
Reverse knowledge and technology transfer: imbalances caused by cognitive barriers in asymmetric relationships

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Abstract: An imbalance exists in almost any type of knowledge and technology transfer due to the information asymmetry of the relationship. However, this is especially the case for reverse technology and knowledge transfer which is epitomised for us by “transfers from an MNC’s subsidiary to its headquarters”. This paper builds on the few pieces of research in the area of reverse knowledge transfer and, by integrating the cognitive barriers to reverse knowledge transfer produces a conceptualisation which emphasises the importance of informal mechanisms such as social networks. This establishes a theoretical framework for the investigation of barriers to successful reverse knowledge transfer including failure of psychological contracts, perceived lack of procedural justice, a lack of intrinsic motivation, psychic distance and liability of foreignness.

Keywords: reverse knowledge and technology transfer; cognitive barriers; asymmetric relationship; headquarters; subsidiary; MNC imbalance.

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1 Introduction

This paper is about ‘reverse knowledge and technology transfer’ between the subsidiary and the headquarters of an MNC. We define the term as follows:

“Reverse knowledge and technology transfer is the process of transfer of explicit or tacit knowledge from an MNC’s subsidiary to its headquarters.”

Such reverse knowledge and technology transfer situations differ from traditional top down knowledge and technology transfers, due not only to the hierarchical relationships amongst those involved but also to the credibility of the sources and the nature of potential payoffs perceived by those involved. Such factors often manifest themselves in cognitive barriers to knowledge transfer, which we consider here, with particular attention to the distinction between tacit and explicit knowledge.

A key issue of research in knowledge and technology transfer is the relationship between an MNC’s headquarters and its subsidiaries. A common theme in this research is that knowledge and technology developed in one part of the organisation or one location can be exploited in other parts of the organisation or in other locations (Atamer and Schweiger, 2003; Frost, 1998; Hakanson and Nobel, 2001; Yamin, 1997). Prior research on knowledge transfer has tended to focus on factors that either inhibit or facilitate knowledge transfer between MNC units.

Transfer is particularly problematic for tacit knowledge (Polanyi, 1966). Explicit knowledge can be coded in writing or symbols, but much knowledge is tacit: ‘we can know more than we can tell’ (Polanyi, 1957). This distinction between the two types of knowledge is important because of the transferability and appropriability of explicit knowledge, as opposed to tacit knowledge (Foss, 1996; Millar, 2008). Tacit knowledge is acquired by and stored within individuals and cannot be easily transferred or traded as a separate entity (Wong et al., 2006). Because of this, tacit knowledge requires strong and established ties between the parties concerned before that knowledge can be transferred (Cantwell and Piscitello, 1999; Lane and Lubatkin, 1998; Lundvall,

1993; Nobel and Birkinshaw, 1998). Strong ties allow for a two-way interaction between the units or what Lane and Lubatkin call 'interactive learning' (Lane and Lubatkin, 1998, p.462).

The non-existence of such two-way interaction is one of the key barriers to knowledge transfer within MNC's and we argue that this should be expected to be particularly important in the case of the imbalance between subsidiaries and headquarters within the same corporation caused by their asymmetric relationship (Hedlund, 1986; Jones et al., 1997; Lundvall, 1988; Scott, 1994). A key point of our paper is that transfer is a two-way interaction and that the value that can be provided by the entity that we normally see as the 'weaker' party would actually be much higher than is normally estimated, if only one would be open to it. From our further analysis, it will be clear that psychological/cognitive barriers are identified as major factors that prevent a proper and accurate valuation or acceptance of such value. In spite of the assumed intrafirm bargaining 'power' of the subsidiaries (Mudambi and Navarra, 2004) it is observed that reverse knowledge transfer that comes to the HQ from a 'subsidiary' – especially one overseas/at distance/a small unit – tends to be discounted and downgraded in value without properly, rationally or scientifically assessing the value in an unbiased way allowing for cognitive barriers.

In this conceptual paper, we argue that a major element in such a barrier to 'reverse knowledge transfer' arises from various psychological factors – psychological contracts, procedural justice, intrinsic motivation, psychic distance and liability of foreignness – that need to be considered and brought into the existing literature through a framework that explicitly recognises their impact.

In such a framework, these factors operate in parallel with self-interest agency theory and bargaining power factors such as those described for intersubsidiary knowledge exchange (Mahnke et al., 2006). Our paper also illuminates the issue of the receptiveness of headquarters to the knowledge that is available from subsidiaries, whereas most current literature has its focus on the barriers to the subsidiary being willing or able to transmit the knowledge (Mahnke et al., 2006).

2 Psychological contract

The term *psychological contract* originates from research by Schein (1965) and Levinson et al. (1962). These works define a psychological contract as expectations about 'reciprocity' in terms of the obligations between organisations and employees. Early works on psychological contract such as Kotter (1973), Levinson et al. (1962), and Schein (1965) assumed a certain reciprocity and mutually shared expectations. Rousseau (1989), however, showed that such an assumption could not be easily made, with issues of promises, implied contracts and expectations that may or may not be shared by employees and their employer organisations (McLean Parks and Schmedemann, 1994; Rousseau and McLean Parks 1993). More recent works such as Morrison and Robinson (1997) have analysed the importance of psychological contract violation, and the negative effects on motivation within organisations.

Rousseau and McLean Parks (1993) suggest that contracts may involve strong emotional ties and trust. If such a contract is breached, the reciprocal good faith is called into question. Executives in the subsidiaries of MNCs in principle have a psychological

contract with MNC headquarters, linked by trust, shared values and professional backgrounds. Yet, the asymmetric relationship between a company's HQ and its subsidiary emphasises the imbalance between the two parties, and make it difficult for such psychological contract to occur spontaneously. The extent and effectiveness of such a psychological contract is not a foregone conclusion and more recent research (Bjorkman et al., 2004) has shown the relevance of agency theory to an understanding of headquarter-subsidiary interactions, including the temptation for managers in subsidiaries to limit or negotiate with knowledge transfer.

Proposition 1: For full and effective reverse knowledge transfer to occur, all parties must consider this to be part of the psychological contract.

3 Procedural justice

Related to psychological contract is the idea of procedural justice. The seminal work of Thibaut et al. (1974) provides the theoretical foundation upon which the procedural justice perspective rests. Building on social psychology and law, Thibaut et al. (1974) examined the methods commonly used to resolve conflicts and the impact of procedural factors on the individual's perceptions of the fairness of the resulting resolution outcomes. In further defining procedural justice, Lind and Tyler (1988) emphasise the importance of the fairness of the procedures (processes) by which the judgements are derived and not the outcomes in and of themselves.

Kim and Mauborgne (1991) were the first to explore the role of procedural justice within the global strategic management field. One of the primary conclusions of their initial study centred on the fact "that the procedural justice of the global strategy generation process indeed affects commitment, trust and social harmony as well as outcome satisfaction in subsidiary top management" (Kim and Mauborgne, 1991). Taggart (1997) used the dimensions of autonomy and procedural justice to develop a four group taxonomy of MNC subsidiaries and found that "higher levels of procedural justice indicated substantial levels of trust, with suspicion and even hostility being present at lower levels of procedural justice" (Taggart, 1997, p.57). Consequently, procedural justice can have a significant impact on the effectiveness of knowledge transfer within a multinational corporation's global network (Kim et al., 1998).

Proposition 2: For full and effective knowledge transfer to occur the transfer process must be seen to be procedurally just.

4 Intrinsic motivation

Another aspect of the psychological barrier is motivation. Motivational factors include, for example, the lack of motivation of the source and the recipient of knowledge as analysed in Szulanski (1996) and the motivational disposition of the source and the target units as found in Gupta and Govindarajan (1991, 2000). Osterloh and Frey (2000) emphasise that a distinction needs to be made between extrinsic and intrinsic motivation. Motivation is extrinsic for example, if employees are able to satisfy their needs indirectly, especially through monetary compensation. Money is a "goal which

provides satisfaction independent of the actual activity itself" (Calder and Staw, 1975, p.599). Extrinsically motivated coordination in firms is achieved by linking employees' monetary motives to the goals of the firm. In such a case, the ideal incentive system is strict pay-for-performance (Bjorkman et al., 2004).

Motivation is intrinsic if an activity is undertaken for one's immediate need satisfaction. Intrinsic motivation "is valued for its own sake and appears to be self sustained" (Calder and Staw, 1975, p.599; see also Deci, 1975, p.105). Intrinsic motivation takes various forms and can be directed to the activity's flow (Csikszentmihalyi, 1975), or even to a self-defined goal such as climbing a mountain (Loewenstein, 2000). Intrinsic motivation has a long tradition in motivation-based organisation theory (Argyris, 1964; Likert, 1961; McGregor, 1960). Intrinsic motivation is also drawn upon by critics of transaction cost theory (e.g. Donaldson, 1995; Ghoshal and Moran, 1996; Pfeffer, 1997), and by the literature on psychological contracts (e.g. Morrison and Robinson, 1997; Rousseau, 1995). They emphasise intrinsic motivation in the form of identification with the firm's strategic goals, shared purposes and the fulfilment of norms for their own sake.

However, as Osterloh and Frey note, proponents of the behavioural view tend to look only at the positive aspects of intrinsic motivation and neglect the interaction with extrinsic motivation. Other research in psychology (e.g. Calder and Staw, 1975; DeCharms, 1968; Deci, 1971, 1975; Deci and Flaste, 1995; Deci and Ryan, 1980, 1985), as well as field research in economics (Barkema, 1995; Frey, 1997), strongly suggest that under specific conditions there is a trade-off between extrinsic and intrinsic motivation. For example, Titmuss (1971) suggested that paying for blood would undermine social values and motivations and lead to a lower willingness to donate blood (Deci et al., 1999; Frey, 1997; Titmuss, 1971). This stream of research suggests that in addition to extrinsic motivation for knowledge transfer, it is necessary to consider intrinsic motivation. In particular, Osterloh and Frey suggest that transfer of tacit knowledge is more strongly related to intrinsic motivation and recent research (Bjorkman et al., 2004) has lent support to this.

Proposition 3: For full and effective transfer of tacit knowledge to occur, there must be intrinsic motivation in all concerned.

5 Psychic distance

A fourth psychological factor that affects knowledge transfer in MNCs is psychic distance. This has previously been examined in the context of international expansion. The literature on the internationalisation process describes the sequence of market entry steps that firms follow when internationalising. This sequence reflects an orientation towards a gradual learning through experience process. Companies typically begin their internationalisation process in countries that are psychically close to their own (Benito and Gripsrud, 1992; Hofstede, 1980; Johanson and Vahlne, 1977; Kogut and Singh, 1988; O'Grady and Lane, 1996, 1997). Researchers have suggested that entering countries that are psychically close reduces the level of uncertainty firms face in the new market (Johanson and Vahlne, 1992) and that psychically close countries are easier for companies to learn about (Kogut and Singh, 1988).

Previous research has suggested that psychic distance can affect the degree of knowledge transfer that takes place in internationalisation. For example, cultural distance

has been defined as “the sum of factors creating on the one hand a need for knowledge, and on the other hand barriers to knowledge flow and hence also for other flows between the home and the target countries” (Luostarinen, 1980, pp.131–132). Cultural distance has been found to adversely affect international joint ventures by eroding the applicability of the parent's competencies (Barkema and Vermeulen, 1997; Barkema et al., 1996; Johanson and Vahlne, 1977). We suggest that similar psychic distance can exist between headquarters and subsidiaries in MNC's and that this has an effect on technology and knowledge transfer (Li and Scullion, 2006).

Proposition 4: The difficulty of reverse knowledge transfer increases with the psychic distance between subsidiaries and headquarters within the same corporation.

6 Social embeddedness

Psychic distance is a problem particularly where the subsidiary is deeply embedded in the local social network. The business network constitutes a firm's most important interface with the environment. It is mainly through these relationships that the exchange of information with the environment is handled. Therefore, embeddedness reflects the intensity of information exchange and the extent to which resources between the parties in the dyad are adapted (Granovetter, 1985). The stronger the embeddedness, the more difficult it will be for the counterparts to change to other partners, at least in the short run. The weaker the embeddedness, the more the relationship will have an arm's-length character (Grabber, 1993; Uzzi, 1996).

This presents a challenge to the envisaged process of learning about local conditions by establishing a local subsidiary, which will gather and transmit back knowledge. On the one hand the degree of embeddedness has been correlated with the amount of knowledge acquired (Piscitello and Rabbiosi, 2006) but on the other hand our theoretical approach suggests that this embeddedness will limit the extent to which that knowledge is actually transferred.

Proposition 5: The difficulty of reverse transfer of knowledge increases with greater relative social embeddedness of local subsidiaries.

7 Liability of foreignness

A particular issue that arises in relation to psychic distance is the issue of the liability of foreignness (Hymer, 1960, 1976), a set of costs associated with unfamiliar operating environments, administrative and cultural differences, coordinating global managers over vast geographic distances. In relation to MNCs, this can lead to an over-reliance on expatriate managers at headquarters relative to local managers at subsidiaries (Zaheer, 1995). These issues arise out of broader long-standing arguments about the balance in multinational corporations between global integration and local responsiveness (Bartlett and Ghoshal, 1989), mind-sets about the relationship between home offices and their subsidiaries (Perlmutter, 1969) and the appropriate role of expatriates.

Research in international business has shown the importance of the liability of foreignness for the success of MNCs in the banking and financial services. Zaheer and

Mosakowski (1997) have shown that for MNCs in the foreign exchange industry such a liability of foreignness can exist for even 20 years, although changes can occur over time. Miller and Parkhe (2002) have further substantiated the importance of this issue with an application to MNCs in global banking.

Proposition 6: The difficulty of reverse transfer of knowledge increases where there is a liability of foreignness.

The propositions set out above and which will pave the way for further empirical research highlight barriers to knowledge transfer, which will operate in many trans-national situations. Their relevance is heightened in the case of subsidiary-headquarters relationships because of the nature of the structural relationship in which, at least in economic and ownership theory terms, the headquarters is the dominant party. This dominant role is itself a factor potentiating the psychological factors listed, operating through the perceptions and prejudices of the executives concerned.

The 'Not-Invented-Here' (NIH) syndrome is a well-known phenomenon in innovation (Katz and Allen, 1982). Two causal factors that have been identified are ego-defence mechanisms (Allport, 1937; Sherif and Cantrill, 1947) and power struggles within organisations (Pfeffer, 1981). The former can lead some managers to block any information that might suggest that others are more competent than they are. The latter can lead some managers to try to downgrade the potential power of peer units. Within an MNC, the NIH syndrome can be manifested as a form of xenophobia or a low opinion of foreign subsidiaries. Thus, knowledge transfer can be blocked not so much by local subsidiaries' lack of willingness to transfer knowledge but by headquarters' lack of willingness to receive it.

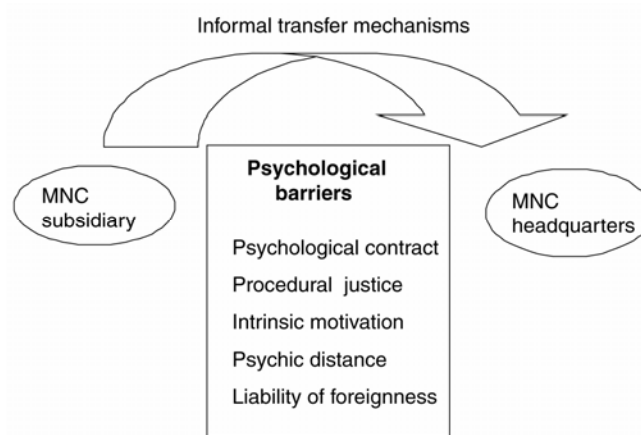
8 Informal mechanisms of transfer: overcoming cognitive barriers

To overcome these psychological barriers to knowledge transfer, we posit that multinational corporations need to pay attention to informal mechanisms for knowledge transfer. This is corroborated by two pieces of research: attention has been paid in the literature to the practice of expatriate secondment which creates the opportunity for person to person contact, thus facilitating transfer of tacit knowledge. However, the expected personal relationships of trust do not necessarily develop and it should be recognised that it is the expected relationships and the mechanisms they create that are important rather than the physical presence of expatriates. Such relationships are essentially informal and the mechanisms operate informally (Minbaeva and Michailova, 2004). And preliminary findings of empirical research amongst Italian MNCs indicate

“that the transfer of subsidiary knowledge to its parent company occurs, most of all through person-based mechanisms, and it is effective mainly when the knowledge absorption and exploitation take place in similar activities”
(Piscitello and Rabbiosi, 2006, p.17)

The cognitive barriers discussed in the above sections that complicate reverse knowledge transfer and the need for more informal mechanisms are shown in Figure 1.

Figure 1 Reverse knowledge and technology transfer: cognitive psychological barriers in asymmetric situations



The informal mechanisms at work here can be regarded as giving rise to subgroups within the recognised networks that make up the organisation. As Frank and Yasumoto (1998) note, one of the emerging themes in research on social networks has been the idea of a set of integrated subgroups. Actors establish primary affiliations with members of their subunit while defining their roles through ties with other subunits. Granovetter (1973) argued that networks of individuals with strong ties to each other exhibit a tendency to transitivity (If person A is linked to persons B and C in a network, there is high probability that B will also be linked to C.) This facilitates the emergence of subgroups. For example, Frank and Yasumoto (1998) show how in the French financial elite, subgroups are based on the pattern of friendships. In addition to the knowledge that is exchanged in formal networks, much knowledge leaks through such networks based on friendship.

A vast body of research on collective ownership also shows that groups or communities driven by social bonds and reciprocity-based exchange can be limited in size (Hardin, 1982; Olson, 1965). As Oliver and Marwell (1988) show, when groups are heterogeneous, fewer people are needed to achieve a 'critical mass'. Furthermore, fewer contributors are needed where there are dense social ties (Oliver and Marwell, 1988). Thus, within larger networks, subnetworks of very limited size may form provided the social ties are strong. Actors in such strategic networks can then be linked indirectly to all other actors in the network system.

These subnetworks may be informal networks and this is especially the case when the members of the network are from heterogeneous backgrounds and value systems (Cheng et al., 2002). In today's global business environment, successful strategic networks require actors from different countries, regions and professional backgrounds to incorporate such heterogeneity or diversity within the network. Access to knowledge from subsidiaries is then sought by headquarters through tapping into subnetworks arising from particular informal systems of values and strong social ties.

In addition to strong ties, Granovetter (1973) has also drawn attention to the importance of weak ties – those that are infrequent and extend beyond an actor's immediate social circle – in providing access to unique influence and information. As Brown and Reingen (1987) show, these informal networks are particularly important

in word of mouth referral and in facilitating the flow of information between diverse segments of the population that are not linked by strong ties. Between and within a company, industry or community network, therefore, there may be several subnetworks consisting of individuals linked to each other by strong ties, each linked to each other via weak ties. These subnetworks can act as localised sources of knowledge. Increasing recruitment of local managers to run subsidiaries of MNCs raises the importance of such structures of linked subnetworks as opposed to attempting to achieve knowledge transfer by diktat or by insertion of expatriates.

A key function of subnetworks is to provide benefits for members that are not available to outsiders in the wider network. Social networks serve collective interests and provide for resource sharing among network members, but at the same time, they will require mechanisms to exclude outside non-members from the benefits and knowledge of the network (Hardin, 1982; Kuran, 1989). This is similar to the concept of club goods in law and economics, whereby members of a strategic network pay a type of club fee for membership, and share collectively the benefits, but at the same time exclude non-members from free riding (Olson, 1965; Ostrom, 1990; Sterbenz and Sandler, 1992) on the resources and assets of the network. This is further enhanced when the actors in the network are from diverse, heterogeneous backgrounds and value systems (Andreoni, 1990; Bergstrom et al., 1986; Buchanan, 1965). In a complex MNC, today's executives would originate from many countries and heterogeneous backgrounds and value systems.

9 Conclusions

The nature of the relationship between headquarters and subsidiaries is one in which the complexities of knowledge and technology transfer are especially visible. In particular there is an imbalance affecting reverse knowledge transfer, which goes beyond the imbalances in subsidiary to subsidiary transfer – the usual subject of reverse transfer (Mahnke et al., 2006).

In this conceptual paper, we have sought to focus on the knowledge and technology transfer between subsidiaries and headquarters within the same corporation. As far as reverse knowledge transfer is concerned, the gap in the research literature on knowledge and technology transfer is twofold. Firstly, most of the papers on knowledge transfer focus on the technology and organisational implications of the technology transfer. However, knowledge is socially complex, and may also be more complex than technology in terms of transfer. Secondly, factors such as psychic distance, and liability of foreignness between an MNC's headquarters and a subsidiary should be more fully analysed. These research questions we positioned within the context of reverse technology and knowledge transfer, that is, between an MNC's subsidiary and its HQ: an asymmetric and unbalanced relationship.

In the context of reverse knowledge transfer we showed that any knowledge transfer, especially in the case of tacit knowledge, is a two way interaction and that is normal for an asymmetric relationship to exist between the unit transferring and the unit receiving the transferred knowledge. However, in the specific situation of reverse knowledge transfer between already asymmetrically related parts of the organisation, the subsidiary and the HQ of an MNC, we identified cognitive, psychological barriers hampering an easy transfer and we posited that HQ should show itself to be much more receptive to

reverse knowledge transfer from the subsidiary as the entity that we normally see as the 'weaker' party could actually provide more value than is at first sight estimated through transfer of explicit and especially tacit knowledge. We argued that psychological/cognitive barriers prevent a proper and accurate valuation or acceptance of such value.

Our conceptual paper approached the research questions above as follows: Firstly, we showed that the cognitive and psychological aspects of reverse knowledge transfer are crucial, given that knowledge is socially complex (Cantwell and Piscitello, 1999; Hakanson, 1995; Hedlund, 1986). We identified several cognitive factors, such as psychological contracts (Bjorkman et al., 2004; Rousseau, 1995; Thibaut et al., 1974) intrinsic motivation (Bjorkman et al., 2004; Osterloh and Frey, 2000); psychic distance (Johanson and Vahlne, 1977; Li and Scullion, 2006) and liability of foreignness (Miller and Parkhe, 2002; Zaheer and Mosakowski, 1997). Secondly, we explored the importance of informal subnetworks in such reverse knowledge transfer. Given the socially complex nature of knowledge and the imbalance in relationship between the subsidiary and the HQ, we analysed how such networks might help to overcome the social and psychological barriers to reverse knowledge transfer.

Two areas warrant further research. More comprehensive empirical study of the importance of the whole range of such cognitive factors, and the role of social subnetworks, taking reverse knowledge transfer as a paradigm, which will illuminate factors which can too easily be put to one side in investigation of other types of knowledge transfer. Knowledge is much more socially complex than technology, and the reverse knowledge transfer process is relatively still more complex and has the potential to display the effects of imbalances. Secondly, research on the managerial implications within corporations, especially the nature of executive training on addressing and overcoming these cognitive barriers to reverse knowledge transfer, which magnify the imbalance caused by the asymmetric relationship between an MNC's subsidiaries and headquarters. Such work could also deepen the analysis of the impact of policies on expatriate insertion, which have been a recurrent theme of HR research.

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