

Efficiency in Inter-Organisational Learning

A Taxonomy of Knowledge Transfer Costs

Husman, Tina Brandt

Document Version

Final published version

Publication date:

2001

License

CC BY-NC-ND

Citation for published version (APA):

Husman, T. B. (2001). *Efficiency in Inter-Organisational Learning: A Taxonomy of Knowledge Transfer Costs*. LOK Research Center. CBS. LOK Working Paper No. 2/2001

[Link to publication in CBS Research Portal](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us (research.lib@cbs.dk) providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 01. Dec. 2021



Institut for Industriøkonomi og Virksomhedsstrategi

WP20001-4

**Efficiency in Inter-Organisational Learning:
A Taxonomy of Knowledge Transfer Costs**

Tina Brandt Husman

Efficiency in Inter-Organisational Learning: A Taxonomy of Knowledge Transfer Costs

Tina Brandt Husman
Department of Industrial Economics and Strategy
Copenhagen Business School
Howitzvej 60, 6.
DK-2000 Frederiksberg
Phone: +45 38 15 25 37
Fax: +45 38 15 25 40
Mail: tbh.ivs@cbs.dk

1st DRAFT
January 2001

Abstract

This paper investigates the market for knowledge by theoretically identifying the costs associated with transferring knowledge between two firms. An argument is put forward that inter-organisational knowledge transfer involves cognitive and incentive related costs. Determinants of knowledge transfer costs should be found in the *institutional arrangement* and *institutional environment* of a knowledge transfer. Cognitive costs arise if the firms' *knowledge transfer abilities*, that is, their absorptive and transmissive capacities, are low. Incentive related costs arise because of determinants in the institutional arrangement and environment, but are also outcomes of firms' different ways of solving cognitive problems. Understanding and trust is crucial for successful knowledge transfer relations. Firms can seek to promote understanding and trust in their institutional arrangement, whereas they have little influence on the environment.

Acknowledgements

The paper is written within the framework of the LOK Research Center (Management, Organization, Competence), and is part of the project managed by Mark Lorenzen, Copenhagen Business School. His insights, as well as useful comments provided by Henrich Dahlgren, Henrik Sornn-Friese and Mikkel Andreas Thomassen, are highly acknowledged.

Introduction

This paper provides a conceptual overview of the determinants of knowledge transfer costs. It focuses on knowledge transfer in inter-organisational relations rather than within an organisation. Inter-organisational knowledge transfer is closely related to inter-organisational learning, since often learning is an outcome of agents sharing knowledge. Hence, determinants of knowledge transfer costs may also be seen as costs associated with inter-organisational learning. The paper may serve as inspiration to business managers who aim at managing the costs of co-operation and hence boost chances of success of long-term relationships.

Because of market pressures such as competition firms increasingly specialise and therefore need to access (Milgrom and Roberts 1992) and co-ordinate with external resources. Resources outside the firms' own boundaries are gained access to either by spot contracting or by entering inter-organisational relationships. Inter-organisational relations are co-operative arrangements established between two or more firms, either vertically, that is, with contractors or customers, or horizontally in the value chain, that is, with "colleagues"¹. Opposed to spot contracting, long-term relationships provide an opportunity for a long lasting access to resources. This is one reason why a research interest has emerged in inter-organisational relationships (e.g. Hamel, Doz and Prahalad 1989; Drucker 1995). Particular attention has been devoted to external knowledge resources (e.g. Spender and Grant 1996; Inkpen 1998; Teece 1998). However, there are some complications in combining a resource and knowledge perspective with that of industrial networks. Much knowledge is firm specific and syncretic, and compared to physical resources it is often difficult to trade knowledge on the strategic factor markets (Barney 1986; Dierickx and Cool 1989; Maskell et. al. 1998). Ambiguity, asymmetrical distribution of information between seller and buyer about the knowledge (Maskell et. al. 1998) and difficulties in pricing it (Arrow 1962) characterise markets for knowledge. Because of such market imperfections concerning knowledge, this resource does not undergo ubiquitification, that is, a process converting local resources into being world wide accessible, to the same extent as many other resources do (Maskell 1999). Because much knowledge continues to be ambiguous and firm specific, it may still be a source of sustainable competitive advantage (Argote and Ingram 2000).

In spite of the imperfection of markets for knowledge this resource is still traded and exchanged between firms. However, the costs of doing so are little explored by researchers (Szulanski 1999). This paper aims to investigate the market for knowledge by theoretically identifying the costs associated with transferring knowledge between two firms. The paper falls in five parts. Section I accounts for elements in the knowledge transfer process

¹ For analytical purposes, throughout the paper the dyad is used for illustrating examples. Nonetheless, the findings have wider application since the cost determinants may arise also in relationships consisting of more firms.

as well as explains how firms' knowledge is affected in knowledge transfer processes. Section II defines knowledge transfer costs, while section III theoretically identifies determinants of knowledge transfer costs. The determinants are divided into those influencing cognitive costs and incentive related costs, respectively. Section IV and V are concluding parts.

I. Knowledge Transfer and the Firm

Knowledge transfer is necessary to firms, as this allows firms to access knowledge that is otherwise outside their reach. However, there are costs associated with knowledge transfer possibly lowering the extent of efficient knowledge transfer. Thus, keeping the transfer costs down must be in the firms' interest. A useful starting point for minimising the costs is to identify their determinants. Inspired by North (1990) and Williamson (1975; 1985), it is contended that cost determinants may arise in the *institutional arrangement*, which refers to the institutional framework of the firms' interaction, and in the *institutional environment*, that is, contextual characteristics under which the knowledge transfer process takes place.

To identify the determinants one needs to get a depiction of the *elements* of the knowledge transfer process. Most researchers see the knowledge transfer process as consisting of different phases starting with initiation and ending in implementation (e.g. Argote and Ingram 2000; Breshman et.al. 1999 and Szulanski 1996, 1999). Communication theory provides a useful perspective on the process of transferring knowledge². It examines elements such as *knowledge senders (S)* (the individuals or firms sending the knowledge), *knowledge contents (CO)* (the characteristics of the knowledge being transferred), *knowledge channels (C)* (the media through or by which the knowledge is transferred), and *knowledge receivers (R)* (the firms receiving the information). It is largely within the firms' reach to affect these elements. These elements constitute the *institutional arrangement*. Cost determinants to be found here are for example contracts and knowledge characteristics. In addition, the *external context (CT)* is considered, among others the geographical and the cultural, as influential on the determinants arising in the institutional arrangement³. For example, variances in the firms' national languages, national laws and norms may influence the cost determinants negatively. Such characteristics shape the context, or what in the following is referred to as the *institutional environment*. It is less possible for single firms to affect such environmental characteristics. The elements of the knowledge transfer process, as they are applied in this paper, are illustrated in Figure 1.1.

² Also Albino, Garavelli and Schiuma (1999), and Langlois and Garrouste (1994) have been inspired by communication theory to describe the knowledge transfer process or learning.

³ Apart from having renamed a few terms this largely corresponds with Shannon and Weaver's (1949) signalling metaphor, which specifies the basic elements of a transfer.

INSERT FIGURE 1.1

Figure 1.1 exemplifies how knowledge (CO) is transferred from knowledge sender (S) to knowledge receiver (R) by applying a knowledge channel (C). Besides possible knowledge transfer cost determinants emerging in these elements, factors in the knowledge transfer context (CT) may influence the determinants and thus whether knowledge transfer costs arise or not, as well as to what extent the costs possibly arise. One remark must be added. Figure 1.1 illustrates only the simplest form of knowledge transfer, frequently knowledge content (CO) will pass several sub-units/actors, possibly within both firms, prior to being transferred or received. The more sub-units to pass, the more likelihood of disturbances or "noise" to arise in the transfer process since more knowledge senders (S) and receivers (R) are involved.

Knowledge Stock and Knowledge Flow

What is being transferred in a knowledge transfer process? Drawing on Dierixck and Cool's (1989) work on strategic assets in general I argue that a distinction can be made between a firm's knowledge stock and knowledge flow. Knowledge stock is *the level of knowledge present in a firm at any point in time*, while the knowledge flow characterises *the flow of knowledge into and out of the knowledge stock*. Knowledge flow fulfils a *maintenance* function of the knowledge stock by changing, renewing, increasing (knowledge inflow) and/or decreasing (knowledge outflow) the stock. Inflow of knowledge is important since the knowledge stock is likely to decay or disappear over time (knowledge outflow). For example, knowledge outflow is decay of knowledge happening when employees possessing much knowledge leave, or if employees abolish existing working processes to adopt new ones (see section III Determinants of Knowledge Transfer Costs for examples of knowledge). The latter may also be termed *forgetting* or *unlearning* and can happen either intendedly or unintendedly⁴. Knowledge inflow is knowledge flowing into the stock for example from a partner firm or for example as an outcome of learning processes between employees within the firm⁵. Put differently, knowledge inflow and outflow regulate and maintain the *level* of the knowledge stock, that is, the number of knowledge "units". A firm thus should strive at *protecting its knowledge stock by minimising the unintended outflow*

⁴ It is important to note that knowledge outflow refers only to decay or disappearance of knowledge from the stock. It does not encompass knowledge transferred to a partner, since as will be argued, knowledge transfer in fact is knowledge sharing implying that knowledge sender will still be in possession of the knowledge although transferred to the partner.

⁵ One can argue that knowledge inflows may also happen unintendedly, for example if incorrect information or knowledge is received, and time is spent (wasted) working with it as its incorrectness is discovered too late. However, since this distinction has little influence on the arguments put forward here it is not examined further.

of the stock and optimising the inflow⁶. Also Dierickx and Cool (1989) and Reed and DeFillipi (1990) stress the importance of maintaining knowledge, or the factors that protect it.

The Transfer Process: Level and Value of Knowledge Stock

Besides the knowledge transfer process having an effect on the *level* of the stock, the *value* of the knowledge stock also is affected. The *market value*, that is, the “value per knowledge unit” of the knowledge stock too needs to be protected, since sharing knowledge implies a risk of ones knowledge shared being imitated, or misused, by the partner, which will ultimately result in a decrease in the market value of sender’s (S) knowledge stock⁷.

In a typical successful knowledge transfer process, the knowledge receiver (R) experiences an increase in the *level* of his or her knowledge stock without this leading to a deterioration of the *market value* of the knowledge sender’s (S) stock. The knowledge sender’s (S) *value* of his or her stock remains constant if the partner *uses*, rather than *misuses*, the knowledge transferred. The knowledge sender (S) also still possesses the knowledge (knowledge sender (S) simply shares the knowledge and still knows what he has just told his partner, therefore sharing does not affect the level of the sender’s (S) knowledge stock). The knowledge receiver’s (R) knowledge stock increases in the level since he or she did not have that particular knowledge prior to the transfer. (The *level* of the knowledge receiver’s (R) stock remains constant if for example the transfer process fails and no knowledge is taken in because of too high costs).

The ideal outcome for the firms involved in the knowledge transfer process of course is when both firms, in an exchange process where they both act as knowledge sender (S) and knowledge receiver (R), experience both an increase in the level and an increase in the value of their knowledge stocks. Since market conditions determine a possible value increase of the stock, firms can primarily see to that the value of knowledge does not decrease and that the level of knowledge increases. What can be concluded from this is that firms, besides aiming at keeping down knowledge transfer costs, must be aware of the risk of knowledge misuse when transferring knowledge.

The Knowledge Transfer Ability: Absorptive and Transmissive Capacity

Crucial for a successful outcome of a knowledge transfer process are the firms’ *abilities* to reach such an outcome. A knowledge sender (S) must be able and willing to hand over knowledge (for example by explaining or codifying knowledge the appropriate way) to

⁶ Not all knowledge residing in the knowledge stock is equally important to protect. Of particular importance to protect is the knowledge that contributes to giving the firm a competitive advantage.

⁷ Opposed to this the market value of the knowledge stock can also increase. This will be the case in the situation where market conditions change favourably to the knowledge stock, that is, an increased demand for that particular knowledge emerges leaving it a unique source of competitive advantage.

the knowledge receiver (R), who on the other hand must both be able and willing to receive and adopt the knowledge transferred. One can speak of a firm possessing a *knowledge transfer ability*. I argue that this ability consists of an *absorptive capacity* (Cohen and Levinthal 1990) and *transmissive capacity*, where the absorptive capacity refers to the ability, or capability, of the firms to *understand* the knowledge received from the partner, while the transmissive capacity refers to the ability of *transferring knowledge* to the partner, for example ensure knowledge is presented in a sufficiently codified form (see Section III Determinants of Knowledge Transfer Costs) possible for the receiver (R) to understand.

The knowledge transfer ability is closely related to the notion of *cognition*. Cognition refers to the human ability “to know” (De Wit and Meyer 1998). The knowledge that people possess is stored in what are referred to as cognitive maps or cognitive schemata (Anderson 1983; Schwenk 1988). The ability to know encompasses an ability to adopt information or knowledge, and transform it into new knowledge by understanding, storing and being able to apply it. This process requires that the individual taking in information or knowledge already possesses a knowledge-base with which to compare the new knowledge, that is, an *absorptive capacity* (Cohen and Levinthal 1990).

The higher the absorptive capacity, that is, the better the firm is at understanding the knowledge received, and the higher the transmissive capacity, that is, the better the firm is at preparing the knowledge for transfer (that is explain and codify it) and for transferring it, the smoother the knowledge transfer process. However, such high knowledge transfer abilities cannot always be expected. Figure 1.2 shows the absorptive and transmissive capacity of firms transferring knowledge from their knowledge stocks.

INSERT FIGURE 1.2

The transmissive capacity controls the outgoing knowledge, while the absorptive capacity manages the incoming knowledge. It is clear from the figure that the knowledge stock influences in particular how incoming knowledge is absorbed. This figure reflects a successful transfer process between two firms. As indicated, however, in reality knowledge transfer costs may lower the absorptive and transmissive capacities.

II. Knowledge Transfer Costs

Co-operating and transferring knowledge are associated with costs. Search costs, that is, time and money spend on finding the right partner firm, maintenance costs, that is, costs of maintaining the relationship, and the costs of establishing and using knowledge sharing mechanisms are examples. Although these costs may be considerable, a narrower focus on knowledge transfer costs is adopted in this paper. Basically, knowledge transfer costs refer to impediments for the knowledge sender (S) and/or knowledge receiver (R) to transfer

knowledge successfully between each other, that is, impediments to transfer, take-in and absorb the knowledge received. A distinction can be made between cognitive and incentive related knowledge transfer costs.

Cognitive Costs

Cognitive costs consist of *lost knowledge* for the knowledge receiver (R). Cognitive costs arise if the knowledge receiver (R) is unable to understand and absorb knowledge transferred to him or her because of disturbances to the knowledge transfer process that eventually has the result that important knowledge is lost. Cognitive costs may be high if for example knowledge, which is to be transferred, is not transformed into a sufficiently codified form possible for the knowledge receiver (R) to understand, that is, knowledge is tacit (for a closer discussion of tacitness see Section III Determinants of Knowledge Transfer Costs).

Incentive Related Costs

While cognitive costs means *losing knowledge* because of an inability of the parties to understand each other, incentive related costs consists of *time and money* spent by firms in relation to knowledge transfer, that is, transaction costs (Williamson 1975, 1985). Encompassed by this definition is the *value of the knowledge* being transferred. Since firms differ by nature (in resources and competencies (Penrose 1959)), they are likely to approach their cognitive problems differently. Knowledge transfer therefore also can be seen as a transaction problem where potential co-ordination and motivation problems exist (e.g. Williamson 1975, 1985; Milgrom and Roberts 1992). Their different ways to solve cognitive costs may enhance possible varieties in the firms' preferences and priorities, which ultimately may imply varieties in the firms' intent and incentives with staying in the relationship. Incentive related costs thus are measurable in *time and money*, and arise if partners get both *room and intent* to act opportunistically (Nooteboom 1999). Opportunism means that one, or both parties, tries to maximise his or her self-interest at the expense of the other party's benefit. For example, incentive related costs are if a partner misuses the knowledge received, which as mentioned implies deterioration in the value of the knowledge sender's (S) knowledge stock. Incentive related costs therefore also are cost spent by firms for safeguarding knowledge from deterioration. Put differently, *variances in firms' solutions to cognitive problems may lead to incentive related costs*.

Firms must strive at minimising the costs experienced with *understanding* each other (cognitive costs) in the transaction, while minimising the partner's *incentives* for opportunistic behaviour (incentive related costs). Section III identifies determinants of these different knowledge transfer costs.

III. Determinants of Knowledge Transfer Costs

The following presents a taxonomy of determinants of cognitive and incentive related knowledge transfer costs. Figure 3.1 and 3.2 provide an overview of the identified cost determinants. The distinction made between cognitive and incentive related knowledge transfer cost determinants is analytical. In reality interrelationships between the determinants exist, for example certain characteristics of knowledge may require a high frequency of interaction. Such interrelationships may increase costs, because determinants reinforce each other.

The distinction between the institutional arrangement and the institutional environment is maintained in this discussion. It is argued that firms in many cases can affect, or regulate, the determinants in the institutional environment giving them an opportunity to affect whether cognitive and incentive related knowledge transfer costs arise, while firms have little influence on the institutional environment.

A few points need to be stressed prior to the discussion. First of all, it should be noted that the paper presents just an indication of where costs *may* arise, of course not all inter-organisational relations will experience all of them and some relations may even experience other costs than those identified here. Also important to note is that the cost relationship experienced may change over time as the firms' relationship matures. For example, absorptive capacity is likely to increase with an increased interaction among the parties. The knowledge contents and channels may also change, as well as changes in the environmental context will influence costs in the longer run.

III.I Cognitive Costs in the Knowledge Transfer Process

Basically, cognitive costs refer to *loss of knowledge* because of an inability of the parties to understand each other. Each determinant of cognitive costs is accounted for in detail below. It appears from Figure 3.1 that determinants of cognitive costs may be found within all elements of the knowledge transfer process. The institutional environment, or context, has the function of influencing the determinants of the institutional arrangement.

Figure 3.1 Determinants of Cognitive Costs

Institutional Environment		
Institutional Arrangement		
Content (CO)	Channel (C)	Sender and Receiver (S)(R)
<ul style="list-style-type: none"> • Characteristics of Knowledge 	<ul style="list-style-type: none"> • Involvement in Knowledge Channel 	<ul style="list-style-type: none"> • Organisational Characteristics • Institutional Inertia • Frequency of Interaction • Knowledge Transfer Experience

III.I.a. The Institutional Arrangement

Characteristics of Knowledge (CO)

The characteristics of knowledge largely determine the ease with which the receiver (R) can understand the knowledge being transferred. The distinction between what can be termed *knowledge* and *information* respectively has been subject to considerable discussion in the literature. Knowledge differs from information by being "open-ended" and created ongoingly, while information is "closed" as it can be seen as derived from a specific set of data (Loasby 1986; Fransman 1998). Knowledge can be seen as an *institution* relative to information and knowledge is context-dependent in that it requires human *knowers*, where information does not require a human holder to be stored (Lorenzen 1999).

Causal ambiguity is what causes knowledge to be difficult to understand (Reed and DeFillippi 1990; Simonin 1999a). Defining ambiguity as *the basic ambiguity concerning the nature of the causal connections between actions and results* (Lippman and Rumelt 1982 p: 420), I will argue it is another expression for *tacitness*⁸ (Polanyi 1966). Polanyi states that "*we can know more than we can tell*" (ibid. pp: 4), and proposes a distinction between tacit and explicit knowledge. Tacit knowledge describes knowledge that is personal, context-specific, hard to formalise and communicate, whereas explicit, or codified, knowledge is transmittable in formal systematic language (ibid.). Thus, codified knowledge is structured in a way that makes it easier to store, reproduce, communicate and trade (Dosi 1988). Examples of tacit knowledge are skills and routines, while examples of codified

⁸ Warglien, in a paper presented at a LINK seminar at Copenhagen Business School in November 2000, suggests that the absorptive capacity (Cohen and Levinthal, 1990) of agents interacting, to a higher extent than the degree of knowledge's tacitness, is determining for knowledge to be transferred successfully. I do not subscribe to the view that absorptive capacity is a *more* essential determinant than tacitness (or others of the identified determinants) for knowledge transfer costs to arise. Rather, I believe the determinants must be seen in conjunction, for example tacitness affects the absorptive capacity, and as is obvious from this paper I point to several determinants, that may cause an unsuccessful knowledge transfer process, rather than one most contributing.

knowledge are product specifications, and knowledge encompassed in formal laws, rules and methods. The more tacit the knowledge, the higher the cognitive costs.

To ease understanding in a knowledge transfer process the knowledge to be transferred must be codified. Sometimes, however, codification of knowledge may be difficult. If for example formal rules (codified knowledge) are transferred from one firm to another, the knowledge sender's (S) particular interpretation of the rules (tacit knowledge) may not be transferred as the interpretation is firm specific, that is, a result of the sending firm's corporate culture, experienced employees using the knowledge etc. This phenomenon has also been referred to as *asset stock interconnectedness* (Dierickx and Cool 1989), *lacking transparency* (Grant 1991) and *complexity* (Reed and DeFillippi 1990).

Specificity sometimes also is a source of knowledge being hard to understand (Reed and DeFillippi 1990; Simonin 1999a). Specificity in essence refers to the Transaction Cost specificity, that is, *durable investments that are undertaken in support of particular transactions* (Williamson 1985 pp: 55); *transaction-specific skills and assets that are utilized in production processes and provision of services for particular customers* (Reed and DeFillippi 1990 pp: 89). Specificity may make knowledge tacit for the knowledge receiver (R), since it is designed specifically to match the knowledge sender (S). Nonetheless, the knowledge may still be useful for the knowledge receiver (R) for which reason attempts to transfer it are still beneficial.

These characteristics cause knowledge to be tacit and thus possibly leading to high cognitive costs (as will appear later, incentive related costs may exist primarily because of codified knowledge being transferred).

Knowledge Channel (CH)

Cognitive costs also depend upon the channel, through which knowledge is exchanged, that is, the relation between knowledge sender (S) and knowledge receiver (R). Knowledge sharing mechanism is another term for this channel. One can distinguish between public and private knowledge sharing mechanisms (Appleyard 1996). The public ones embrace mechanisms such as newsletters, the press, patent reviews, and the private ones comprise among others e-mail, telephone, face-to-face and meetings. Different options provided by the Internet such as the World Wide Web, communities, and Intra-net set-ups may also be characterised as a public knowledge sharing mechanism. As may appear, the degree of personal involvement associated with the different mechanisms vary, and a ranking may be possible to make on a scale of highly personal to highly impersonal mechanisms (one can see it as a varying degree of involvement by the parties in the particular mechanism).

Cognitive costs increase if the knowledge sender (S) or receiver (R) does not fully comprehend the knowledge sharing mechanisms used. The cognitive costs associated with

the knowledge sharing mechanism also depend on the nature of the knowledge content, in particular its characteristics. A good match between the knowledge sharing mechanism and the characteristics of the knowledge keeps the cognitive costs down. The more complex and tacit the knowledge, the greater the need for personal knowledge sharing mechanisms⁹. Codified knowledge can easily be transferred in impersonal channels, but face-to-face interaction is required if ambiguous, or highly tacit, knowledge is to be shared (Teece 1998). Part of the explanation for this is that the greater the face-to-face interaction, the faster a shared understanding is developed. Personal interaction makes it possible to agree upon when knowledge is codified sufficiently, one can see it as *common experiences* arising as a result of similarity in firm routines being developed. Firms' organisational designs (see below) may indicate whether primarily personal or impersonal knowledge sharing mechanisms are preferred when transferring knowledge. For example, employees in a small and young *adhocracy* (Minzberg 1993) in particular will co-operate closely and be familiar with highly personal knowledge sharing mechanisms, which may indicate also a preference for applying mechanisms requiring high personal involvement with partner firms.

Organisational Characteristics

The organisational structure influences a firm's absorptive and transmissive capacity and thus to increasing or decreasing the cognitive knowledge transfer costs. The absorptive capacity¹⁰ is indirectly affected by the organisational structure in the manner that the organisation's design contributes to making people more or less geared for adopting new knowledge and learn, and the transmissive capacity in the manner that the design influences employees' ability to transfer knowledge efficiently. For example, the communication structure within the firm, that is, the internal communication structure, may lead to cognitive costs. Both the knowledge sender (S) and the knowledge receiver (R) may suffer from this: if knowledge to be transferred have to pass too many sub-units within the firm before it can be transferred, its meaning and/or characteristics may have been transformed into a different meaning when finally ready to transfer. Also, knowledge received may not be spread out efficiently to those in need of it. To control the outflow of confidential knowledge, for example frequent access to a firm is allowed only via a contact point consisting of one single gatekeeper. However, research shows that, unless the knowledge and information exchange is very simple, the span of issues and technical

⁹ Although personal knowledge sharing mechanisms may be most suitable for a knowledge transfer situation there may be several reasons for this mechanism not being chosen, for example establishing and maintenance costs of the different mechanisms have to be taken into account before the mechanism to use is chosen.

¹⁰ The determinant of institutional inertia therefore also interrelates with the organisational design since inertia is an outcome of the employees', and thus organisational design's, ability to learn and take-in in new knowledge.

content often make a “single interface point” problematic (Baughn and Denekamp 1997). A single contact person’s insight may be insufficient to serve the partner firm, to pass on knowledge from colleagues to the partner, and/or to identify the right colleague to pass on to the knowledge receiver, the result may be cognitive costs experienced both by knowledge sender (S) and receiver (R). Some Japanese firms have efficient intra-firm technology transfer that can be ascribed a systematic company internal transfer of engineers that develop the communication networks (Baughn and Denekamp 1997).

Misfit between sub-units in firms transferring knowledge may cause cognitive costs. Knowledge being too embedded in sub-networks of people, tasks and tools complicates understanding because the knowledge sender’s (S) sub-networks are unlikely to match those of the receiver’s (R) organisation (Argote and Ingram 2000). Underlying these observations is that similarity in the organisational designs; co-ordination mechanisms and communication structure may reduce cognitive costs.

Institutional Inertia (S)(R)

A balance between comparing with the pre-existing knowledge base and abstracting from it is essential for agents to acquire new knowledge. Learning new knowledge implies an ability to *unlearn* what is already known, since otherwise existing procedures, principles and knowledge will govern, although this may be out-of-date. Lacking ability to abstract from existing irrelevant knowledge results in *institutional inertia* (Rumelt 1995), inflexibility and slow response time to adapting to internal or external changes (Hedberg 1981). Inertia, or inability to abstract from existing knowledge, thus is a cognitive cost for the *knowledge receiver (R)* in a knowledge transfer situation. The knowledge receiver (R) may be convinced that his or her existing way to conduct business is the optimal, and consequently he/she will not question the validity of this knowledge base or procedures. As Argyris (1991) terms it, no critical reflection upon own behaviour and contribution to corporate performance is made with the intention of changing it. A reason for such lack of self-critique may spring from the knowledge receiver (R) having rarely failed and thus learned to learn from failure (ibid.). Instead, the knowledge receiver (R) is focused upon problem solving, or single-loop learning, rather than double-loop learning (ibid.; Argyris and Schön 1996), hereby blocking against adopting new knowledge (ibid.). This problem may block individuals from learning both within an organisation as well as learning from partner firms¹¹. The more employees suffering from such inability to abstract from an existing, possibly invaluable, knowledge base, the higher the cognitive costs to take-in in

¹¹ The inability to abstract from existing knowledge may also derive from the firms’ approach to learning and adapting to changes. A firm may favour *market orientation*, hereby focusing upon adapting to external customer changes, while compared to this a *production orientation* may reflect a stricter focus on existing production and learning processes and less room for changes. A market versus production-oriented approach will be reflected in the organisational structures (Minzberg 1993), and hence is another example of how cost determinants are inter-related.

new knowledge to update the level of the knowledge stock. Referred to the knowledge stock and flow discussion institutional inertia implies that inflow of new knowledge is blocked.

Frequency of Interaction (S)(R)

The size of cognitive costs in taking in new knowledge depends on the frequency of interaction between the partners. The more frequent, the more intimacy is likely to be developed between the parties and the more understanding of the knowledge exchanged, and of the special language and organisational culture which will all affect the characteristics of the knowledge exchanged, is likely to be developed. In short, cognitive costs will decrease with an intensification of the frequency of interaction, that is, cognitive knowledge transfer costs are negatively correlated to the frequency of interaction¹². As will also appear from the next determinant a high frequency of interaction increases the parties' experience with each other, that is, a common experience is developed.

Knowledge Transfer Experience (S)(R)

Experience-related determinants in the institutional arrangement especially affecting cognitive knowledge transfer costs are knowledge receiver's (R) experience with the particular type of knowledge transferred, and knowledge sender (S) and receiver's (R) knowledge transfer experience with each other. The more experienced knowledge sender (S) and receiver (R), the more enhanced their absorptive and transmissive capacities, and the lower the cognitive costs.

As Simonin puts it "*learning is limited by the degree of experience of the knowledge seeker*" (Simonin 1999a p. 601). Bierly and Hämäläinen (1995) and Mowery et. al (1996) point to similar observations. What is referred to is what Cohen and Levinthal (1990) term absorptive capacity. Put differently, if the knowledge receiver (R) does not understand the *meaning* of the knowledge transferred, this reflects the receiver's (R) inexperience with that particular knowledge and thus a misfit of the knowledge with his or her absorptive capacity.

If the firms have previous experience with transferring knowledge with each other, they have developed a common experience. The more experience with each other, the lower the cognitive costs, since their knowledge transfer abilities will become more identical. Darr and Kurtzberg (2000) propose that strategic similarity between firms co-operating implies a close fit of knowledge structures in the organisations. Strategic similarity¹³, influences the ability to use knowledge acquired from partners (ibid.).

¹² Frequency is an example of a determinant that potentially leads to both cognitive and incentive related knowledge transfer costs (see Section III.II Incentive Related Costs in the Knowledge Transfer Process).

¹³ Strategic similarity refers to managers making similar business strategy choices (Darr and Kurtzberg 2000).

Therefore, cognitive costs are likely to be smaller if the knowledge receiver (R) is experienced with the knowledge transferred and if the partners have experience with each other.

This section showed how determinants in the institutional arrangement affect the rise of cognitive costs in the dyad, or rather the level of *inter-organisational understanding*.

III.I.b. The Institutional Environment

Researchers widely agree that geographical and cultural distances between firms potentially cause implications for their ability to co-operate (e.g. Gertler 1995; Hallén and Johanson 1985; Simonin 1999a). Thus, the institutional environment, that is, the knowledge transfer context, affects the cost determinants' nature and thus whether or not they lead to cognitive costs. Some firms, which have never met, may possess similar experiences, knowledge bases, and "*patterns of communication and interaction*" (Arrow 1973, pp.19). Such *shared experiences* are especially likely to exist if partners are located in the same geographical area, that is, have the *same* environmental context, but it is not a prerequisite. Darr and Kurtzberg (2000) stress that strategic similarity rather than geographical proximity is important for successful knowledge transfer. Thus, shared experiences may derive also from *similar* environmental contexts such as for example similar education systems. Such similarities provide the firms with a certain *understanding* for *member firms* of their particular context, as well as with *perceptions* of what is acceptable behaviour for member firms. Understanding and perceptions referred to here are termed *code keys* (Lorenzen 1998b) and *norms*, respectively, which are both examples of *focal points* (Shelling 1960). Focal points may be defined as actors' abilities to, without full information, predict in a specific situation an appropriate course of action, taking other relevant actors' expected behaviour into account.

A discussion follows of how the institutional environment influences on the cognitive cost determinants. Since code keys affect the level of understanding firms have for each other, for example possessing the same *code keys ease firms' communication and transfer of less explicit knowledge* (Lorenzen 1998b), the possible presence of code keys' are considered. Code keys emerge for example from the cultural and educational context (ibid.). Especially the cultural but also geographical characteristics are reflected upon.

Knowledge Content and Channel

Technological advancements in transport and communication have eased, or reduced the costs of, transferring codified knowledge (Lundvall 1995). Some geographical locations have more developed IT-infrastructure than others, for which reason parties transferring knowledge may have different experience with public knowledge sharing mechanisms

such as IT, which may lead to cognitive costs if IT is used as channel. Geographic and cultural proximity may ease the transfer of tacit knowledge. Product innovations are claimed to develop more easily for local partners than for geographically distant partners, since high interaction levels are required, and since social frameworks emerge, for example industry associations and local training courses, that transfer geographically concentrated tacit knowledge locally. Thus, this enhances knowledge transfer within local networks (Lorenzen 1998a; Maskell 1999). Through such local networks code keys are promoted.

If the partners are culturally very distant from each other, a high level of personal involvement from the parties may be required for keeping the cognitive costs down. Different cultures may also prefer certain knowledge sharing mechanisms to others. For example, a Universalist culture (rules focused) up against a Particularist one (relationship focused) (Trompenaars 1993) may prioritise contracts, trustworthiness and face-to-face interactions differently. As mentioned earlier, high personal involvement makes it easier to communicate and codify the knowledge sufficiently for the knowledge receiver (R) to understand it. Sweeny (1991) and Teece (1998) also stress that transfer of tacit knowledge requires face-to-face interaction.

Opposed to this, if the parties have some understanding of each other prior to transferring knowledge, for example if their cultural and educational backgrounds have certain similarities, which give them some shared experiences, and if language barriers are not a major obstacle, less personal knowledge sharing mechanisms may be sufficient for transferring knowledge without increasing cognitive costs.

Organisational Characteristics

Cultural and geographical differences may be hard to overcome, thus leading to high cognitive costs, since national specificities in firms' organisational structures and routines are likely to be retained, alone from the path dependency often visible in firms' learning patterns, which are cumulative in nature, as well as from their patterns of conflict and governance (Coriat and Dosi 1998). This statement partly shows how code keys may contribute to organisational distances between firms, as well as to path dependency. Institutional inertia may result from path dependency, since flexibility in adapting to some company internal and external changes may lack.

Knowledge Transfer Frequency and Experience

If the firms transferring knowledge are culturally distant from each other, it can be argued that there is a need of frequent interaction, at least in the beginning of their relationship. A high frequency ensures a quicker experience of the parties with each other, which may

ultimately reduce possible cognitive knowledge transfer costs. Put differently, a high interaction provides the firms with common experiences. The question is whether it is possible to maintain a high level of frequency if the parties are geographically distant from each other. Using public knowledge sharing mechanisms such as IT may be possible, but, as mentioned, culturally very different firms may need personal knowledge sharing mechanisms too to optimise understanding. Maintaining a frequent interaction level using personal knowledge sharing mechanisms may be hard for firms located very different geographically. This is one reason why researchers often claim that local knowledge transfer is easier than long distance knowledge transfer.

If firms are experienced with transferring knowledge to each other common code keys may cause some of this experience. Defining code keys as an outcome of cultural, educational and training activities experienced their relationship to firms' absorptive capacity and knowledge transfer experience is clear: Code keys contribute to shaping firms' absorptive capacity (Lorenzen 1998b) and their transmissive capacity. Since firms ongoingly make use of the code keys, the code keys contribute to generating knowledge transfer experience. The more experience the firms have with transferring knowledge in general, the lower their cognitive costs tend to be. The institutional environment affects firms' knowledge transfer experience in different ways. For example, both the knowledge sender (S) and the receiver (R), prior to meeting each other, may have experience with transferring knowledge to *other* firms, and with knowledge channels in general, which eases their future knowledge transfers (Simonin 1999b). These prior experiences may cause firms' prescripts for action to be similar as similar understandings of what are good and bad practices and routines are developed.

Similarity in firms' general knowledge transfer experiences may also be an outcome of the employees in the firms having attended similar training or education since here common code keys may also be established. For example, employees may have attended MBA classes different locations in the world, but some standardisation of their strategic thinking is achieved. Once the particular thinking and perceptions are not confined to single firms, they are collective, that is, social or cultural (Lorenzen 1998b). A variance of this example is if employees in firms, which eventually establish a relationship, appear to have visited for example the *same* local school. This will promote common code keys and eventually their understanding for each other. For example, the furniture industry in Northern Jutland (Salling in Denmark) educates apprentices at the Skive Technical school (Lorenzen 1999), which may promote their local knowledge transfer. As firms' general knowledge transfer experience eases their future transactions, their general knowledge transfer experience may contribute to reducing also the need for frequent interaction, although the interacting firms are located geographically distant.

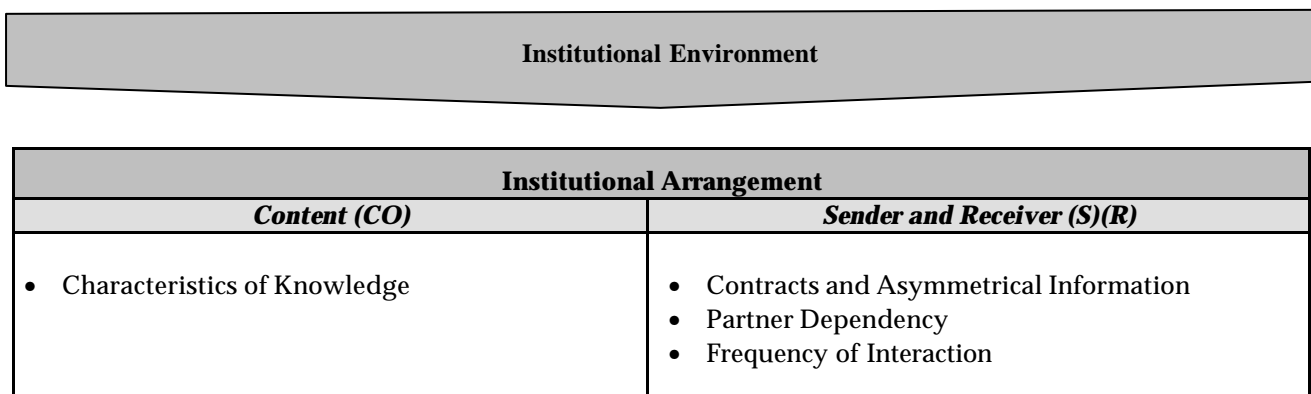
This section showed how determinants in the institutional environment affect the determinants hereby increasing or decreasing the cognitive costs. It can be argued that the

institutional environment affects how much *social understanding* exists, or is created, in the environment in which the firms interact.

III.II Incentive Related Costs in the Knowledge Transfer Process

Basically, incentive related costs consists of *time and money* spent by firms on knowledge transfer. A central aspect, however, is the cost of deterioration of the value of knowledge. Costs therefore are defined as *deterioration of value* of the knowledge stock, for example caused by a partner misusing knowledge transferred, as well as *costs resulting from safeguards made* against opportunism, such as for example contracts. Defined this way, incentive costs consist of both real costs associated with knowledge transfer, as well as of potential cost, or a risk, of deterioration of value of the knowledge stock. A partner's inclination to act opportunistically, by misusing knowledge received from the knowledge sending firm, abusing the knowledge received through hold up or by spilling over the knowledge received to competitors, as mentioned is determined by the partner's room, or scope, and intent towards opportunism (Nooteboom 1999). Transaction costs economics (Williamson 1975, 1985) stresses how room is influenced by firm size and legal tightness of agreements, the latter which again depends on uncertainty in the environment and asymmetrical information such as for example private information (Milgrom and Roberts 1992). Intent, on the other hand, is influenced by dependency among the partners, reputational effects and partner-specific inclinations towards opportunism, that is, his or her trustworthiness. The following identification of determinants of incentive related costs is inspired by these observations. Figure 3.2 provides an overview of the cost determinants that each will be accounted for in detail. The institutional environment influences the determinants of the institutional arrangement. Determinants of the incentive related costs are not considered in connection with the knowledge channel (C), since the major costs associated with knowledge channels are cognitive, or consist of time and money spent by the parties on involving in the channel. Hence the nature of these costs is not incentive related.

Figure 3.2. Determinants of Incentive Related Costs



III.II.a. The Institutional Arrangement

Characteristics of knowledge (CO)

As explained, codified and tacit knowledge is hard to separate from each other. However, since tacit knowledge is hard to transfer, as it is associated with high cognitive costs, primarily codified knowledge will be transferred in inter-organisational relations. This implies that especially the relatively easier understandable codified knowledge may provoke the partner to behave opportunistically increasing incentive related costs.

Incentive related costs arising from a risk of partner misusing knowledge are particularly high if confidential knowledge is transferred unintendedly to the partner. If a relationship is newly established the knowledge, that the knowledge sender (S) intends to transfer, is normally carefully selected from the knowledge stock. Sometimes, however, knowledge is transferred unintendedly, partly because of the intangibility of knowledge, and thus the difficulty of separating knowledge types from each other (see Section III.I Cognitive Costs in the Knowledge Transfer Process), and partly because of the number of contact points in the knowledge-sending firm being too enormous. Knowledge essential for the firm's competitive advantage is an example of knowledge firms wish to protect against misuse and thus keep confidential.

In general, knowledge sender (S) may be reluctant to transfer knowledge because of the risk of the partner's intent of opportunism and misuse of confidential knowledge exposed to him or her, or because of the risk that the partner may be leaking the knowledge to competitors (the spillover effect)¹⁴. On the other hand the knowledge receiver (R) may have an interest in receiving the confidential knowledge, and if it has a particular value for knowledge receiver (R) he or she may even have intent to act opportunistically. Whether misuse or spillover, however, will be the outcome depends on knowledge receiver's (R) available resources for misusing the knowledge and on sanctions possible associated with acting opportunistically.

Contracts and Asymmetrical Information

Formal contracts are one way to attempt to control risks at stake for partners in a relationship. More precisely, the purpose of the contract is to align incentives (Milgrom and Roberts 1992). However, contracts are only limitedly efficient as a protection

¹⁴ Spillover effects refer to a risk of core competencies leaking to competitors through the partner, that is, the partner by intent collects information and knowledge for the purpose of passing it on to competitors (Nooteboom, 1999). However, this leaking may also happen unintendedly. Spillover effects may sometimes also imply benefits for the firm knowledge leaks from. For example, word of mouth can be a useful marketing tool contributing to enhancing a firm's reputation and seed future customers (the reverse of course may also be the outcome), or maybe aid new players entering a market to establishing itself and a network.

mechanism. This is partly because of the effect they have on the *atmosphere* between the parties, and partly because of *behavioural* and *environmental uncertainties*. These factors increase transfer costs in spite of contracts.

A contract can have a negative effect on the atmosphere between the parties. A vicious circle of distrust may develop, leaving the partners to accumulate constraints on each other's actions (Nooteboom 1999). Many firms thus avoid formal contracts (Macaulay 1963).

Contracts regulating all possible eventualities are impossible to create because of behavioural and environmental uncertainties, or risks. Behavioural uncertainty refers to intentions and competencies of partner firms. Environmental uncertainty refers to environmental conditions that affect execution of agreements and outcomes of cooperation (Nooteboom 1999). Efficiency of contracts as protecting against opportunistic behaviour therefore is limited, and contracts leave room for opportunistic behaviour. One example of behavioural uncertainty relevant to mention is the fact that contracts can be breached. This may be both by a firm's own employees, benefiting the partner, or by the partner firm. In many cases top management sets the legal parameters for what knowledge should be exchanged with a partner. However, often the important deals of what *is* in fact shared and *with who* are made on lower organisational levels than where the contract was originally designed (Hamel, Doz and Prahalad 1989). Such a disrespect of the contract arises since the sanctions, or consequences, of not complying with the contract are perceived as being smaller than the benefits of breaching it. Thus, no credible commitment (Williamson 1983) is made, leading to a Prisoner's Dilemma problem (Dixit and Nalebuff 1991; Milgrom and Roberts 1992; Holmqvist and Maravelias 1998), where the parties each speculate to predict the other party's behaviour, and take this expected behaviour into account before making his or her own move. In this example, the employees' incentives for breaching the legal restrictions are greater than they are for complying with them (the employees practise self interest-seeking behaviour with guile).

Whether the alliance structure of the inter-organisational relations is contractually based or not also determines incentive related costs. Inter-organisational relationships based on equity arrangements, for example Joint Ventures, promote knowledge transfer better than do for example licensing agreements, since more tacit knowledge embedded in the organisation is likely to be transferred (Kogut 1988). An explanation for this must be found in that residual rights of control and residual returns (Milgrom and Roberts 1992) are shared equally by both parties in equity based arrangements, as opposed to licensing agreements where the control rights and returns are separated. This gives licensee higher incentives for acting opportunistically. Equity based relationships therefore may be seen as associated with less incentives for acting opportunistically, that is, less incentive related costs. All in all, knowledge sender (S) and knowledge receiver (R) must be careful when

using formal contracts, and strive at minimising the partner's incentives for not complying with the contract.

Partner Dependency (S)(R)

Knowledge sender (S) and receiver (R) may be highly dependent on each other for various reasons. Being highly dependent on a partner makes a firm vulnerable to opportunistic behaviour by the partner. If the dependency is not mutual, a power imbalance exists with one party being superior in bargaining power to the other, leaving the subservient party to potentially experience incentive related costs of for example knowledge misuse and thus deterioration of its value.

Opposed to this, a power balance may exist between the knowledge sender (S) and receiver (R). The knowledge receiver (R) may be equally dependent on knowledge sender (S), and *mutual dependency* thus exists that gives both parties low incentives and intent to act opportunistically (as mentioned the risk of opportunism to arise depends on room and intent). For example, partners are dependent on each other if sunk costs (Begg et.al. 1991) in the relationship are made, that is, relation specific investments are made. Relation-specific investments refer to capital investments such as specialised physical production capital and specialised training of personnel made specifically for the relationship with the partner (Williamson, 1990). Once the relationship is terminated the investments are lost. This is a classical example of the hold-up problem (Milgrom and Roberts 1992). Put differently, relation-specific investments imply high switching costs (Williamson 1975), often forcing partners to remain together. The below examples illustrate power imbalances between firms and thus when incentive related costs may be high.

Knowledge sender's (S) dependency upon the partner may be high, and thus its incentive related costs potentially high, if for example knowledge sender (S) lacks alternative providers to important production resources (Baughn and Denkamp 1997). Power imbalance may also exist if the firms differ significantly in size (Nooteboom 1999), for example a small firm contributing with innovations may fear misuse of these, of its technology, or ultimately of a take-over by its larger partner firm (Baughn and Denkamp 1997).

The power balance may also change if one party suddenly is granted resource support from its host government such as multinational corporations sometimes experience with partners in foreign countries (Baughn and Denkamp 1997). If a firm relies on its partner for conducting production tasks that contribute to competitive advantage, a high dependency also exists that will leave to high incentive related costs if the partner chooses to act opportunistically.

Frequency of Interaction (S)(R)

Frequency of interaction is an essential determinant for incentive related costs. Trust increases with the frequency of interaction (Dyer and Chu 2000). This may be explained with that initially, routines may form a basis for trust being established to a particular partner (Lorenzen 1999), that is, *inter-organisational trust*. With increasingly frequent interaction the parties experience that the other does not act opportunistically. This implies that an expectation is developed that in the future opportunism will not happen too (ibid.). Put differently, routines give personal trust to a particular partner. Therefore, a relation can be deduced that the more frequent the interaction, the more trust may arise and the less strong gets the *perception* of opportunism being a risk. Continuing to cooperate, develop common routines and experience that no opportunism happens implies that routines teach the parties both to trust and to behave, that is, be trustworthy (ibid.). From this springs, that *incentive related costs are reduced with an increase in the frequency of interaction*, since trust arises that opportunistic behaviour by the partner (knowledge receiver (R)), resulting in an economic loss for knowledge sender (S), does not happen.

Having determined this important role of frequent interaction, its relation to formal contracts appears. If interaction between parties cannot be frequent, for example because of very distant geographical locations, and if trust thus cannot be established via interaction, contracts sometimes are used by firms to safeguard themselves against opportunism. That is, if the parties do not trust each other formal regulations such as contracts, although their limited efficiency, are often seen as a protection against opportunistic behaviour.

Frequency of interaction is also interrelated with partner dependency. Sunk costs in a relationship reflect a high dependency level between the parties, but also that the parties may interact regularly. It may be that the relationship specific investments, and dependency, do not necessitate a frequent interaction. Nonetheless, often this tends to be the case (Williamson 1990)¹⁵.

This section showed how determinants in the institutional arrangements affect the incentive related costs by increasing or decreasing them. Reflecting upon the determinants it can be concluded that *inter-organisational trust* seems to have the function of reducing the incentive related costs in the knowledge transfer process.

III.II.b. The Institutional Environment

Similar to affecting cognitive costs the environment may influence the determinants of incentive related costs. Nooteboom (1999) states that uncertainty in the environment gives

¹⁵ Frequency of interaction is also interrelated with knowledge content. The more tacit the knowledge to be transferred, the more personal the knowledge sharing mechanism, and the more frequent the interaction needed.

room for opportunism and thus contributes to incentive related costs. The environment may, however, also be with low uncertainty thus not increasing incentive related costs. Low uncertainty may be for example if the knowledge transferring firms are positioned in the *same* geographical or cultural context, or in other ways are exposed to *similar* contexts, as this may provide the parties with shared experiences, for example *norms* of what is considered good and bad behaviour for members of similar or the same environment. If associated with a credible commitment, such ingrained *norms may contribute to keeping the incentive related costs down* both in the dyad but also between the member firms, as the norms have the effect of regulating firms' behaviour. A credible commitment is achieved if the sanctions of not committing are considered higher than the costs of committing. For example, within an industry a credible commitment may be if a firm's reputation is harmed as this may damage future sales. Norms thus give firms a sense of *trust* that other members will act in accordance with the norms and not behave opportunistically, that is, *social trust* exists (Coleman 1984). This is also termed *ascriptive trust*, and when firms establish new relations their inter-organisational trust often originates from this trust (Lorenzen 1998a).

Below the geographical, cultural and industrial context, and the possible presence and contribution of shared norms to increasing or decreasing incentive related costs, are discussed.

Knowledge Content

If no shared experience of what is good behaviour exists between the firms, or if there is no commitment to the norms possibly existing, incentive related costs may be high. Trust between the parties may be low for which reason knowledge sender (S) should be especially careful that highly confidential knowledge is not transferred to the partner, since if he or she has intent to act opportunistically, he or she has room for doing so, at least norms are not hindering him or her in spilling over knowledge to competitors or misuse it. It has been found that Western firms co-operating internationally tend to contribute with highly codified skills, which are relatively easy to misuse (Hamel et al. 1989)¹⁶. Thus, Western firms ought to safeguard themselves against such risk of opportunism if no common norms and social trust exist to minimise opportunism. Baughn et. al. (1997) found that oriental and other collectivistic cultures distinguish between *insiders* and *outsiders* consciously limiting access to tacit information for outsiders. This may illustrate distrust from collectivist cultures to outsiders, which may be because of lack of shared experiences between parties.

¹⁶ Hamel, Doz and Prahalad (1989) propose the example of manufacturing excellence often provided by Asian firms as being less easy to transfer and imitate for a non-Asian partner.

If shared norms of good behaviour exist between the firms, and are credibly committed to, confidential knowledge, or other knowledge transferred unintentionally to the partner, may not be misused. For example, reputational effects may cause the partner to not behave opportunistically, since, if the partner gets known as unreliable, it will jeopardise his or her future transactions (Nooteboom 1999). An assessment of the partners' morals and treatment of previous partners will indicate his or her inclination towards opportunism.

Contracts and Asymmetrical Information

If no cultural experience and norms are shared between firms the social trust between them may also be low. If such two firms in a context without social trust transfer knowledge, and they have only little inter-organisational trust to reduce their intent to act opportunistically, formal contracts may be an alternative way to outline rules for how to behave and thus to safeguard against for example misuse of knowledge (although, as pointed to, contracts may be limitedly efficient). The perception whether or not contracts are a *good* way to safeguard against opportunism, however, may be culturally determined too. A contractual approach to achieve co-operation is frequently applied in Anglo Saxon societies, while trust is widely used in Asia and a *hostage* approach often has been used in the past (Choi et.al. 1993). However, one can question how often such knowledge transfer relations without shared experiences and a minimum level of trust exist in reality.

If shared experiences, norms and some social trust exist between firms in a region, for example since reputational effect matters, and if contracts are commonly used for achieving co-operation in the region, such cultural characteristics will influence the dyad. If both firms, for example, are from the same region contracts are likely to be accepted for regulating the relationship. As mentioned firms, at least in the Western world, tend to use contracts when co-operating. However, if the level of inter-organisational trust is high, one may discuss whether or not contracts are necessary to use as the norms of how to behave already have some effect of safeguarding against opportunism. Thus, since major disagreements may not be expected contracts in such situations can be argued to have primarily a symbolic effect of reminding each other that sanctions *do* exist should such be needed.

Partner Dependency and Frequency of Interaction

If no shared norms exist, or are committed to in the industrial context of the firms interacting, and no social trust thus exist, being highly dependent on a partner who is this geographically, or at least culturally, distant may be a dangerous cocktail. Research supports this view pointing to that the cost of achieving information about a potential

partner firm is higher if the parties are not geographically proximate to each other, and the cost of information being low if the partner is local (Hallén and Johanson 1985; Lorenzen 1998a). The costs of such information are high because it is not easily accessible. Consequently, *ceteris paribus* a high risk may be at stake when firms are located geographically, or at least culturally, distant places.

If firms in the dyad have no shared norms, their need for establishing trust is high. Frequent, and personal, interaction may contribute to establishing this trust. However, as noted already such interaction may be expensive for the firms if their locations are very distant from each other.

Opposed to this if social trust exist in the industrial context of the dyad this may add to their possible inter-organisational trust and the incentive related costs may be low. Hence, partner dependency may be less risky, for example, misuse of knowledge may not happen because of a high level of trust, dependency in the relationship is mutual or because of reputational effects. In such situations a high frequency of interaction may be of less importance.

Generally, the institutional environment may contribute to establishing *social trust* and thus affect the size of the incentive related knowledge transfer costs.

IV. Summary

The paper has outlined determinants of cognitive costs and incentive related costs when knowledge is transferred between firms with the purpose of generating new knowledge and learn from each other. Thus, the paper makes a theoretical contribution, but may also function as a framework of relevance for managers.

It was found that a firm possesses an absorptive and a transmissive capacity that constitutes its ability to successfully transfer knowledge, that is, the abilities facilitate the knowledge transfer. Whether the knowledge transfer process will work smoothly or not depend on the knowledge transfer costs experienced. The paper identified determinants of cognitive and incentive related knowledge transfer costs respectively.

Whether cognitive costs arise or not largely depends on the characteristic of the knowledge transferred, the level of involvement in the mechanisms, or channel, used for sharing the knowledge, on the firms' organisational characteristics, whether or not the knowledge receiver (R) suffers from institutional inertia, on the parties' frequency of interaction and on their knowledge transfer experiences.

Firms' differences may lead to incentive related costs. The discussion revealed that determinants of the incentive related costs are the characteristics of the knowledge transferred, the efficiency of the contracts designed for knowledge sender (S) and receiver (R), the dependency of the parties on each other, and the frequency of their interaction.

It was argued that determinants are found in the institutional arrangement and can be influenced by firms themselves while determinants in the institutional environment, that is, the contextual characteristics, are hard for the firms to influence. Thus, a distinction between these two institutional levels was made. The cost determinants in the institutional arrangement expressed the level of understanding (cognitive costs) and trust (incentive related costs) in the dyad, while the institutional environment reflected the level of understanding and trust in the industrial context of the dyad. The determinants of knowledge transfer costs can be summarised as in Figure 3.3.

Figure 3.3 Determinants of Knowledge Transfer Costs

Institutional Environment			
Institutional Arrangement			
	<i>Content(CO)</i>	<i>Channel (C)</i>	<i>Sender and Receiver (S)(R)</i>
<i>Cognitive Costs</i>	<ul style="list-style-type: none"> • Characteristics of Knowledge 	<ul style="list-style-type: none"> • Involvement in Knowledge Channel 	<ul style="list-style-type: none"> • Organisational Characteristics • Institutional Inertia • Frequency of Interaction • Knowledge Transfer Experience
<i>Incentive Related Costs</i>	<ul style="list-style-type: none"> • Characteristics of Knowledge 	-	<ul style="list-style-type: none"> • Contracts and Asymmetrical Information • Partner Dependency • Frequency of Interaction

V. Concluding Remarks

It appears that an underlying dilemma exists in a knowledge transfer situation. Firms on the one hand wishes to reap the benefits of knowledge transfer, that is, receiving and generating new knowledge, while on the other hand they wish to protect their existing knowledge base, that is, to minimise the costs of co-operating.

In an attempt not to reveal too much knowledge, firms may implement safeguards, or *protection mechanisms*, to protect their knowledge stock against decreasing in level and/or in value, that is, deliberately or not, firms may hold a protectionist behaviour. Therefore, it can be argued that managers themselves may push up knowledge transfer costs. Protection mechanisms, however, hinder a smooth flow of knowledge between the firms since they, similar to cost determinants, function as a protection filter that

knowledge, which are to be transferred or received, needs to pass¹⁷. The whole puzzle of inter-organisational knowledge transfer therefore is to *strive for a balance between not revealing too much knowledge and maximising the knowledge in-take from the partner(s)*.

Having claimed this, however, another observation must be explicated: *Protection mechanisms may be relevant only until trust is established*. The reasoning behind this is the notion that the more experienced firms are with sharing knowledge with each other, the lower their cognitive and incentive related costs tend to be. As mentioned, firms' cognitive costs have a tendency to decrease over time and firms tend to develop routines for *best practice* of transferring knowledge, which increases the level of *inter-organisational trust*. Trust eases future transactions and may have the effect of decreasing incentive related costs (but, as was also pointed to, as the relationship matures new determinants may arise and lead to transfer costs, nonetheless the existing level of inter-organisational trust may also contribute to reducing them). The general conclusion, therefore, may be that *if incentive related costs tend to decrease within the relationship, so must the need for protection against opportunistic behaviour from the partner decrease*. That is, over time trust seems to replace protection mechanisms within a particular relationship.

The second observation thus seems to resolve the above outlined dilemma of how to balance acquisition of new knowledge with exposition of own knowledge. *A balance seems to be reached within a dyad where a sufficient level of inter-organisational trust have been established*¹⁸. Nonetheless, if the social trust is limited, that is, trust to other firms in the industrial context is low, protection mechanisms may still prove relevant for safeguarding against these firms' possible opportunistic behaviour.

¹⁷ Sometimes protection mechanisms are inefficient that results in knowledge being transferred from the stock unintendedly. This may be illustrated in Figure 1.2 as firms' having protection filters with holes.

¹⁸ At what particular point trust is considered sufficient by the parties may vary from relationship to relationship, and be affected for example by managers' risk aversion, but this need to be examined further on a future research agenda.

References

- Albino, V., C. Garavelli and G. Schiuma (1999): Knowledge Transfer and inter-firm relationships in industrial districts: the role of the leader firm, *Technovation*, 19: 53-63
- Anderson, J.R. (1983): *The Architecture of Cognition*, Harvard University Press, Cambridge, MA.
- Appleyard, M.M. (1996): How Does Knowledge Flow? Interfirm Patterns in the Semiconductor Industry, *Strategic Management Journal*, 17: 137-154. (Winter Special Issue)
- Argote, L. and Ingram, P. (2000): Knowledge Transfer: A basis for competitive advantage in firms, *Organizational Behavior and Human Decision Processes*, 82/1, May: 150-169
- Argyris, C. (1991): Teaching Smart People to Learn, *Harvard Business Review*, May-June: 99-109
- Argyris, C. and Schön (1996): *Organisational Learning: A Theory of Action Perspective*, Addison-Wesley Publishing Company
- Arrow, K.J. (1962): *Economic welfare and the allocation of resources for invention*, in *The Rate and direction of inventive activity*. Nelson (ed.). Princeton
- Arrow, K.J. (1973): *Information and Economic Behaviour*. Stockholm: Federation of Swedish Industries
- Barney J. B. (1986): Strategic Factor Markets: Expectations, Luck and Business Strategy, *Management Science*, 32:1231-1241
- Baughn, C., Denkmamp, J., Stevens J. and R. Osborn (1997): Protecting Intellectual Capital in International Alliances, *Journal of World Business*, 32/2: 103-117
- Begg, D., S. Fischer, R. Dornbusch (1991): *Economics*, 3rd ed., Berkshire: McGraw-Hill International (UK) Limited
- Bierly, P.E. and T. Hämmäläinen (1995): Organizational Learning and Strategy, *Scand. J. Mgmt*, 11/ 3: 209-224

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

Choi, C.J, Grint, K. and B. Hilton (1993): *Achieving Co-operation: Contracts, trust and hostages*, Templeton College, MRP22/93

Cohen, W. M. and D. Levinthal (1990): Absorptive capacity: A new perspective on learning and innovation, *Administrative Science Quarterly*, 35/1: 128-152

Coleman, J.S. (1984): Introducing Social Structure into Economic Analysis, *American Economic Review*, 74/2: 84-88

Coriat, B. and Dosi, G. (1998): *Learning how to Govern and Learning how to Solve Problems: On the Co-Evolution of Competences, Conflicts and Organisational Routines*, in *The Dynamic Firm: The Role of Technology, Organization, and Regions* (1998), Chandler, A., Jr., P. Hagstöm and Ö. Sölvell (eds.), Oxford: Oxford University Press,:103-133

Darr, E.D. and Kurtzberg, T.R. (2000): An Investigation of Partner Similarity Dimensions on Knowledge Transfer, *Organizational Behavior and Human Decision Processes*, 82/1, May: 28-44

De Wit, B. and R. Meyer (1998): *Strategy: Process, Content, Context – An International Perspective*, London UK: ITP

Dierickx, I. and K. Cool (1989): Asset Stock Accumulation and Sustainability of Competitive Advantage, *Management Science*, 35/12: 1504-1511

Dixit, A.K. and B.J. Nalebuff (1991): *Thinking Strategically*, W.W. Norton & Company, Inc., New York

Dosi, G. (1988): Institutions and markets in a dynamic world, *The Manchester School of Economics and Social Studies*, 61/2: 119-146

Drucker, P. (1995): The Network Society, *Wall Street Journal*, March 29, 1995: 12

Dyer, J.H and W. Chu (2000): The Determinants of Trust in Supplier-automaker Relationships in the U.S., Japan, and Korea, *Journal of International Business Studies*, 31/2: 259-285

Fransman, M. (1998): Information, knowledge, vision and theories of the firm, in *Technology, organization, and competences*, G. Dosi et al (eds.), London: Oxford University Press

Gertler, M.S. (1995): Being There: Proximity, Organization, and Culture in the Development and Adoption of Advanced Manufacturing Technologies, *Economic Geography*, 71: 1-27

Grant, R.M. (1991): The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation, *California Management Review*, 33/3: 114-135

Hallén, L. and J. Johanson (1985): Industrial Marketing Strategies and Different National Environments, *Journal of Business Research*, 13: 495-509

Hamel, G., Doz, Y. and C.K. Prahalad (1989): Collaborate with your Competitor - and win, *Harvard Business Review*

Hedberg, B.L.T. (1981): *How organisations learn and unlearn*, in *Handbook of Organizational Design*, Nystom, P.C. and W.H. Starbuck (eds), 1, New York: Oxford University Press

Holmqvist, M. and C. Maravelias (1998): Imaginary Organisations: Effective Partner Interactions Through Strategic Use of Trust, *Beyond Convergence*, 12th Biennial Conference

Inkpen, A.C. (1998): Learning and knowledge acquisition through international strategic alliances, *The Academy of Management Executive*, Ada: November 1998

Kogut, B. (1988): Joint Ventures: Theoretical and empirical perspectives. *Strategic Management Journal*, 9: 319-322

Langlois, R. and Garrouste, P. (1994): *Cognition, Redundancy, and Learning in Organizations*, Paper presented for the conference on Evolutionary Economics and Technological Change, Strasbourg, October 6-8, 1994

Lippman, S. and Rumelt, R. P. (1982): Uncertainty imitability: An analysis of interfirm differences in efficiency under competition, *Bell Journal of Economics*, 13: 418-438

Loasby, B.J. (1986): *Organisation, Competition, and the growth of knowledge*, in *Economic as a process: Essays in the new institutional Economics*, Langlois, R.N. (ed.) Cambridge: Cambridge University Press

- Lorenzen, M. (1998a): *Information cost, Learning, and Trust. Lessons from co-operation and higher-order capabilities among geographically proximate firms*, DRUID Working Paper No. 98-21, Aalborg University.
- Lorenzen, M. (1998b): *A "higher-order" knowledge base for trust in Specialisation and Localised Learning*, Lorenzen, M. (eds), Copenhagen: Copenhagen Business School Press
- Lorenzen, M. (1999): *Localised learning and community capabilities: On the organisation of knowledge in markets, firms, and communities*, Copenhagen: Samfundslitteratur
- Lundvall, B-Å. (1995): *The Learning Economy – Challenges to Economic Theory and Policy*, Paper presented at EAEPE-Conference in Copenhagen 27-29 October 1994.
- Macaulay, S. (1963): *Non-contractual Relations in Business: A Preliminary Study*. *American Sociological Review*, 28: 55-67
- Maskell, P., Eskelinen H., Hannibalsson I., Malmberg A., and E. Vatne (1998): *Competitiveness, Localised Learning and Regional Development*, London: Routledge.
- Maskell, P. (1999): *Globalisation and Industrial Competitiveness: The Process and Consequences of Ubiquitification*, in *Making Connections: Technological learning and regional economic change* by E. J. Malecki and P. Oinal (eds), Ashgate
- Milgrom, P. and J. Roberts (1992): *Economics, Organisation and Management*, Prentice Hall International Editions, New Jersey, US
- Minzberg, H. (1993): *Structures in Five: Designing Effective Organizations*, New Jersey, US: Prentice-Hall, Inc.
- Mowery, D.C, J. E. Oxley, B. Silverman (1996): *Strategic Alliances and interfirm knowledge transfer*, *Strategic Management Journal*, 17: 77-91, Winter Special Issue
- Nooteboom, B. (1999): *Inter-firm Alliances*, New York: Routledge
- North, D. C. (1990): *Institutions, institutional change and economic performance*, Cambridge: Cambridge University Press
- Penrose, E. (1959): *The Theory of the growth of the firm*, Oxford, Oxford University Press

Polanyi, M. (1966): *The Tacit Dimension*, Gloucester, Mass., Peter Smith – reprinted 1983, by arrangement with Doubleday & Company, Inc.

Reed, R. and R.J. DeFillippi (1990): Causal Ambiguity, Barriers to Imitation and Sustainable Competitive Advantage, *Academy of Management Review*, 15/1: 88-102

Rumelt, R. (1995): *Inertia and Transformation*, in *Resource-based and evolutionary Theories of the firm: Towards a synthesis*, Montgomery, C. (ed), Norwell, MA: Kluwer Academic Publishers

Schelling, T.C. (1960): *The Strategy of Conflict*. Harvard University Press. Cambridge 1960

Schwenk, C.R. (1988): *The Essence of Strategic Decision Making*, Lexington, MA: Lexington Books

Shannon, C.E. and W. Weaver (1949): *The Mathematical Theory of Communication*, Chicago: Illinois: University of Illinois Press

Simonin, B.L. (1999a): Ambiguity and the process of knowledge transfer in strategic alliances, *Strategic Management Journal*, 20: 595-623

Simonin, B.L. (3rd Quarter, 1999b): Transfer of Marketing know-how in international strategic alliances: An empirical investigation of the role and antecedents of knowledge ambiguity, *Journal of International Business Studies*, 30/3: 463-490

Spender, G. and Grant, R. (1996): Knowledge and the Firm: Overview, *Strategic Management Journal*, 17: 5-9, Winter Special Issue

Sweenye, G.P. (1991): Technical Culture and the Local Dimension of Entrepreneurial Vitality, *Entrepreneurship & Regional Development*, 3: 363-378

Szulanski, G. (1996): Exploring internal stickiness: Impediments to the transfer of best practice within the firm, *Strategic Management Journal*, 17: 27-43, Winter Special Issue

Szulanski, G. (1999): The Process of knowledge transfer: A diachronic analysis of stickiness, *Prepared for OBHDP*, June 14, Special issue on Knowledge Transfer

Teece, D.J. (1998): Capturing value from knowledge assets: The new economy, markets for know-how and intangible assets, *California Management Review*, 40/3: 55-79

Trompenaars, F.(1993): *Riding the waves of culture - understanding cultural diversity in business*, London: Economist Books

Warglien, M. (2000): *Knowledge representation and the theory of the firm: notes for a modelling strategy*, Ca' Foscari University of Venezia and Cognitive Science Lab., Rovereto, paper presented at LINK seminar at Copenhagen Business School, Nov 22, 2000

Williamson, O. E. (1975): *Markets and hierarchies*, New York: The Free Press.

Williamson, O.E. (1983): Credible Commitments: Using Hostages to Support Exchange. *American Economic Review*: 519-540

Williamson, O. E. (1985): *The economic institutions of capitalism*, New York: The Free Press.

Williamson, O. E. (1990): *Transaction-Cost Economics: The Governance of Contractual Relations*, in *The Firm as a Nexus of Treaties* by Aoki, M., Gustaffson, B. and Williamson, O.E. (eds), London: Sage

Appendix 1: Figures

Figure 1.1: Elements in the Knowledge Transfer Process

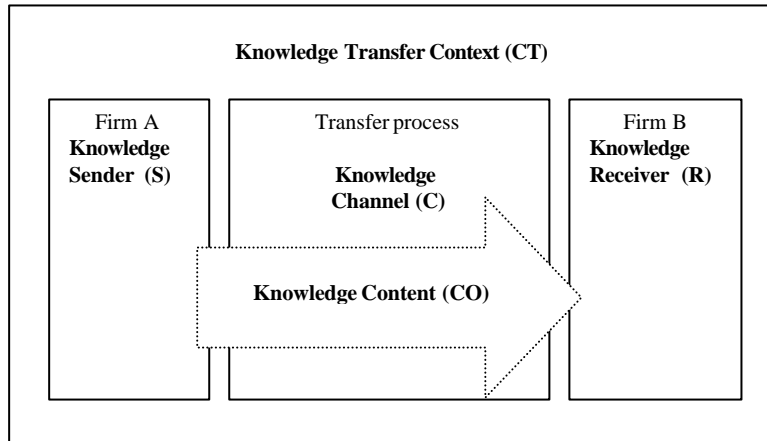


Figure 1.2: The Knowledge Transfer Ability: The Transmissive and Absorptive Capacity

