Towards An Inter-organisational Knowledge Transfer Framework for SMEs

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Abstract

This paper aims to develop a framework for SMEs to help them understand, and thus to improve, the process of knowledge exchange with their customers or suppliers. Through a review of the literature on knowledge transfer, organisational learning, social network theory and electronic networks, the key actors, key factors and their relationships in the process are identified. Finally, a framework containing all above points is proposed.

Keywords: Framework, SMEs, knowledge transfer, inter-organisation, organisational learning, social network.

1. Introduction

Knowledge management (KM) is an emerging discipline (Ives *et al*., 1998), which is mainly derived from large businesses (Deakins, 1999). As a result of this, only a small proportion of the literature has attempted to address knowledge management issues in SMEs (Deakins, 1999; Sparrow, 2000). Experience and lessons learned from large organisations can not be directly applied to SMEs, as Sparrow (2000) argues "… like so many aspects of business and management, the knowledge management issues that SMEs will face may not be simply a scale-down replica of large company experiences". For example, external knowledge is of prime importance to SMEs, whereas large businesses may pay more attention to the knowledge of their internal aspects (Sparrow, 2000).

The process by which SMEs (or others) may be able to acquire external knowledge, which comes from their customers, suppliers, or other organisations, will be referred to here as inter-organisational knowledge transfer. Knowledge transfer is a premise to knowledge creation (Nonaka and Takeuchi, 1995). The understanding of how knowledge is transferred is essential for explaining the evolution and change in institutions, organisations, technology and economy. However, we know little about it (Appleyard, 1996; Grant, 1996; Dyer and Nobeoka, 2000; Huber, 2001).

An emergent view is that it may be beneficial for SMEs if research can be done to help them understand and, thus to improve their inter-organisational knowledge transfer process. Such research has the potential to help SMEs to improve their business performance and enhance their competitiveness. Therefore, this paper aims to develop an inter-organisational knowledge transfer framework for SMEs, to help them understand the knowledge transfer process, and will theoretically focus on studying how a SME exchanges knowledge with its customers (or suppliers), which may be other SMEs or large businesses.

2. Review of Literature on Knowledge Transfer and Organisational Learning

2.1 Knowledge Transfer

Knowledge transfer means that, knowledge is transferred from the sender (s) (person, or group, or team, or organisation) to the recipient(s) (person, or group, or team, or organisation) (Lind and Seigerroth, 2000; Lind and Persborn, 2000; Bender and Fish, 2000; Albino *et al.*, 1999). Some researchers (Nonaka and Takeuchi, 1995; Shariq, 1999) use the term "knowledge sharing". There are no obvious differences between the two terms. This paper will use the term "knowledge transfer".

There are great differences in inter-organisational knowledge transfer, as opposed to within an organisation. An organisation always tries to expand the amount of shared knowledge among its employees to an appropriate level (or to the highest level possible), so as to develop (or preserve) its competitive advantages (Lind and Seigerroth, 2000). As to inter-organisational knowledge transfer, organisations should have their own knowledge transfer strategy to solve 'the boundary paradox'. That is, their borders must be open to flows of information and knowledge from the networks and markets in which they operate, but, at the same time, the organisation must protect and nurture its own knowledge base and intellectual capital (Quintas *et al.*, 1997; Beeby and Booth, 2000). In other words, there is a knowledge sharing versus knowledge security trade-off that must be made explicit. This issue is analysed in Section 4.

In addition, inter-organisational knowledge transfer is actually the process of organisations learning from each other, i.e., inter-organisational learning.

2.2 Organisational Learning

2.2.1 Organisational Learning

Organisational learning may occur when an organisation acquires information (knowledge, understanding, know-how, techniques, or practices) of any kind and by whatever means (Argyris and Schon, 1996). It is individuals that make up an organisation, so, individual learning is a necessary condition for organisational learning which is institutionally embedded (Beeby and Booth, 2000). However, only individual learning is not sufficient, it is generally accepted that the acquisition of knowledge by individuals does not represent organisational learning (Nonaka and Takeuchi, 1995; Beeby and Booth, 2000). To achieve the necessary cross-level effects, individual learning should be on the organisation's behalf (Argyris and Schon, 1996), and must first be shared through communication which is supported by institutional processes for transferring what is learned by individuals to the organisation and the reverse as well as for storing and accessing that which is learned (Beeby and Booth, 2000).

Organisations may fail to convert individual learning into organisational learning. For instance, Kim (1993) and Sparrow (2000) identify ten kinds of incomplete learning cycles (e.g., role-constrained learning, superstitious learning, organisation position-constrained learning), where learning in the face of changing environmental conditions is impaired because one or more of the links is either weak or broken. To overcome these barriers, organisations need to build up internal mechanisms to shape the organisational learning process (Dodgson, 1993), to ensure that knowledge which is received by individuals from external sources is communicated and utilised effectively throughout the organisation.

2.2.2 Inter-organisational Learning

The inter-organisational learning process may be considered to be composed of two sub-processes: 1) inter-individual learning between individuals from different organisations; 2) once the individual recipient acquires the needed knowledge, the individual learning will be converted into organisational learning through organisational internal mechanisms. However, the inter-individual learning is within the inter-organisational context, and will be affected by inter-individual relationship, inter-organisational relationship and the organisations' inter-organisational knowledge transfer strategy. Therefore, inter-organisational learning is more complicated than inter-individual learning, also than organisational learning. This research will mainly focus on the first sub-process, i.e., inter-individual learning in the inter-organisational context, which is the point that demonstrates how inter-organisational learning is different from organisational learning.

In the inter-organisational learning literature, "openness", "trust", "prior experience" (Wathne *et al.*, 1996; Albino *et al.*, 1999) and "absorptive capacity" (Cohen and Levinthal, 1990) are identified to be the key factors influencing the effectiveness of the knowledge exchange:

- Openness has been defined mainly as the individual senders' willingness to transfer their knowledge in a collaborative interaction, in order to stress the attitude of the individual senders involved in the knowledge transfer of not hiding their knowledge, so that potential learning is facilitated. A higher level of individual senders' openness allows a more effective knowledge transfer.
- Trust has been recognised as a fundamental element for the success of inter-organisational learning. Trust between organisations influences the individual senders' openness through the organisation's inter-organisational knowledge transfer strategy; trust between individual senders and recipients has a direct and positive influence on the senders' openness.
- Prior experience owned by both individual senders and individual recipients will influence their abilities to exchange knowledge. It influences the capability of both conveying knowledge through information and internalising new knowledge. It seems possible to claim that the higher the degree of actors' prior experience, the greater the effectiveness of knowledge transfer.
- Absorptive capacity reflects the recipient's ability to absorb the knowledge sent by the sender. It is decided not only by the recipient's prior experience but the recipient's intelligence and comprehension as well.

Another factor that needs to be added to the individual sender should be "expressiveness", i.e., the ability of the individual sender to use oral or facial expression, body language to clearly express what he knows. Because, even if the individual sender has high levels of prior experience and openness, the transfer effectiveness may still be quite low if the individual sender has poor expressiveness.

From the foregoing discussions, both inter-organisational and inter-individual relationships are found to have an important influence in (inter-)organisational learning, knowledge transfer and creation (Beeby and Booth, 2000). It would be beneficial if the key factors of the relationships could be identified. This paper aims to do so by means of social network theory, which is explained in the next section.

3. Review of Literature on Social and Electronic Networks

3.1 Social Network

Social network refers to a set of social entities (or persons) and social relationships which connect them (Grandori and Soda, 1995). Social relationships play an important role in social networks. Michelli and McWilliams (1996) argue that "the principles upon which (social) networks are built are not complex. They are nothing more than a series of relationships, connected by mutual interest or a common goal." Granovetter (1985) further points out, all activities are embedded in complex networks of social relations which include family, state, educational and professional background, religion, gender and ethnicity.

Social relationships are maintained and co-ordinated by two mechanisms: trust and power (Bachmann, 1999). Trust is a risky engagement. It is inevitable that a social actor who decides to trust another actor extrapolates on limited available information about the future behaviour of this actor. Trustors constantly try to find "good reasons" to believe that the risk they are about to accept is low. If they cannot find sufficient reasons for this assumption they might well refrain from trusting, and either avoid social interaction at all or seek an alternative basis for it (Bachmann, 1999).

Power is a comprehensive concept. It appears as system power in the form of law, powerful trade associations, inflexible business practices, technical standardisation, and rigid structures of hierarchy (Luhmann, 1979). Power may direct the expectations of social actors to certain routes of behaviour, its existence can be seen as minimising the risk of trust.

The differences (Bachmann, 1999; Michelli and McWilliams, 1996) and similarities (Bachmann, 1999; Luhmann, 1979) between the two mechanisms, trust and power, are shown in Table 1.

The relationship between trust and power is complex. On the one hand, they can be seen as alternative and compatible means - which do not exclude each other but occur in combination in many cases - to fulfil the same social function. On the other hand, power often appears as a precondition rather than an alternative to trust, and can foster the constitution of trust (Bachmann, 1999). Since both of them are limited in their capacity, a combination often seems to be the only way to ensure that the co-ordination of expectations and interactions is achieved satisfactorily. In fact most relationships are usually based on a mixture of both trust and power (Bachmann, 1999).

The social network may provide opportunities for face-to-face communication, produce strong ties between member organisations through the appropriate application of the two mechanisms - trust and power, and thus work as a channel to transfer both tacit and explicit knowledge between member organisations (Dyer and Nobeoka, 2000).

3.2 Electronic Network

An electronic network may work as another channel to transfer knowledge between organisations. As we know, tacit knowledge is normally transferred through face-to-face communication, which offers people the opportunities of co-presence, visibility, audibility, co-temporality, simultaneity and sequentiality (Clark and Brennan, 1993). At present, even the most advanced IT is still insufficient to offer people all the above opportunities. For example, a video teleconference cannot offer co-presence, although it may offer all the others. Therefore, there is a great difficulty in using an electronic network to transfer tacit knowledge. However,

electronic networks have advantages over social networks in rapidly transferring explicit knowledge, rapidly developing weak ties and greatly reducing communication cost (Grandori and Soda, 1995; Preece, 2000; Jones and Beckinsale, 2001; Warkentin e*t al*., 2001) (See Table 2).

Table 1: The Differences and Similarities Between Power and Trust

		Power	Trust
Differences		1. Based on a negative selection of a hypothetical possibility which is presented by the powerful actor and believed by the subordinate actor not to be in the interest of either side.	1. Based on positive assumption.
		2. Easier to build up.	2. Takes tremendous amounts of time and effort to establish.
		3. More robust and much less in danger of an unforeseen breakdown.	3. Less robust and more in danger of such a breakdown.
		4. In the case of breakdown, damage is not severe, a relationship may be continued.	4. If breakdown, the damage is severe, the emotion is hard to recover.
Similarities		1. Both are mechanisms to co-ordinate social interactions efficiently and to allow for relatively stable relationships between co-operating social actors. 2. Both of them influence the selection of actions in the face of other possibilities. 3. Both mechanisms allow social actors to link their mutual expectations into each other and to co-ordinate (re-)actions between them. 4. Both have risks and may break down if they are massively challenged. The usability of power depends greatly on whether or not the threat of sanctions which is implied is realistic and has a good chance of being acknowledged by the subordinate actor. The more the latter starts to doubt that the threat of sanctions would ultimately be used against him the weaker is the position of the powerful actor.		

So, the member organisations of a social network may build up their own electronic network to facilitate explicit knowledge transfer between them. But this case may happen only when the social network has strong ties between its member organisations, otherwise, the social network may have no thrust to build it up. However, even if a social network does not have its own electronic network, its member organisations may still use network technology such as the Internet to market products or acquire information from external sources.

Table 2: Advantages and disadvantages for social and electronic networks

	Advantages	Disadvantages
Social networks	Provide chances for face-to-face communication; develop strong ties, transfer tacit knowledge.	Slowly transfer explicit knowledge, slowly develop weak ties, expensive cost in communication.
Electronic networks	Transfer explicit knowledge very fast, develop weak ties very fast, greatly reducing communication cost.	Very difficult to provide chances for face-to-face communication, develop strong ties and transfer tacit knowledge.

4. The Co-ordinating Mechanism for Inter-organisational Knowledge Transfer

No matter which channel (social or electronic network) they use to transfer knowledge, organisations have to face the "boundary paradox", and establish their own inter-organisational knowledge transfer strategies to deal with it. However, the relevant literature normally focuses on discussing one or two knowledge transfer problems (Albino *et al.*, 1999; Parker and Vaidya, 2001; Grundmann, 2001), only a few systematically study the strategy. For instance, McEvily *et al*. (2000) propose three strategies of continuous improvement, lock-in, and market deterrence for organisations to build the barriers to prevent competence substitution. But these strategies may not be suitable for SMEs because of their limited market power and expertise. So almost no literature systematically studies inter-organisational knowledge transfer strategies for SMEs.

From the foregoing literature review, it has been established that inter-organisational learning is composed of two sub-processes: 1) inter-individual learning between individuals from different organisations; 2) once the individual recipient acquires the needed knowledge, the individual learning is converted into organisational learning. So, there are four actors which are involved in the process: an organisational sender and its individual sender, an organisational recipient and its individual recipient. The following factors have been identified to be the key factors influencing the effectiveness of the knowledge exchange: individual recipient's prior experience and absorptive capacity; individual sender's openness, expressiveness and prior experience; trust between individual recipient and individual sender, trust between organisational recipient and organisational sender. The organisational objectives can only be realised through the actions of the individual recipient (or sender). In other words, the actors' relationships constitute a co-ordinating mechanism which guides the actors' behaviours, and thus directly influences the effectiveness of the knowledge transfer process. According to social network theory, social relationship has two mechanisms: trust and power. In addition, the relevant literature (Dyer and Nobeoka, 2000; Albino *et al.*, 1999) shows that a third party, based on its own economic benefits, may use its relationship with the organisational sender (or recipient) to influence the knowledge transfer process. Based on the above description, a co-ordinating mechanism for knowledge transfer between a SME and its customer (or supplier) is depicted in Figure 1. The SME may be an organisational recipient or an organisational sender.

As we know, power is a very comprehensive concept. Only the main sources of power exerted by the relevant actor(s) will be listed here. In the SME – customer (or supplier) relationship, the power is mainly from contract (or patent) and market power; in the relationships of SME - individual and customer (or supplier) – individual, the power mainly comes from their internal mechanisms; in the individual – individual relationship, the power may be from the specific operational norms in their specific common tasks. The third party mainly uses its market power to influence the inter-organisational knowledge transfer process between the SME and its customer (or supplier).

To develop an effective strategy, the SME should know how to make use of the co-ordinating mechanism to influence other actors' behaviours (i.e., the levels of the key factors), to pursue the best effectiveness for itself, i.e., to acquire what it wants when it is a recipient, or to protect what it wants when it is a sender.
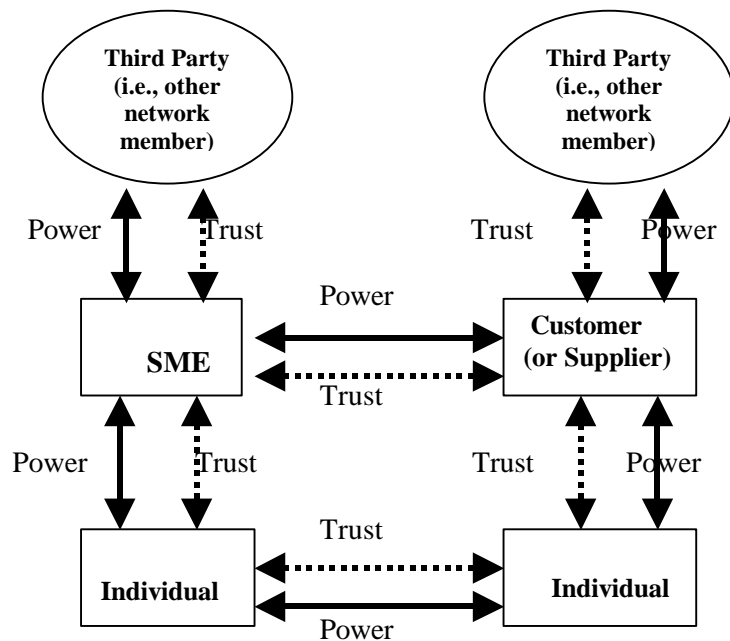
Figure 1: The Co-ordinating Mechanism for Inter-organisational Knowledge Transfer

5. Development of an Inter-Organisational Knowledge Transfer Framework for SMEs

Several articles study inter-organisational knowledge transfer by means of the theory of social networks (Albino *et al*., 1999; Khanna *et al*., 1998; Preece, 2000), but only one is concerned with SMEs (Albino *et al*., 1999). None of them contain the component of knowledge transfer strategy or even knowledge transfer interaction between organisations (or individuals). Therefore, a framework is developed here to help improve people's understanding of the complex process.

On the basis of the literature review and analyses in the previous sections, the key components of the inter-organisational knowledge transfer process can be identified as below.
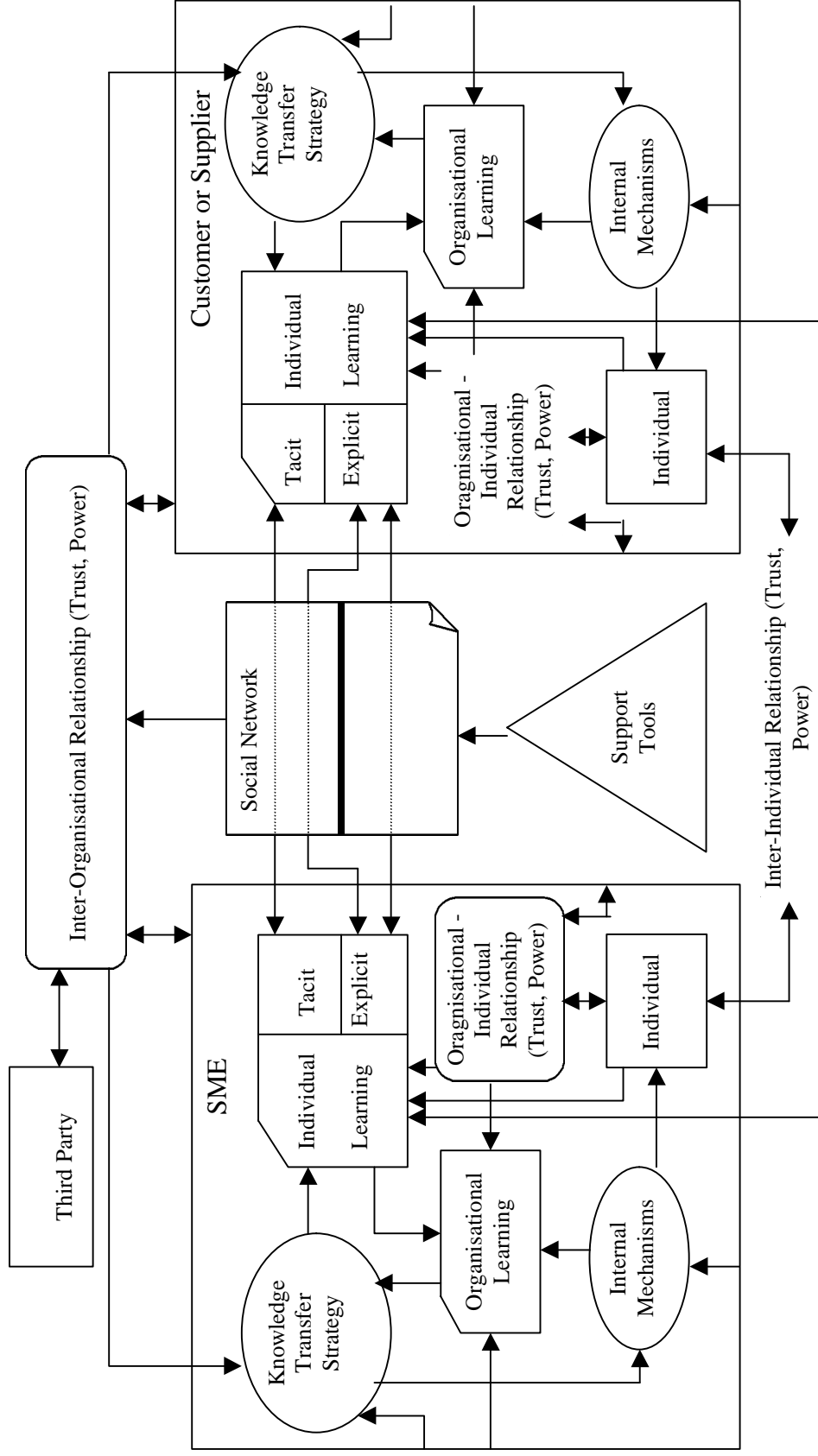
The three main actors (the SME, the Customer or Supplier and the Third Party) will use their power, which mainly comes from the legal system (e.g., contract, intellectual property law, commercial law), norms (e.g., norms of associations) and their market power, and relationships to influence the knowledge transfer process between the SME and the Customer (or Supplier) on behalf of their own economic interests.

- Individual. The individual sender or recipient in a specific knowledge transfer process, coming from either the SME or the customer (or supplier). Individual sender's prior experience, openness, expressiveness; individual recipient's prior experience, absorptive capacity; as well as trust between individuals are determining factors of successful knowledge transfer between individuals. The SME or the customer (or supplier) will mainly use its relationship with its individual recipient (or sender) to influence the individual's behaviour, then the inter-individual knowledge transfer process.
- Relationships. The relationship between the SME and the customer (or supplier); between a third party and the SME (or the customer (or) supplier); between individual sender and individual recipient; between organisations and their individuals. The relationships are

maintained by power and trust. Trust is based on the prior performances, prior behaviours, common commitment and reciprocation of the relevant actors. The inter-organisational knowledge transfer process is co-ordinated by the relationships through their power and trust (i.e., the co-ordinating mechanism).

- Inter-organisational knowledge transfer strategy. Based on its own organisational learning situation, and the co-ordinating mechanism for inter-organisational knowledge transfer, the SME (or the customer or supplier) must establish systematic strategies to deal with various (potential) problems at each sub-process of inter-organisational knowledge transfer, to ensure the success of the transfer, and thus to acquire what it wants.

- Internal mechanisms. These are employed by the SME or the customer (or supplier) to prevent incomplete learning cycles and inhibitory learning loops from happening, and create corporate culture based on trust to enhance and incentive employees' loyalty to the organisation, so as to successfully convert individual learning into organisational learning, or so that individual employee whole-heartedly executes its employer's intentions when he is an individual sender. The mechanisms are influenced by the inter-organisational knowledge transfer strategy.

- Individual learning. This includes the contents of the transferred knowledge (e.g., tacit and explicit knowledge), communication modes (e.g., face-to-face)

- communication, or communication through other media (e.g., electronic network) between individual sender and recipient. It is influenced by abilities of both individual sender and recipient as well as their relationship, the relationships between the individuals and their own organisations.

- Organisational learning. This is where the transferred knowledge is absorbed by the organisation, and is mainly influenced by the organisation itself, individual learning, the relationship between the organisation and the individual, and the organisational internal mechanisms.

- Social network. It consists of the SME, the customer (or supplier) and others (e.g., third party), as well as the supplier-customer relationships between them.

- Electronic network. This mainly refers to the network that is built up by the social network, and used by the social network members to conveniently exchange information (or explicit knowledge) with each other. However, many SMEs also use the Internet (e.g., e-mail, web-pages) to exchange information (or explicit knowledge), thus, here, it also refers to the Internet.

- Support tools. These are used in the electronic network (include the Internet), and help SMEs to search, store and analyse information (or explicit knowledge).

These components constitute the framework shown in Figure 2. The meanings of the symbols used in Figure 2 are explained in Figure 3.From the framework, the key components of the inter-organisational knowledge transfer can easily be identified. Each of the components may be broken down into more detailed factors which play important roles in the process as well. None of them can be ignored if successful knowledge transfer between organisations is to be achieved. So, the inter-organisational knowledge transfer process is very complicated, and difficult to achieve successfully. The above framework assists by indicating which of the components is influenced by what. In addition, there is a co-ordinating mechanism within the framework, i.e., four kinds of relationship influence the actors' behaviours and inter-organisational knowledge transfer strategy by means of power and trust, and further co-ordinate and guide the knowledge transfer process. Therefore, the framework may help SMEs to understand the inter-organisational knowledge transfer process, its key components, co-ordinating mechanism and complexity, as well as the difficulties involved in making a success of inter-organisational knowledge transfer.
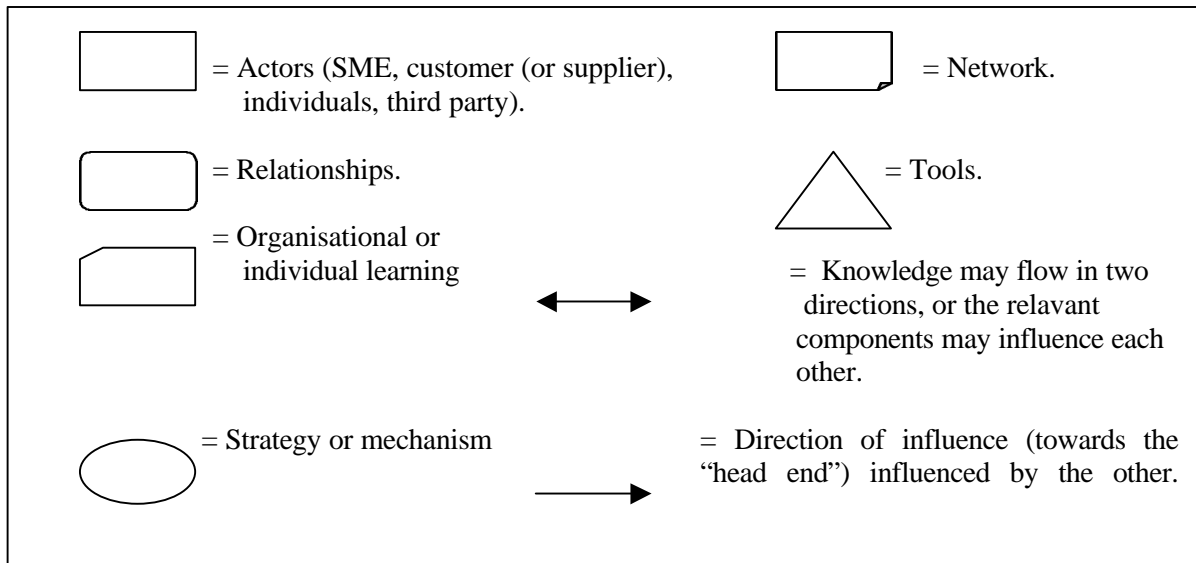
Customer or Supplier

Knowledge Transfer Strategy

Organisational Learning

Internal Mechanisms

Individual Learning

Tacit

Explicit

Oragnisational - Individual Relationship (Trust, Power)

Individual

Inter-Organisational Relationship (Trust, Power)

Social Network

Support Tools

Third Party

SME

Tacit

Explicit

Individual Learning

Oragnisational - Individual Relationship (Trust, Power)

Individual

Organisational Learning

Internal Mechanisms

Knowledge Transfer Strategy

Inter-Individual Relationship (Trust, Power)

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Figure 3: Key to Figure 2 - the meanings of the various symbols.

6. Conclusions

Based on the above theoretical development, some conclusions can be drawn as follows:

- Two extra factors, "expressiveness" and "power", are identified in this paper to be key factors influencing the effectiveness of the knowledge transfer between organisations (or individuals).
- Power and trust between organisations (i.e., SME, its customer (or supplier)) and their individuals constitute a co-ordinating mechanism of inter-organisational knowledge transfer which guides and influences the relevant actors' knowledge transfer behaviours. The inter-organisational knowledge transfer strategies may be developed on the basis of the co-ordinating mechanism.
- The framework shown in Figure 2 demonstrates key components, key factors and their relationships, contains the co-ordinating mechanism, and may help SMEs understand what components (or factors) and relationships they should concentrate on and take control of, so that the successful knowledge transfer may be achieved. It also shows that the knowledge transfer process is indeed highly complex.

7. Future Work

The framework presented here is a draft one, which will be evaluated and refined in further research. The specific work planned is as follows:

- Each component of the framework will be further detailed in both content and function. In particular, inter-organisational knowledge transfer strategies for SMEs will be developed; and some specific computer support tools will be proposed to facilitate knowledge transfer within an electronic network for SMEs.
- Two rounds of semi-structured interviews will be adopted to evaluate the framework, strategies and support tools. In each round, 5-10 SMEs which are involved in supplier-customer social networks will be selected (some of them are also involved in electronic

networks). Their managers will be interviewed and asked to comment on the framework, strategies and support tools. After the first round of interviews is finished, the framework, strategies and support tools will be revised based on the managers' comments. Then, the second round of interviews will be carried out, and the managers' perceptions and comments will be analysed and summarised.

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