

The Search for Externally Sourced Knowledge: Clusters and Alliances

La Búsqueda de fuentes de Conocimiento
externas: Clusters y Alianzas

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I. INTRODUCTION

In the technology-intensive, communication-rich global marketplace, firms have come to rely increasingly on external sources of technical and organizational knowledge in the race to generate competitive advantage through innovation.

Two major sources of external knowledge are alliance networks and geographical clusters, either independently or in combination. In some ways, the technologically close combinations of firms that form alliance networks function much like the geographically close groups of firms that form clusters. In other ways, though, the ties that create these loosely organized groups are quite different, resulting in considerable disparity in how knowledge spreads across each of them. In practice, global network firms are learning to build joint knowledge stocks by relying on contractual partners based in dense clusters in many locations around the world.

As scholars compare alliance networks explicitly with clusters as sources of external knowledge, these similarities and differences are being identified and addressed to better understand when, how, and why firms would use one or the other, or both, approaches to

JEL CODES:
M00, M10, M19

Received: April 22, 2013. Accepted: September 9, 2013.



EXECUTIVE SUMMARY

External sources of knowledge have become more important to firms as they have dispersed their value-adding operations around the globe and outsourced them to alliances. The global network firm has access to a rich store of external knowledge – but what do we know about accessing this treasure trove? The purpose of this paper is to summarize key ideas behind the research on alliance networks with clusters to better understand when, how, and why firms would use one or the other, or both, approaches to accessing external sources of knowledge, and to suggest new directions for both practice and scholarship.

RESUMEN DEL ARTÍCULO

Las fuentes externas de conocimiento son cada vez más importantes para las empresas, en la medida en que éstas han dispersado las actividades que les generan valor a lo largo del planeta y las subcontratan a través de alianzas. La empresa red global tiene acceso a un rico acervo de conocimientos externos -pero ¿qué sabemos sobre cómo acceder a este tesoro? El propósito de este artículo es resumir las ideas principales de la investigación en redes de alianzas dentro de clusters para entender mejor cuándo, cómo y por qué las empresas utilizan uno u otro, o ambos enfoques para acceder a fuentes externas de conocimiento, así como proponer nuevas orientaciones tanto para la práctica como para la academia.

accessing external sources of knowledge. The purpose of this paper is to summarize key ideas behind such research and to suggest new directions for both practice and scholarship.

2. KNOWLEDGE

To understand the mechanisms of external knowledge capture, we must first distinguish types of knowledge. A common dichotomy is that between explicit or codified knowledge and tacit or uncodifiable knowledge. This typology suggests a clear distinction, but other work suggests that all knowledge is to some extent explicit and to some extent tacit (Brown & Duguid, 1991). I have found that a

distinction based on the scope of any particular knowledge

is perhaps more revealing. Building on the work of

Henderson and Clark (1990), we have extended the idea

of component knowledge, which addresses the value-

adding processes of the firm, and architectural knowledge,

which focuses on the organization and direction of these

processes (Tallman, Jenkins, Henry & Pinch, 2004).

Component knowledge runs from highly technical and

explicit to conceptual and often tacit, but can be reduced to

ever more codified forms through inquiry, observation, and

testing. Most of the external knowledge that firms gather,

as well as that typically studied in scholarly research on

organizational learning, is component knowledge. This

is the basis, for instance, of Nonaka's (2007) discussion

of making tacit knowledge explicit for transmission and

incorporating this explicit knowledge into new processes to return

it to a more tacit state when used, as for instance by building a

business model in one market and transferring the documentation

to another subsidiary.

Architectural knowledge, on the other hand, is deeply embedded in

the organization, is very much path dependent, and is largely (or at

least the important parts of it are largely) tacit in nature. Architectural

knowledge develops through practice, and common architectural

understandings develop in two or more organizations through

common or shared practice, not through a process of codification

and de-codification. Finally, shared architectural knowledge clearly

increases mutual absorptive capacity for component knowledge

or technologies (Tallman et al., 2004), as organizations that have

common architectures will place the same value on pieces of

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component knowledge and apply them in very similar fashions. These aspects of knowledge are important to any discussion of how firms go about accessing externally sourced knowledge.

3. ALLIANCE NETWORKS

In management studies, access to external knowledge has until fairly recently been focused on cooperative strategies – the use of joint ventures and alliances. When firms do not have the knowledge resources that they need to pursue new products or processes, they have the options of internal development, acquisition in the market for knowledge or organizations, or allying with another organization that does have the needed knowledge (Madhok & Tallman, 1998). Internal development is slow, uncertain, and expensive; acquisition in the market is fast but generally restricted to commonly available commodity-like knowledge; acquisition of another firm is fast, but expensive and encumbered with unrelated considerations. Alliances, whether equity-based or contractual, are relatively fast to execute, relatively inexpensive, and relatively focused on the item at hand. In addition, they allow the parties to the transaction to continue about their separate businesses in all other activities.

Alliances or networks of alliances bring together firms with multiple complementary stocks of knowledge, allowing them to both combine inputs as a part of the alliance and often to internalize at least some part of each other's knowledge. Alliances, particularly those organized as contracts, are typically arranged to combine component knowledge. However, firms do undertake longer, more involved relationships for the purposes of combining architectural inputs as well. Evidence seems to suggest that such cooperative ventures, characterized as having multiple objectives, involving multiple value-adding steps (R&D, manufacturing, marketing), or having product development goals, are best organized as equity joint ventures that have separate identities, workforces, and strategies (Phene & Tallman, 2012). In successful EJVs, new architectural knowledge (often characterized as capabilities) will arise over time, giving incentives for stability and adding value that cannot be captured directly by either parent.

Alliances of all sorts, even those with explicit production goals, involve sharing (if not explicitly exchanging) knowledge. The contracts on which they are based typically specify what knowledge will be exchanged, what limits will be placed on partner access,

KEY WORDS

External sources of knowledge, alliances, clusters, networks

PALABRAS CLAVE

Fuentes externas de conocimiento, alianzas, clusters, redes

and how component knowledge developed in the alliance will be made accessible to the partners. The idea that alliances can involve opportunistic learning races (Hamel, 1991) between the partners has been popular, indeed, when expressed as the need for mutual hostages to good behavior (Hennart, 1988), is often treated as the primary reason behind EJVs – at least from a transaction cost economics perspective. Studies of alliance contracting and many real cases in which firms rely on contracts for essential operations (Apple, Nike and other firms that rely on offshore outsourcing contracts for manufacturing come to mind) suggest that equity is not, or at least no longer, seen as essential to reliable partnerships. Recent studies (Phene & Tallman, 2012) provide evidence that equity joint ventures are motivated by the need for improved coordination in strategically complex situations, but show little support for the idea that fears of misappropriation of component-type knowledge by the partner drive the governance forms of alliances.

However, it does seem to be the case that alliance networks still raise concerns for the loss of essential knowledge. One study suggests that firms with stronger internal capabilities that are involved in alliance networks tend to gain less from stronger alliance portfolios than do weaker firms (Srivastava & Gnywali, 2011). The bargaining power literature suggests that stronger firms have both more to potentially lose to partners and more power to control the terms of the contract (Yan & Gray, 1994). It does seem that real firms recognize this. Of course, excessive fear of unintended spillovers of knowledge to a partner can lead to a contract that restricts knowledge sharing so much that the objective of discovering and exploiting complementarities is limited and the alliance fails to accomplish its objectives. Finding the right balance of fear and hope challenges joint activities in all aspects of life, to include organizational alliances.

4. CLUSTERS

Another source of external knowledge, one only recognized in management studies recently, is membership in a local cluster of firms in related and supporting industries (Porter, 1998). Clusters, or industrial districts as they are commonly known in economic geography, have been recognized within that field for somewhat longer (Piore & Sabel, 1984). Clusters are said to have a variety of potential benefits for member firms: locally specialized infrastructure, skilled regional work forces, short shipping distances, social



networking that can increase trust and reduce opportunism risks, and so forth. A critical benefit, though, is the existence of ‘untraded interdependencies’, or knowledge exchanges taking place without economic transactions (Storper, 1995). These interdependencies are commonly referred to as knowledge spillovers (Zucker, Darby & Armstrong, 1998), and have come to be seen as a key identifier of clusters. Spillovers are defined as unintended and uncompensated transfers of knowledge from one firm to another (Phene & Tallman, 2012b). In a cluster, spillovers have the effect of moving knowledge from the private to the locally public sphere; that is, knowledge spillovers tend to be available to all firms in the cluster. The very fact that this knowledge is mobile categorizes it as component knowledge, often either hard technology or process knowledge. Architectural knowledge can also be shared in clusters, but develops among clustered firms as they engage in multiple cooperative and competitive interactions over time.

The impact of knowledge spillovers on the firms within a cluster has been assessed and reassessed many times. The driver of membership in clusters is often said to be access to spillovers from other firms and associated institutions such as local universities (Zucker, et al., 1998). Studies of clusters suggest that firms within clusters tend, as a group, to outperform isolated firms. However, some studies suggest that larger, stronger multinational firms tend to avoid locating among concentrations of firms in their own industry (Shaver & Flyer, 2002). This outcome has been widely interpreted to suggest that firms with more knowledge to lose through potential outward spillovers as compared to the possible value of incoming spillovers tend to avoid clusters. On the other hand, recent empirical evidence suggests that highly innovative firms gain more from being in highly innovative clusters than do weaker firms (Srivastava, Gnyawali & Tallman, 2010). Additional research (Phene & Tallman, 2006) suggests that spillovers of knowledge tend to encourage alliance ties within clusters in patterns that suggest that stronger recipient firms minimize formal contacts.

Overall, it appears that the concept of absorptive capacity (Cohen & Levinthal, 1990) is relevant to firms operating in an environment where spillovers of formerly private knowledge are commonly available. That is, weaker firms tend to seek out such locations, but stronger firms tend to be able to take better advantage of such semi-public knowledge to increase their own performance

without engaging in more formal ties. The nature of spillovers suggests that they will consist of fragmentary, poorly developed, potentially uncertain component knowledge. Strong firms that pick up new concepts can use their internal resources to take maximum advantage of these innovations, while weaker firms within a cluster may well acquire the same available bits of knowledge, but will struggle to make sense of them or to combine them with their private knowledge into important innovation. Because spillovers do not involve formal interactions by definition, the defensive aspect described above in alliance relationships is less likely to be relevant in clusters. If firms are part of the cluster, they will be able to access spillovers. Whether or not they are able to effectively integrate incoming spillovers, they will still find that their own private component knowledge will leak out. If firms wish to avoid spilling knowledge to real or potential competitors, they must simply avoid investing in clusters or perhaps move their facilities elsewhere. If they stay in the cluster, they must know that attempting to over-control knowledge leaks is both impossible and will do more damage by keeping the firm outside the local knowledge network, so that it will tend to be isolated from other spillovers.

Overall, clusters provide a less-certain opportunity for external knowledge access, and do not offer the support of formal processes the way that alliance networks do. On the other hand, clusters offer free, or at least payment-in-kind, access to a wide variety of information relevant to their own innovative potential. Strong firms need to monitor their knowledge exchange ties, but should ultimately gain more from cluster-level knowledge than will their weaker co-cluster members. If they feel that they put too many of their own essential resources on the line by being within a cluster.

5. ALLIANCES AND CLUSTERS

Discussion of alliances and clusters separately as sources of external knowledge that can be accessed and absorbed by firms in search of innovation is common, but simplified. Contrary to the early model of clusters expressed in economic geography, clusters do not typically consist of a homogenous collection of small firms, each fully embedded in a social and economic network. Rather, many clusters, perhaps particularly in technology-intensive industries, are organized as sets of alliances (Tallman & Jenkins, 2002). Groups of suppliers tend to develop around 'lead firms', usually larger firms

that produce final goods and sell them to customers outside the cluster. Competition within the cluster takes place between these vertical groups, focused on the horizontal interactions of the lead firms, rather than between firms at all levels of the local value-adding chain (Maskell, 2001). What mechanisms lead toward this differentiation within clusters? Suppliers tend to develop in areas of concentrated economic activity, and supply relationships seem often to become co-specialized as the firms work together over time. The descriptions by Dyer and various co-authors of the development of the Toyota vertical keiretsu in Japan (e.g., Dyer & Hatch, 2004) provide a classic example of vertical co-specialization in action. Toyota was the only lead firm in its Toyoda City cluster, but similar, if less extensive and formal, processes are at work in supply networks in more competitive clusters as well. Evidence also suggests (Phene & Tallman, 2006) that when firms take note of spillovers within clusters, originating firms have a tendency to seek alliances with firms that cite their patentable component knowledge. Recipient firms, however, tend to avoid alliances with firms whose knowledge they cite, a condition exacerbated inside clusters. These tendencies suggest that originating firms would prefer to access the returns to their knowledge that is lost through uncompensated spillovers by setting formal ties that presumably include some form of licensing or other compensation. Recipients of spillovers, particularly within clusters where a common architectural knowledge base increases absorptive capacity (Tallman et al., 2004), have no reason to want to share their returns on freely obtained knowledge spillovers and are less likely to need access to the complementary knowledge that the originator might still hold privately.

We see that recent empirical research suggests that firms in alliances tend to hold their partners at a distance through contracting arrangements and operational expectations, apparently in fear that knowledge beyond that specifically contracted for will leak to the partner. Stronger firms seem to benefit the least from strong partners, suggesting that weaker partners may be more open in alliances in the hope of establishing two-way flows of knowledge from which they would hope to gain more than they lose (Srivastava et al., 2010). In clusters, however, the unintended nature of spillovers makes restrictions irrelevant – firms may try to limit opportunities for leaks, but a spillover by definition has bypassed any controls. In this situation, all firms try to limit outward leaks, but are alert to incoming



spillovers from others. Stronger, more innovative firms should have greater capacities for absorbing and incorporating such spillovers into meaningful innovation than will their weaker co-located firms. If we consider that much of such leakage will be of component knowledge within a supply chain, these results suggest that the final product firm is likely the larger, stronger, more externally focused partner and is likely to gain more than its suppliers. The suppliers would have an incentive to seek long-term contracts in order to benefit from their knowledge more fully, and the lead firm, while not necessarily needing more knowledge inputs, may be willing to lock in partners to reduce future bargaining and perhaps for future joint development projects. Thus, what start as arms-length contracts are likely to evolve into vertical supply networks of alliances. In vertical clusters with a single lead firm, suppliers may have little choice about accepting formal ties – indeed, they presumably locate in the area with this expectation. In technology clusters with multiple competing lead firms, the desire to build joint technology or product development ties without worrying about leakage to other lead firms via shared suppliers suggests that formally organized networks are again likely. Except in the case of the smallest, most traditional clusters, the use of alliances to stimulate knowledge development and to protect innovations from premature leakage seems to suggest that complex internal network structures are to be expected in regional clusters.

6. CONCLUSION

What is to be learned from research into external knowledge sourcing that might be useful to practice? First, it is clearly the case that firms around the world are engaged in dispersing their value-adding operations through both outsourcing of previously internal operations and through moving operations to more productive locations. Outsourcing is built on networks of contractual alliances that are integrated with the wholly- and partially-owned subsidiaries of the firm and that bring intermediate goods and business services and also novel knowledge into the firm. To make the most of global logistic nets, multinational firms must engage their partners in knowledge combination and creation, not just permitting them to perform their own activities with minimum performance but encouraging them to be integral parts of the larger knowledge network that makes up what might be called ‘the strategic firm’. To



make this happen, the powerful global multinationals that control these networks need to overcome their reluctance to expose their own knowledge to partners. Every indicator is that opportunistic strategies are becoming rapidly obsolete in an information-intensive world. Firms in networks need to look to the advantages of more active combination and recombination of knowledge (Kogut & Zander, 2002) within the network rather than the risks of some proprietary know-how leaking to a partner. The motto needs to be: 'if it is important enough to leak, it is important enough to share.' That is, licensing knowledge that is needed to make the alliance transaction successful, and which demands for efficiency will eventually pull into the open, protects the value of the knowledge even as the details are revealed. Secrecy limits the ability to make the most of an idea, while only slowing but never stopping its eventual loss.

This same movement of value-adding activities into global networks makes clustering more relevant. Value creation, once separated from value delivery to the market for that value, should be established in the most productive location available. It appears that in most industries, such locations are the homes of industry clusters. Local competition drives aggressive pricing. Cooperation, short supply lines, and trained workers drive lower costs. Shared knowledge keeps innovation sharp. Multinational firms need their subsidiaries – or at least their suppliers – to be among the lead firms in critical clusters. Not only should these provide a local foothold and access to cost-efficient value production, but they should also allow the multinational to tap indirectly into the knowledge of goods, services, and technology that has developed in any cluster. By engaging actively in stronger knowledge clusters, strong firms benefit greatly, and not just in the cluster.

Thus, access to and sharing of externally-sourced knowledge is essential to economic success in technology-intensive, globalizing industry sectors. Focus on protecting static know-how from partners must shift to recognition that knowledge sharing is a necessary two-way activity, and that the speed of knowledge development in this world makes inefficient recombination a much greater strategic risk than uncompensated spillovers. Firms need to act on this understanding and scholars need to recognize that the truisms of 30 years ago do not reflect the realities of today's international marketplace.

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