

Research on the relationship between knowledge transfer models to various strategic alliances

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Received 1 March 2014, www.cmmt.lv

Abstract

As a part of knowledge management research, this paper focuses on knowledge transfer within strategic alliances and attempts to classify the basic models of knowledge transfer that actually take place within SA so that get to know on how partners chose the most suitable knowledge transfer model in SA. This paper presents four kinds of knowledge transfer model in strategic alliances by summing up the outcome of research on this issue. Based on the conclusion, this paper then discusses the correspondence between the types of the strategic alliances and choosing these knowledge transfer models and five corresponding propositions about the issue is given at last.

Keywords: knowledge management, strategic alliances, knowledge transfer, tacit knowledge, explicit knowledge

1 Introduction

As Francis Bacon said, "Knowledge is power". The power of knowledge is a very important resource for preserving valuable heritage, learning new things, solving problems, creating core competences, and initiating new situations for both individual and organizations now and in the future. How to manage this knowledge has become an important issue in the past few decades, and the knowledge management (KM) community has developed a wide range of technologies and applications for both academic research and practical applications. In addition, KM has attracted much effort to explore its nature, concepts, frameworks, architectures, methodologies, tools, functions, real world implementations in terms of demonstrating KM technologies and their applications. In modern business world, knowledge has emerged as the most strategically- significant resource of the firm [1]. This assertion characterizes well the recent research impetus centered on the role of knowledge-based resources in the firm and on competitiveness.

At the heart of the analysis of competitive advantage and its sustainability lies the issue of knowledge imitability. Accordingly, of all approaches to knowledge imitability between a knowledge holder and a knowledge seeker, strategic alliances (SAs) constitute perhaps the most adequate, but nevertheless challenging vehicle for internalizing the other's competency. Not surprisingly, the growing interest in how organizations learn from their partners and develop new competencies through SAs has led to the emergence of a distinct stream of research. That is, SA and knowledge transfer (KT) have been a focal point of recent international business research. The emerging literature on KT within SA has studied the process of KT

and imitability from different perspectives, including: how knowledge is managed in SAs [2,3]; how knowledge is transferred across partners [4]; how knowledge is acquired from the parents by the joint venture itself [5]; how knowledge about collaborating per se develops over time and impacts collaborative outcomes [6]; how knowledge impacts performance [4].

Despite this growing research on how KT works within SA, few researchers summarize the basic models of KT and general principles of choosing right models of KT. According to Inkpen [2], part of the problem has been the types of SA are various, and the process, affecting factors and criterion of performance evaluation of KT in each type of SA are different.

As a part of KM research, this paper focuses on KT within SA, and attempts to classify the basic models of KT that actually take place within SA in order to provide a clear focus on how partners chose the most suitable KT model in SA. This is a theoretical discussion based on extensive literature on the subject.

2 Theoretical model

The purpose of this paper is to examine how different resource types influence the choice of alliance forms. To assist us in this examination, in this section we identify two major types of resources and propose a four-part typology of alliance forms.

2.1 TYPES OF FIRM'S RESOURCES

Since firm resources are of various types, it is no surprise that scholars have proposed a number of resource typologies. These descriptive typologies, however, lack

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adequate theoretical underpinnings. Miller and Shamsie suggest that based on the notion of barriers to imitability, all resources may be classified into two broad categories: property-based resources (PBRs) and knowledge-based resources (KBRs) [7].

PBRs are legal properties owned by firms, including financial capital, physical resources, human resources, etc. Owners enjoy clear property rights to these resources, or rights to use the resources, so that others cannot take them away without the owners' consent. Thus, PBRs cannot be easily obtained, because they are legally protected through property rights in such forms as patents, contracts, and deeds of ownership [7]. Because others cannot take PBRs away, alliance partners will not be overly concerned about unintended transfers of these resources.

KBRs refer to a firm's intangible know how and skills. In contrast to PBRs, KBRs are not easily imitable owing to knowledge and information barriers. Others cannot easily copy or imitate KBRs, because they are vague and ambiguous. Thus, tacit know-how, skills, and technical and managerial systems not protected by patents, all fall in this category [8]. Imitating technological and managerial resources may be inherently "uncertain," because knowledge creation inevitably involves "irreducible ex-ante uncertainty" [9].

Besides imperfect imitability, technological and managerial resources are also imperfectly substitutable. Satisfactory substitutes and alternatives to superior technologies and managerial talents are often not available. Nevertheless, these resources are relatively mobile, because technologies and managerial talents may be acquired rather efficiently through the market. In contrast, organizational resources, such as culture and learning capacity, are deeply embedded in a firm and are thus characterized by imperfect mobility.

The key difference between PBRs and KBRs springs from the fact that the protection of knowledge barriers is not perfect [7]. Whereas PBRs enjoy near-perfect legal protection, PBRs are more vulnerable to unintended transfers. Once others get adequate access to PBRs, it is difficult to keep these resources within the confines of the firm for long. Consequently, alliance partners will be concerned with losing their KBRs through an alliance [10, 11].

2.2 TYPES OF KNOWLEDGE-BASED RESOURCES

KBRs can be classified in many different ways but some of the key dimensions that have previously been examined are:

- Individual, versus collective knowledge, based on levels of knowledge;
- Explicit, versus tacit knowledge, based on nature of knowledge.

Distinguishing the type of KBRs in a project is important because different types of KBRs have been shown to vary in their characteristics such as ease of transfer.

Individual knowledge is knowledge that can be wholly understood and retained by an individual. Collective knowledge is knowledge that is shared by a collective such as a team, an organization, an industry or a society [14]. It is also assumed in the organizational learning literature that individual learning is necessary but insufficient to produce organizational learning. It is also more than the sum of learning by individual members of the organization. For the occurring of organizational learning, knowledge must be accessible to others beyond individual learners and it must be subject to application, change and adaptation by others in the organization. In this paper, collective knowledge is further divided into team knowledge and organization knowledge for simplifying the description.

A second key distinction often made in the knowledge management literature is that between explicit knowledge and tacit knowledge. Explicit knowledge is that which can be readily stated and codified [12]. Tacit knowledge by contrast is difficult to state and can only be gained by experience or 'learning by doing' [12]. It is non-verbalized, intuitive, and unarticulated, and hard to communicate and deeply rooted in action, involvement and commitment within a specific context. It is "a continuous activity of knowing" [13]; it is "the way things are done around here" [14]. Tacitness assumes that individuals know more than they can tell and tacit knowledge is often context specific and has a 'personal quality'. It would also involve providing opportunities for the teams to put the knowledge into action, either through role-playing or case-related activities, to allow for the type of tacit-explicit conversions [13].

This classification is essential as it provides a context through which our understanding of the effect of knowledge value on the form of SA can be furthered. Theoretically, Reed and DeFillippi singled out tacitness as a key source of ambiguity that raises barriers to imitation [12]. Empirically, in their study of the transfer of manufacturing capabilities, Zander and Kogut found that, indeed, the degree to which capabilities are modifiable and teachable (i.e., are non-tacit) significantly influences the speed of their transfer [15].

2.3 APPROPRIATION CONCERNS AND PARTNER PROTECTIVENESS

In an exploration of literature on partner appropriation concerns: Gulati posits that firms entering SA face two primary moral concerns; first, the unpredictability of the behaviour of partners, and second, the costs to a firm if a partner engages in opportunistic behaviour [16]. Indeed, prior research on the selection of forms of SA has been influenced primarily by transaction cost economics, which holds that organizations and managers will act opportunistically to maximize profit even at the expense of another party. Knowledge leakage is an important form of appropriation and therefore partner protectiveness is adopted, which influences the effects of KT [17].

In SAs, the protection of proprietary knowledge from partners is a vital issue to many firms [2, 6]. Transferring partners must have an incentive to palliate the cost typically associated with the transfer [18]. If not, partners can adopt explicit measures, deploy shielding mechanisms, and engage in defensive actions to protect the transparency of their competencies, particularly when the embodied knowledge is explicit and held by only a few experts [10, 19]. Hence, protection of technological know-how is likely to be prevalent and actively managed. Therefore, partner protectiveness is expected to lead to directly impede KT. Thus, in this study, associate with to knowledge tacitness, which is also expected to exert a direct effect on the transfer outcome, partner protectiveness is regarded as the main factor.

2.4 FORMS OF STRATEGIC ALLIANCES

A SA is defined as a long-term cooperative arrangement between two or more independent firms that engage in business activities for mutual economic gain, and an international SA is one where partners come from two or more countries. The role of alliance form has been argued that the extent of KT among partners is likely to depend on the alliance form [18].

SAs can take a variety of forms, including, but not limited to joint ventures, minority equity alliances, R&D contracts, joint R&D, joint production, joint marketing and promotion, enhanced supplier partnership, distribution agreements, and licensing agreements. Most studies on alliance structural choice have been based on the dichotomy of equity alliance vs. non-equity alliances [20]. Whereas equity alliances include equity joint ventures and minority equity alliances, non-equity alliances refer to all other cooperative arrangements that do not involve equity exchange. For non-equity alliances, Mowery et al. suggest two types: unilateral contract-based; and bilateral contract-based [11]. Integrating the above approaches into the classification of alliance structures, we adopt the following four part alliance typology: equity joint ventures (EJVs); minority equity alliances (MEAs); bilateral contract-based alliances (BCAs); and unilateral contract-based alliances (UCAs).

In an EJV, firms similarly pool their resources, but also create a new entity that is jointly owned and operated by two or more allying firms. The new entity is created to substantially integrate the joint efforts of partners in which the partners literally work together. One key problem in EJVs is that firms may be opportunistic in maximizing their own particular interests, to the detriment of their partners, such opportunistic behaviour tend to be more severe when it involves tacit knowledge and skills that are not protected by property laws.

In MEAs, one or more partners take all equity position in others Das and Teng argue that shared ownership helps control opportunistic behaviours. Since equity arrangements are rather complicated to implement as well as to get out of, they are usually entered into for longer

time horizons compared to alliances without equity investments [21]. A long duration for an alliance provides an incentive to partners to behave honestly and curb opportunistic behaviour.

UCAs embody a well-defined transfer of property rights, such as the “technology for cash” exchange in licensing agreements. Licensing, distribution agreements, and R&D contracts are the main forms of UCAs. The key feature here is that individual forms carry out their obligations independently of others. Such contracts tend to be complete and specific, and partners are expected to perform on their own accordingly, without much coordination or collaboration. Thus, the level of integration is relatively low in UCAs [11].

On the other hand, BCAs emerge when the partners have sustained production of property rights. BCAs require partners to put in resources and work together on a continuing basis for the purposes of collaboration but do not form a separate legal entity. Joint R&D, joint marketing and promotion, joint production, and enhanced supplier partnership are some good examples of BCAs [11].

As compared to unilateral contracts, bilateral contracts are usually incomplete and more open ended. To some extent, partners of UCAs have to let the cooperative relationship unfold itself.

3 Research model

Contractor and Ra posited that with respect to the appropriation concerns of the knowledge supplier; if knowledge is deeply embedded or tacit, then a partner does not easily copy such knowledge and therefore fears of opportunism are lower [22]. Conversely, if knowledge is codified or easily observable, then the knowledge supplier's appropriation concerns will be high and this may possibly lead to more hierarchical forms of governance. It is assumed that for an alliance to be formed there must be an exchange of knowledge or information (which can be viewed as codified or easily understood knowledge), be it technical, organizational, or policy data. Therefore, the nature of the knowledge exchanges needs to be considered at the first.

In revisiting the question raised by Contractor and Ra's model [22] regarding the manner in which the tacitness of the knowledge supplier influence the choice of forms of SA, it emerges from the literature reviewed that although are of significance in the choice of governance form, other factors such as the partner protectiveness and bargaining abilities of partner firms are also significant.

The research model for this paper draws on knowledge-based and transaction cost theories, Contractor and Ra's theoretical model and several conceptual models related to KT at different levels of analysis [23] and within different forms of SA [5]. It attempts to integrate views from interrelated research as it concerns the various types of resources which is transferred must consist with the suitable forms of SA in order to ensure success. Figure 1

illustrates the primary constructs and relationship of interest in this paper.

inter-firm transfer of technologies, resulting in greater technological similarities between the partners [11].

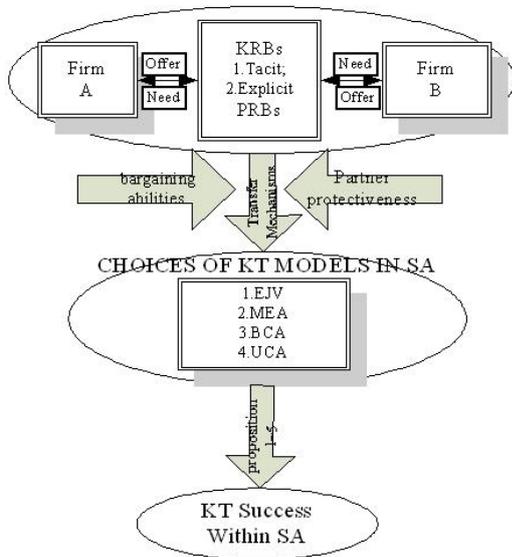


FIGURE 1 Research model

4 Notation basic model of KT within SA

We now discuss basic models of KT in terms of the four major categories of alliances outlined above: EJVs, MEAs, BCAs, and UCAs.

4.1 EQUITY JOINT VENTURES

Among various alliance forms, EJVs are the most instrumental in the transfer of tacit and explicit knowledge between the partners, because of the significant extent to which partners are exposed to each other [24]. Hamel also holds that when the partners work shoulder to shoulder in the same entity for an extended period, it becomes difficult to keep others from accessing one's tacit know-how [10]. Consequently, EJVs provide the best opportunities to acquire partner's KBRs (especially tacit ones). Researchers note that partners often use alliances as a cover for appropriating KBRs [19]. By the same token, Contractor and Ra believe that the transfer of tacit knowledge necessitates longer-term alliances with higher levels of partner interaction [22]. Von Hippel also holds that the transfer of tacit knowledge requires more face-to-face and longer personal contact between companies [25]. Moreover, Contractor and Ra hypothesized that the greater the complexity of knowledge, the more likely it is that EJV arrangements would be adopted by the allies [22]. This proposition is congruent with transaction cost arguments which propose that because complex technologies are more valuable, the associated consequences of opportunism are higher, and therefore EJVs (which are less reversible) is likely to be chosen as a form of SA [22]. Mowery et al. found that EJVs significantly facilitated

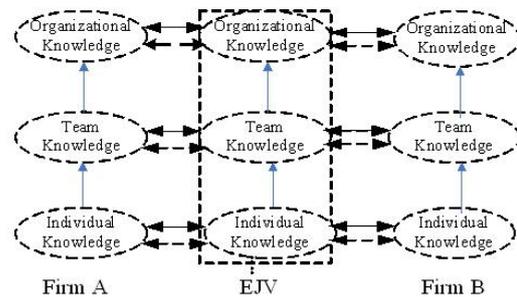


FIGURE 2 KT model in EJVs

However, the closer interaction of partners have, the more likely knowledge leakage (KL) would occur. Seen from Figure 2, KL (shown by the broken line, same in the followings) would emerge at all the levels, which is reluctant for the parents firm to accept because excessive core KL would damage the interests of the parents firm and leads to the termination of the alliance in the end. Hence, in this model of KT, the responsibilities of knowledge gatekeeper are very important for the parents firm.

Consequently, EJVs provide the best opportunities to acquire partners' KBRs including tacit & explicit knowledge while KL is a problem to parents firm at the same time.

4.2 MINORITY EQUITY ALLIANCES

Seen from Figure 3, in MEAs, the channel of knowledge learning is set up by sharing each other's ownership. Comparing to EJVs, there's no medial entity of joint venture, and controlling to the partner is enforced by taking its equity position.

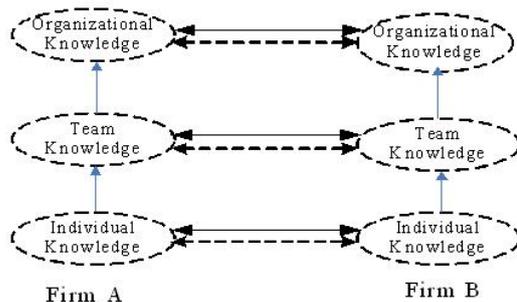


FIGURE 3 KT model in MEAs

In this model, KT is carried out under the supervision of all the partners in SA. The effect and efficiency of KT is impacted directly by the learning abilities of the supervisors of the partner companies. It is easy to deduce that the transfer of explicit knowledge is easier while tacit knowledge is more difficult for lack of close interaction within respective partners. On the other hand, KL is not avoidable but the partner could reduce the leakage of its core knowledge efficiently through strict control to its supervisor.

4.3 BILATERAL CONTRACT-BASED ALLIANCES

Because EJVs facilitate the process of transferring KBRs, they can be a disadvantage if both partners have substantial KBRs in an alliance. Thus, EJVs may be too risky a choice in such situations. Hence, contract-based alliance is better choice.

In BCAs, knowledge transferred within partners is mainly explicit, which is stipulated in the contract. At the same time, little tacit knowledge would be transferred. However, in some situations, the respective resources of partners (including but not limited explicit knowledge) which are stipulated in the contract too would be put into co-operations of alliance, which may result in the transfer of tacit knowledge to some extent. Seen from Figure 4, in this model, KT is limited rigidly by the contract and explicit knowledge is mainly the object of both partner’s learning. So, little core knowledge would be leaked because of the existent contract.

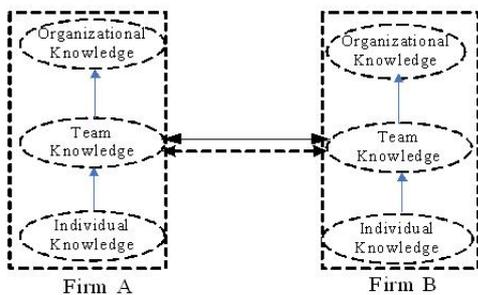


FIGURE 4 KT Model in BCAs

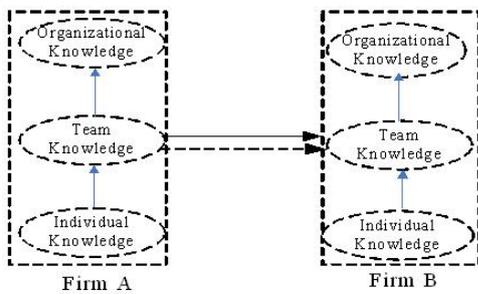


FIGURE 5 KT Model in UCAs

4.4 UNILATERAL CONTRACT-BASED ALLIANCES

Mowery et al. suggested inter-firm knowledge transfers should be more limited in UCAs such as licensing agreements, and postulate that UCAs should create fewer opportunities for inter-firm knowledge transfer. Thus, they determined that EJVs appeared to be more effective conduits for the transfer of complex capabilities than contract-based alliances such as licensing agreements [11]. Furthermore, Mowery et al. concluded that lower levels of transfer occur in unilateral contracts than in bilateral non-equity arrangements [11], while Oxley found that EJV as an alliance structure outperforms alternatives in supporting inter-firm learning [26].

Seen from Figure 5, in this model, KT is very similar to what in BCAs. The difference is that the direction of KT is unilateral and there is no feedback. KL is little in the process of KT hence the partner firms do not worry about KT.

5 Choice of KT model

Seen from the above-mentioned analysis, KT and KL are usually companied in spite of which KT model is adopted while the likelihood and the extent of KL in different KT are not in the same. In order to simplify the issue, two enterprises are supposed to be the partners in SA and KT within SA is therefore to be regarded as transferring between the two partners. Combined with the above classification of resources attributed to SA, 9 cases are deduced and shown by Table 1. According to the different case which Table 1 showed, we then analyse the choice of KT models.

TABLE 1 Matrix of Resources Attributed to SA

	Firm A	Tacit	Explicit	Property
Firm B				
Tacit		1	2	3
Explicit		4	5	6
Property		7	8	9

Given firm A and firm B is of no difference. Case 2,3,6 is the same with 4,7,8 respectively, so we just discuss Case 1,2,3,5,6,9.

Case 1: Both sides mainly attribute tacit knowledge and want to acquire tacit knowledge too from the partner. Because an EJV is primarily a device to obtain tacit knowledge based on the above KT model analysis. Here is the following proposition:

P1: Both partner firms will prefer a EJV if, in the prospective SA, both of them attribute primarily tacit knowledge and want to acquire primarily tacit knowledge too from its partner.

Case 2: Firm A mainly attributes explicit knowledge while firm B mainly attribute tacit knowledge. To firm A, it want to acquire the tacit knowledge from its partner of course, so it prefer an EJV. To firm B, which should attribute tacit knowledge, it wants to just acquire its partner’s explicit knowledge and at the same time, it has to prevent KL. In this case, EJV will not be preferred, for two reasons. First, there are no substantial KBRs contributed by the partners available for exploitation. Second, there are altogether too much of firm B’s own KBRs that the partner could potentially appropriate, making it too risky to form an EJV. Contract-based alliance will also be less attractive to firm B in such case, because it doesn’t offer sufficient safeguards against opportunistic behaviour regarding KBRs. Should a partner be found appropriating others’ KBRs to an undue extent, its equity stake may be held as hostage. Thus, equity investments provide some protection against the unintended transfer of partners’ tacit knowledge [21]. Hence, a MEA will be the preference for firm B. Then there is a conflict when KT model is chosen. The solution depends on the bargaining ability of the partners

and would be dealt with in the process of negotiation. Here's the following proposition:

P2: When firm A mainly attribute explicit knowledge while firm B mainly attribute tacit knowledge. The former prefer an EJV while the latter prefer a MEA, and the final KT model is determined by the bargaining ability of the partners.

Case 3: Firm A mainly attributes PBRs while firm B mainly attribute tacit knowledge. Then, firm A will prefer EJV to acquire tacit knowledge and will not wary about losing its own PBRs in a highly integrated operation characteristic of an EJV. This is because PBRs are protected by property rights, minimizing the likelihood of unintended transfer of resources. To firm B, which want to acquire PBRs and would attribute tacit knowledge, the most important thing is to prevent KL. That means it wants to stop its partner's learning process to its own tacit knowledge as soon as possible. Scholars suggest that once learning has been accomplished, alliances are likely to be intentionally terminated [19]. Hence, contract-based alliances, which are much easier to dissolve, will be preferred over EJVs and MEAs. Here is the following proposition:

P3: When firm A mainly attribute PBRs while firm B mainly attribute tacit knowledge. The former prefer an EJV while the latter prefer a contract-based alliance, and the final KT model is determined by the bargaining ability of the partners.

Case 5: Both sides mainly attribute explicit knowledge and want to acquire explicit knowledge too from the partner. Both of them will chose the KT model, which best facilitates the transfer of explicit knowledge and at the same time, prevents KT of tacit knowledge of their own. Based on the analysis about BCAs, here is the proposition:

P4: Both partner firms will prefer a BCA if, in the prospective SA, both of them attribute primarily explicit knowledge and want to acquire primarily explicit knowledge too from its partner.

Case 6: Firm A mainly attributes PBRs while firm B mainly attribute explicit knowledge. Based on the analysis about BCAs, here is the proposition:

P5: When firm A mainly attribute PBRs while firm B mainly attribute explicit knowledge, both partner firms will prefer a UCA.

Case 9: It is of no need to discuss in this case because both sides in SA mainly attribute PBRs, therefore KT won't occur and no model of KT should be considered to be chosen.

6 Conclusions

Although the concepts of SA and KT are gaining wide currency among both academics and practitioners, the theoretical link between the two is still weak. In this article 2 type of knowledge, 4 forms of basic SA models have been identified and 5 untestable propositions suggested. In particular, it has introduced knowledge tacitness as a key determinant of choosing KT models but it is also fundamental to consider the role of other factors such as KL and bargaining abilities. It has been demonstrated in the end that the types of knowledge which will be attributed and acquired by the partner firms within SA and their bargaining abilities are the main factors which impact the choice of KT models in SA.

Managers would also benefit from the discussion. As they understand more about the nature of the SA & KT, they can chose the right mode of SA and plan their cooperation strategies more effectively.

The aim of this study was to advance our understanding of the process of KT across alliance partners at both the conceptual and theoretical levels through some propositions. These propositions shed some important light on the mechanisms that facilitate or hinder KT between alliance partners. However, this paper does not offer an empirical test, which is the limitation of it.

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