance of proximity (Gertler, 2001). Even in today's age of globalisation and the rapid increases in telecommunication, geographic proximity still increases the likelihood of knowledge sharing and collaboration, particularly when the knowledge in question is tacit (Audretsch, 1998). Therefore, as conceived in this paper, networks in which the geographic proximity of businesses are close, offer more efficient exchanges of tacit knowledge through the establishment of closer ties and fluid communication patterns.

Network Structure

Network structure determines the pattern of linkages among network members. Such elements of configuration as density and connectivity affect the ease of knowledge transfer through their impact on the frequency of contact among network actors (Krackhardt, 1992; Inkpen and Tsang, 2005; McEvily and Zaheer, 1999). Reagans and McEvily (2003), in their study of US contract R&D firms, concentrated on how network structure influences the knowledge transfer process. Specifically, they looked at cohesion (dense third party ties around a relationship) and network range

(relationships that span institutional, organisational or social boundaries). They found that social cohesion around a relationship affects the willingness and motivations of individuals to transfer knowledge by decreasing the competitive and motivational impediments that arise, while network range presented the individuals with a greater opportunity to learn from diverse contacts. Similarly, Ingram and Roberts (2000) describe how dense networks enhanced the performance of Sydney hotels. The hotel managers embedded in these dense networks shared knowledge and best practices easily. Cohesive networks, or networks with closure (Burt, 2004), may also have the effect of promoting consistent norms, trust and cooperation, which motivates individuals to share tacit and proprietary knowledge (Cross and Cummings, 2004).

It is impossible to speak of network structure without recognising the work of Burt (1992; 2005) and his concept of structural holes. Structural holes are those places where people are unconnected in a network and are rich in non redundant sources of information. As a result, structural holes provide opportunities for an individual whose networks span these holes, by providing opportunities to broker the flow of information between people and to broker connections between otherwise disconnected individuals (Burt, 1992; Monge and Contractor, 2003). According to Inkpen and Tsang (2005), the greater the presence of structural holes with weak ties to various cliques, the more likely a pattern of linkages among network members will develop that will lead to knowledge transfer. Similarly, Granovetter (1973; 1983) argues that new ideas more often emanate through weak ties from the margins of a network rather than through strong ties from its core or its nucleus. Thus, individuals rich in structural holes have control over more rewarding opportunities (Burt, 2005).

A trade off therefore exists between loosely coupled networks that maximise access to non-redundant sources of knowledge and dense networks that promote strong ties, and the transfer of tacit knowledge. As access to knowledge in networks is conditioned by structure, it is reasonable to anticipate that different structures may also have an impact on the interpersonal relationships and communication patterns of network actors.

CONCEPTUAL MODEL

It is apparent from the literature that in order to understand the influences of tacit knowledge transfer efficiency in business networks, the micro level components as well as the contextual factors of the network environment must be explored. The conceptual model that is presented in Figure 1 depicts both micro level and contextual variables as influences of tacit knowledge transfer efficiency in a network context.

It is perceived that the previously identified contextual factors influence the strength of the interpersonal relationships between boundary spanners and their interpersonal communication patterns and enhance the association between interpersonal relationships, their communication patterns and tacit knowledge transfer. Further, the nature of the interpersonal relationship (that is, close) has a positive impact on the interpersonal communication patterns of network actors and, in turn, both of these variables have a positive influence on tacit knowledge transfer efficiency.

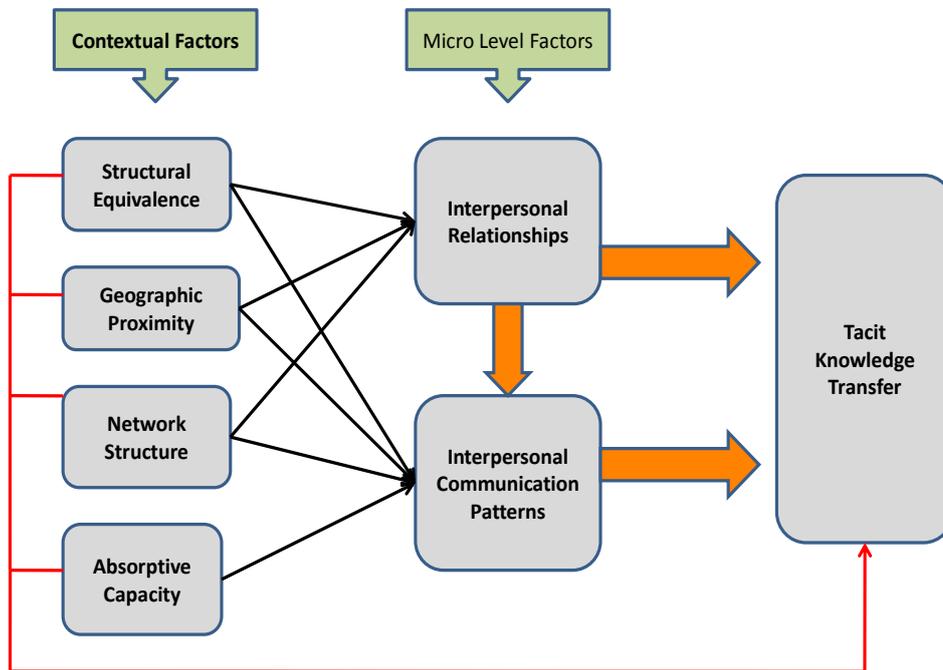


Figure 1: Conceptual Model

A mixed method approach will be utilised involving three business networks of small and medium sized enterprises in the south-east region. Mail surveys will be employed in order to capture data on differing types of interpersonal relationships, communication patterns and the influences of the aforementioned contextual factors. Using Social Network Analysis, the resulting relational data gathered from the quantitative surveys will be used to investigate the relational aspects of the networks in question. Social Network Analysis software, NetMiner, will aid in the exploratory analysis and visualisation of the network data, which will allow the researcher to identify the underlying patterns and structures of the networks in question. This will be followed by in depth interviews with key network personnel, which will aid in the understanding of the dynamics and complexities involved in tacit knowledge transfer.

CONCLUSION

The main premise of this study is to understand the influence that interpersonal relationships and interpersonal communication patterns have on tacit knowledge transfer efficiency in a business network and to investigate the influence that contextual network factors have on enhancing this relationship. Due to the significant gap in the literature, it is perceived that this study will contribute to extant literature in three ways: (1) contribute substantively to academic understanding on how the efficiency of tacit knowledge can be streamlined, (2) highlight the importance of the relational and communication aspects of network research and, (3) provide insights into the relationships between the previously identified contextual factors and interpersonal relationships and communication patterns among network actors.

BIBLIOGRAPHY

Altman, I. and Taylor, D. A., 1973. *Social Penetration: The Development of Interpersonal Relationships*. Holt, Oxford.

Ambrosini, V. and Bowman C., 2001. Tacit Knowledge: Some Suggestions for Operationalization. *Journal of Management Studies*, 38 (6), 811-829.

Andrews K. and Delahaye, B., 2000. Influences on Knowledge Processes in Organizational Learning: The Psychological Filter. *Journal of Management Studies* 37 (6), 797-810.

Argote, L. and Ingram, P., 2000. Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organisational Behaviour and Human Decision Processes*, 82 (1), 150-169.

Audretsch, D. 1998. Agglomeration and the Location of Innovative Activity. *Oxford Review of Economic Policy*, 14 (2), 18-29.

Batt, P. J. and Purchase, S., 2004. Managing Collaboration within Networks and Relationships. *Industrial Marketing Management*, 33 (3), 169-174.

Boisot, M.H. 1998. *Securing Competitive Advantage in the Information Economy*. Oxford, Oxford.

Borgatti, S. P. and Foster, P.C., 2003. The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management*, 29 (6), 991-1013.

Bresman, H., Birkinshaw, J. and Nobel, R. 1999. Knowledge Transfer in International Acquisitions. *Journal of International Business Studies*, 30 (3), 439-462.

Burt, R.S. 1987. Social Contagion and Innovation. Cohesion versus Structural Equivalence. *American Journal of Sociology*, 92 (6), 1287-1335.

Burt, R.S. 2004 "Structural Holes and Good Ideas". *The American Journal of Sociology*, 110 (2), 349-399.

- Burt, R.S., 1992. *Structural Holes*. Harvard Business Press, London.
- Burt, R.S., 2005. *Brokerage and Closure: An Introduction to Social Capital*. Oxford, Oxford.
- Cohen, W. and Levinthal, D., 1990. Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35 (1), 128-152.
- Contractor, N. and Monge, P., 2003. Managing Knowledge Networks. *Management Communication Quarterly*, 16 (2), 249-258.
- Cross, R. and Cummings, J. 2004. Tie and Networks Correlates of Individual Performance in Knowledge Intensive Work. *The Academy of Management Journal*, 47 (6), 928-937.
- Cummings, J. and Sheng Teng, B. 2003. Transferring R&D Knowledge: the key factors affecting knowledge transfer success. *Journal of Engineering and Technology Management*, 20. 39-68.
- Darr E.D. and Kurtzberg, T.R. 2000. An Investigation of Partner Similarity Dimensions on Knowledge Transfer. *Organisational Behaviour and Human Decision Process*, 82 (1) 28-44.
- Doring, T. and Schnellenbach, J., 2006. What Do We Know about Geographical Knowledge Spillovers and Regional Growth?: A Survey of the Literature. *Regional Studies*, 40 (3), 375-395.
- Friedkin, N.E. 1984. Structural Cohesion and Equivalence. *Sociological Methods and Research*, 12 (3), 235-261.
- Gabarro, J.J., 1978. *Interpersonal Behaviour: Communication and Understanding in Relationships*. Englewood Cliffs, Prentice Hall.
- Gabarro, J.J., 1990. The Development of Working Relationships: in *Intellectual Teamwork, Social and Technological Foundations of Cooperative Work*. Jolene

- Galegher, Robert E. Kraut and Carmen Egido (Eds), Erlbaum, Hillsdale, New Jersey, 79-111.
- Gertler, M. 2001. Tacit Knowledge and the Economic Geography of Context. Presented at the Nelson and Druid Summer Conference, Aalborg, Denmark.
- Grandinetti, R. and Camuffo, A. 2006. A Theoretical Model of Knowledge Transfer and Combination within Industrial Districts. *22nd IMP Conference*, Milan 2006.
- Granovetter, M., 1973. The Strength of Weak Ties. *American Journal of Sociology*, Volume, 78 (6), 1360-1380.
- Granovetter, M., 1983. The Strength of Weak Ties: A Network Theory Revisited. *Sociological Theory*, 1, 201-233.
- Hakansson, H. and Ford, D. 2002. How Should Companies Interact in Business Networks? *Journal of Business Research*, 55 (2), 133-139.
- Hamel, G. 1991. Competition for Competence and Inter Partner Learning within International Strategic Alliances. *Strategic Management Journal*, 12, 83-103.
- Hansen, M.T., 1999. The Search Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organisational Subunits. *Administrative Science Quarterly*, 44 (1), 82-111.
- Harryson, S. and Timlon, A.J. 2006. Know-Who Based Innovation Networks: For Cross-Level Breakthroughs. *22nd IMP-conference*, Milan, 2006.
- Ingram, P. and Roberts, P.W. 2000. Friendships among Competitors in the Sydney Hotel Industry. *American Journal of Sociology*, 106 (2), 387-423.
- Inkpen, A. and Tsang, E., 2005. Social Capital, Networks, and Knowledge Transfer. *Academy of Management Review*, 30 (1), 146-165.

Johnston, W., Peters, L., and Gassenheimer, J., 2005. Questions about Network Dynamics: Characteristics, Structures, and Interactions. *Journal of Business Research*, 59 (8), 945-954.

Journal of Business Research, 55 (2), 123-132.

Kang, M. and Kim, Y.G. 2010. A multilevel view on Interpersonal Knowledge Transfer and Technology. *Journal of the American Society for Information Science and Technology*. 61 (3), 483-494.

Knapp and Vangelisti 2005. *Interpersonal Communication and Human Relationships*. Allyn and Bacon, Boston.

Kogut, R.T. and Zander, U. 1992. Knowledge of the firm, combinative capabilities and the replication of technology. *Organisation Science*: 3 (3), 383-397

Krackhardt, D., 1992. The Strength of Strong Ties: The Importance of Philos in Organisations. In N.Nohria and R.Eccles (Eds.) *Networks and Organisations: Structure, Form and Action*. Harvard, Boston, 216-239.

Kraut, R., Egidio, C. and Galegher, J., 1987. Relationships and Tasks in Scientific Collaboration. *Human Computer Interaction*, 3 (1), 31-58.

Leonard, N. and Insch, G. 2005. Tacit Knowledge in Academia: A Proposed Model and Measurement Scale. *The Journal of Psychology*, 139 (6), 405-512.

Lofstrom, S., 2000. Absorptive Capacity in Strategic Alliances: Investigating the Effects of Individuals Social Capital and Human Capital on Inter Firm Learning. Paper presented at the Organisation Science Winter Conference, Denver, CO.

McEvily, B. and Reagans, R., 2003. Network Structure and Knowledge Transfer: The Effects of Cohesion and Range. *Administrative Science Quarterly*, 48, 240-267.

McEvily, B. And Zaheer, A., 1999. Bridging Ties: A Source of Firm Heterogeneity in Competitive Capabilities. *Strategic Management Journal*, 20 (2), 1133-1156.

- Nonaka, I. and Toyama R., 2005. The theory of the knowledge creating firm: subjectivity, objectivity and synthesis. *Industrial and Corporate Change*, 14 (3), 419 – 436.
- Nonaka, I., 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organisation Science*, 5 (1), 14-37.
- Podolny, J. and Baron, J. 1997. Resources and Relationships: Social Networks and Mobility in the Workplace. *American Sociological Review*, 62, (5). 673-693.
- Polanyi, M., 1967. *The Tacit Dimension*. Routledge, London.
- Sias, P. and Cahill. D.J., 1998. From Coworkers to Friends: The Development of Peer Friendships in the Workplace. *Western Journal of Communication*, 62 (3), 273-299.
- Simmel, G., 1950. *The Sociology of Georg Simmel*. (KH Wolff trans). Free Press, New York.
- Sobol, M.G. and Lei, D. 1994. Environment, Manufacturing Technology and Embedded Knowledge. *International Journal of Human Factors in Manufacturing*, 4 (2), 89-167.
- Tsai, W. 2001. Knowledge Transfer in Intraorganisational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance. *Academy of Management Journal*, 44 (5), 996-1004.
- Tsai, W. and Ghoshal, S., 1998. Social Capital and Value Creation: The Role of Intrafirm Networks. *The Academy of Management Journal*, 41 (4), 464-476.
- Tsoukas, H. and Vladimirou, E. 2001. What is Organisational Knowledge? *Journal of Management Studies*, 38 (7), 973-993.
- Uzzi, B., 1997. Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*, 42 (1), 35-67.

Von Hippel, E. 1994. Sticky Information and the Locus for Problem Solving: Implications for Innovation. *Management Science*, 40 (4), 429-439.

Wilkinson, I. and Young, L. (2002) On Cooperating: Firms, Relations and Networks. *Journal of Business Research*, 55 (2), 123-132.

Zander, U. and Kogut, B., 1995. Knowledge and the Speed of the Transfer and Imitation of Organisational Capabilities: An Empirical Test. *Organisational Science*, 6 (1), 76-92.