

## **Sustaining Competitiveness through Alliances and Innovation: The impact of Alliance Management Issues on learning skills and competencies from partner(s)**

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### **Abstract**

As companies face pressure from increased competition, shortening product life cycles and growing product complexity many are finding they need to change the way they develop new technologies, products and services. As companies realize they can no longer afford to rely solely on their own R&D and need to acquire ideas from others, there has been a trend in many sectors away from a mostly closed to a more open model of innovation.

Over the last two decades there has been unprecedented growth in the number of inter-organizational alliances (David and Foray, 2003; Gulati and Gargiulo, 1999; Hagedoorn, 2002). In the last fifteen years there has been a surge in the number of strategic alliances within the technology-intensive industries. The examples are semiconductors, computers, software, and commercial aircraft. The focus of these studies is joint R&D, product development, and higher levels of knowledge exchange and technology transfer (Mowery, Oxley and Silverman, 1996). The theoretical model that predominantly has been applied to the analysis of alliances is the resource-based view of the firm (Barney, 1991; Penrose, 1959; Wernerfelt, 1984). The central point of the resource-based view is the assumption that firms achieve and sustain a competitive advantage through heterogeneity of resources located within the firm.

Alliances have become very popular on account of the desire by most companies to achieve higher returns in their R&D as well as operations. Innovations have become the key to survival and growth in this highly growing technological era. Owing to the limitations of knowledge resources to generate greater innovative capabilities, companies have taken the route of collaboration. Alliances provide access to complementary skills and capabilities and also bring economies of scale and scope. Chesbrough (2003) argues that the older view of successful innovation requires control which he terms as closed innovation paradigm is to be replaced with open innovation paradigm where rules are just opposite. The fundamental arguments and differences are in creating value through business models in both paradigms. The factors which fundamentally question the assumptions of the closed innovation paradigm are growing mobility of experienced people, faster time to market and the growing presence of private venture capital fund. Given these conditions Chesbrough (2003) argued that the open innovation paradigm will enhance the innovativeness of corporations. The thrust in these arguments is on the need to learn from others and combine it with your skill base and diffuse it to generate new products or processes. This can be mainly seen in the alliance learning research.

Although the alliance learning area is rich and fast developing, many of the most significant theoretical and managerial issues in the area have not been addressed, or have been addressed peripherally. To learn through an alliance, a firm must have access to partner knowledge and must work closely with its partner. As a result, both collaborative process and firm specific perspectives must be understood (Inkpen, 2002).

While a lot of work has been grounded in the R&D innovations internally, not much work has been done to understand the model of appropriating technology from the partner and use the same in the said firm's innovative efforts. Innovation is taken as an iterative process by which a knowledge base is developed by an organization to devise and design tools & procedures for their use which decreases the uncertainty for meeting a set of needs or problems. Study of learning appropriate technology from the partner and combining it with one's own competence and diffusing it is not happened. So this research focuses on those firms with the intent to build competencies by appropriating skills, technology and other strategic capabilities from the partner.

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The literature on the alliance based innovation strategies is premised on the basis of strategic intent of one of the partner firms to appropriate technology from the partner(s) and build on their core competence. We examine strategic alliances involving small and medium firms where the alliance activity is innovations that make new products, processes or services and the intent is to absorb partner capabilities. Small firms have been chosen to minimize the effects such as scale, scope and established influences that impact the management and decision making processes of large firms. The learning alliances in the Indian industry are chosen as the context for this study, since those alliances are predominantly for the purpose of product innovation. Several hypotheses have been developed on the factors that affect the ability of firms to gain advantages and capabilities from its alliance partners.

**Keywords:** Strategic Alliances, Innovation, Learning, Structure of Alliances

### **Sustaining Competitiveness**

A firm's sustainable competitiveness derives from its ability to assemble and exploit an appropriate combination of resources. It is achieved by continuously developing existing and creating new resources and capabilities in response to dynamic market conditions (Barney, 2007). The resource based view (RBV) of firms (Barney, 1991) is based on the concept of economic rent and the view of the company as a set of capabilities. In contrast to Porter's (1980) five forces model, the resource-based perspective highlights the need for a fit between the external market context in which a company operates and its internal capabilities.

The resource-based view is grounded in the perspective that a firm's internal environment, in terms of its resources and capabilities, is more critical to the determination of strategic action than is the external environment. Instead of focusing on the accumulation of resources necessary to implement the strategy dictated by conditions and constraints in the external environment, the resource-based view suggests that a firm's unique resources and capabilities provide the basis for a strategy. The strategy chosen should allow the firm to best exploits its core competencies relative to opportunities in the external environment. According to this view an organization is a set of unique resources and capabilities that provides the basis for its decision making and the primary source of its returns. Thus, differences in firm's performances across time are driven primarily by their unique resources and capabilities rather than by an industry's structural characteristics. Resources are inputs into a firm's production process, such as capital, equipment, and the skills of individual employees, patents, finance, and talented managers. Resources are either tangible or intangible in nature. With increasing effectiveness, the set of resources available to the firm tends to become larger. Individual resources may not yield to a competitive advantage. It is through the synergistic combination and integration of sets of resources that competitive advantages are formed. A capability is the capacity for a set of resources to integratively perform a task or an activity. Through continued use, capabilities become stronger and more difficult for competitors to understand and imitate.

Resource dependence theories suggest that firms need to enter into relationships because they cannot generate all the necessary resources internally (Child, 1974; Pfeffer & Salancik, 1978; Eisenhardt and Schoonhoven, 1996). Small firm alliance with large firms have been explained by synergy arguments. Rothwell (1983) argues that small firms have advantages in innovative activities. Large firms have resource-based advantages. Thus, alliances might give small firms access to complementary assets that are often necessary to commercialize innovations (Hobday, 1994; Teece, 1986). Particularly in technology intensive industries such as biotechnology, this form of strategic technology alliances has been extensively reported (Pisano, 1990; Pisano, 1991).

Over the last two decades there has been unprecedented growth in the number of interorganizational alliances (David and Foray, 2003; Hagedoorn, 2002). In the last fifteen years there has been a surge in the number of strategic alliances within the technology-intensive

industries. The theoretical model that predominantly has been applied to the analysis of alliances is the resource-based view of the firm (Barney, 1991; Penrose, 1959; Wernerfelt, 1984). As discussed above the central point of the resource-based view is the assumption that firms achieve and sustain a competitive advantage through focus on those resources and capabilities that are rare, costly to imitate and are difficult to organize (Dierickx & Cool, 1989; Amit and Schoemaker, 1993; Black and Boal, 1994). Therefore the complementary assets and the firms who own those assets are considered relevant in sustaining advantage allowing the focal firm to focus on deploying its rare, inimitable and organizationally embedded resources and capabilities (Peteraf, 1993).

We will turn our attention to innovation. Innovation is closely linked to the exchange and recombination of knowledge (Nonaka, 1994). Traditionally innovation researchers have distinguished between *invention* and *innovation*. In this perspective invention is defined as the discovery of something that did not already exist, whereas innovation is defined as the subsequent recombination of knowledge (including inventions) into commercialized. Newer research dismisses this distinction and describes innovation as an iterative process that simultaneously includes discoveries and recombination (David and Foray, 1995; Ruttan 2001). At the core of the new framework is the exchange of knowledge as facilitator of both discoveries and the recombination of knowledge (Merton, 1995). Inter-organizational alliances offer a way for such knowledge exchanges to occur (Powell, Koput and Smith-Doerr, 1996b).

Alliances may generate knowledge that can be used by parent firms to enhance innovations in strategic and operational areas unrelated to the alliance activities (Khanna, Gulati, Nohria, 1998). This type of knowledge connotes alliance knowledge. Further we assume that organizational learning is both a function of access to knowledge and the capabilities for using and building on such knowledge (Powell, Koput, & Smith-Doerr, 1996). We also perceive alliances as mixed-motive structural forms. As Inkpen (2002) suggested, to learn through an alliance, a firm must have access to partner knowledge and must work closely with its partner. As a result, both collaborative process and firm specific factors must be understood.

Here our aim is to understand the above two areas which may help the alliances to learn and innovate through structuring and managing the alliance systematically. We are finding out the different factors which may lead to optimize this learning and hence innovation.

### **When alliances are relevant to innovation?**

The innovative competence of the firm has traditionally been linked to intra-organizational factors such as R&D investments and gifted inventors (Ruttan, 2001; Schumpeter, 1955; Shane and Venkataraman, 2000). The literature review and recent research (Burt, 1992; Van de Ven et al., 1999) however, provide evidence that inter-organizational alliances play a central role in determining a firm's innovative capability by demonstrating that innovation occurs in alliances of organizations across multiple contexts.

Taking the frequency of patenting as a surrogate for innovation many researchers have examined the relationship between alliances and innovations by analyzing how formalized alliances influence the frequency of patenting. The positive relationship between alliance formation and innovation can be seen from several empirical studies. These studies include several diverse industries. Biotechnology is one of the areas with several similar studies (Baum, Calabrese and Silverman, 2000; George, Zahra and Wood, 2002; Powell et al., 1999; Walker, Kogut and Shan, 1997). Other areas include chemicals (Ahuja 2000a), telecommunications (Godoe 2000), semiconductors (Stuart 2000), colleges (Kraatz 1998), and across industries (Sarkar, Echambadi and Harrison, 2001a). All these studies are giving ample evidence for the causal part of alliances for innovation.

There are studies which show the positive relationship when the alliances are formed, not with other firms, but with universities (George, Zahra and Wood 2002). The diversity of the research contexts provides support for the effect being generalizable. Moreover, almost all studies

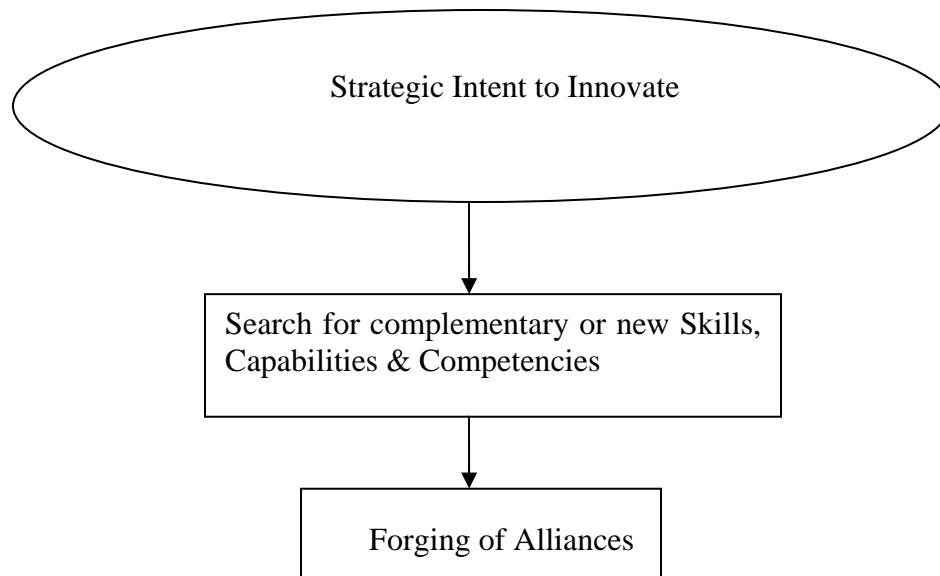
use patents as a proxy for innovation. There are exception like Kraatz (1998), and Sarkar, Echambadi and Harrison (2001) who uses questionnaires for their investigation.

In the literature about the formation of strategic technology alliances, cost arguments have received attention. Cost arguments can be divided into accounting-based arguments and transaction cost arguments. The motivation for entering an alliance is cost savings from the alliance. Particularly for basic research, it has been argued that the increasing cost of innovation might be an important motivation for firms to enter into alliances (Glaister & Buckley, 1996; Hagedoorn, 1993; Hennart, 1993; Madhok, 1998; Kogut, 1988a; Williamson, 1985; Osborn and Hagedoorn, 1997).

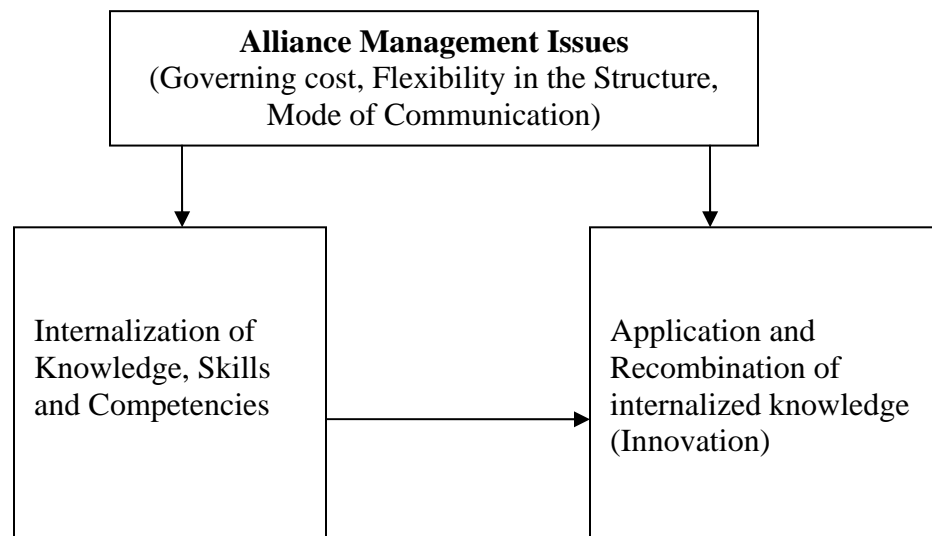
### **Why Consider Alliance Management issues?**

Since our main aim is to understand alliances as causation for innovation and to find out what kind of organizational mechanism optimizes this causation. The moderating factors such as absorptive capacity, characteristic of knowledge, trust, age, size, and R&D spending are discussed. Since literature suggests positive and negative influence of alliance on innovation, we investigate for a mediating variable in between these two constructs. We strongly feel the learning dimension may have a significant impact on the resulting innovation from alliances. The way alliances are organized may pose either positive or negative consequences in its learning ability. Many of the skills that migrate between companies are not covered in the formal terms of collaboration. Top management puts together strategic alliances and sets the legal parameters for exchange. But what actually gets traded is determined by day-to-day interactions of engineers, marketers, and product developers: who says what to whom, who gets access to what facility, who sits on what joint committees. Limited unintended transfers ultimately depend on employee loyalty and self discipline. So when we try to realize the innovative outcomes through alliances, the alliance management issues become a key in the transfer, recombination and application of knowledge from one partner to the other. The firm specific factors may also determine this outcome. But here our aim is to deal with alliance management issues in the transfer, recombination and application of knowledge from one partner to the other. Our research premise and guiding model are presented below.

### **Research premise**



## Guiding Model



### *Alliance Management Issues*

#### **Governing cost**

Despite the importance given to alliances—and the considerable assets and revenues they often involve—very few companies systematically organize their activities. The first is a failure to organize and measure the given firm's activities and performance related to the alliance rigorously. Second, companies often fail to recognize performance patterns across their alliance portfolios. A failure to address recurring problems can affect the effectiveness of the alliance. Also, only a few senior management teams know whether the alliance portfolio as a whole is synergistic with corporate strategy.

For a long time researchers are spending a lot of effort to determine the performance of alliances. To get the maximum value out of all alliances, managers should learn to measure their fitness on several levels. With this deeper understanding, managers can assess whether alliances fully contribute to the corporate strategy of innovation and can spot new opportunities to use them. To measure the performance of alliances accurately, a company must start by recognizing the obstacles. The operations of an alliance are often grouped with those of the parent companies, and this makes benefits and costs difficult to track. Most alliances receive some inputs—raw materials, customer data, administrative services—from the parent companies and provide outputs to them, thereby creating complicated transfer-pricing issues.

Then there is the problem of measuring costs. In many cases, early estimates are exceeded because the partners fail to consider the expenses of coordinating their activities or the value of senior management's time. So the cost becomes the focal issue even when the alliance was decided on the basis of learning for innovation. If alliance can reach a fitness level in organizing of the alliance with respect to financial and relational matters, it can dedicate more time and effort on learning from the other partner. So the way the alliance is organized will determine the effectiveness of learning from the partner and in turn will determine the inputs for innovation.

That leads to the following hypothesis:

*Hypothesis 1: Lesser the organizing cost for the alliance, the more will be the firm's ability to internalize partner knowledge and reduce partner dependency*

Flexibility – Organicity of the alliance structure



Due to need for flexibility specific rules will be minimized. The required use of specific rules for the alliance will be partially correlated with the progress of the firm's skill building effort (Macintosh & Daft, 1987). In a systematic study, Macintosh & Daft had shown that depending upon the interdependence between the departments the control systems vary to enhance performance of the firm as a whole. This should be applicable for alliances also when they are intending to learn for innovation where learning itself is a process which will have pooled, sequential and reciprocal interdependencies (Thompson, 1967). Depending upon what kind of learning is intended, whether operational or strategic, the use of rules will vary. The use of rules will decrease with increased interdependence. For the firms pursuing the intent to build on partner competence, some degree of rules for using the firm's alliance on its partner is likely. This will be the case with pooled and sequential interdependencies. A firm with high capacity to learn would be more likely to extensively incorporate plans for the alliance to meet its objectives of competence building under these circumstances.

That leads to the following hypotheses:

*Hypothesis 2a: Lesser the organicity in the alliance structure, higher will be the internalization of knowledge*

When competence demands for innovations are high or the involvement in the strategic decision making is high, emphasis on rules will be found to occur at slightly higher levels. When the competence of the system increases from both participative decision making and significant demands for the technical concerns of innovation, rule structure will help maintain a needed check to keep a focus on the technology and know-how.

This increased use of rules can be constructed to instances when the market based constraints are similar and creativity is needed. In this setting, rules will be minimized as a way of enlarging the equivocality needed for flexibility conducive to meeting the firm's strategic intentions for the alliances. This will be the case with reciprocal interdependency.

For similar reasons, rules will not moderate the effect of operational learning on the competence building outcomes where interdependency is a pooled or sequential one, since operating rules will only further help the discovery process. But the case will be different in the case of a reciprocal interdependency such as recombination and application of knowledge. Plans are necessary when the technical departments are the most demanding and finding alternate partners for innovation having the greatest search cost.

That leads to the following hypothesis:

*Hypothesis 2b: Higher the organicity in the firm's organizational structure, higher will be the recombination and application of knowledge from the said firm*

### **Mode of Communication**

Japanese companies were better able to disseminate and use acquired knowledge more effectively than their counterparts in other western continents because of dense internal communication networks. Their informal get together and after work hour study groups helped them to disseminate acquired knowledge in their firms (Westney, 1988). The importance of communication modes are here pointed out as one of the major factors in acquiring as well as disseminating knowledge from the partner(s). That leads to the following hypotheses:

*Hypothesis 3a: Higher the openness in communication within the alliance structure, higher will be the internalization of knowledge by the said firm*

*Hypothesis 3b: Higher the openness in communication within the firm's organizational structure, higher will be the recombination and application of knowledge from the said firm*

## Preliminary Results and Discussion

Data were collected through a survey of CEOs with prior alliance experience. Alliance was defined as the following:

One time very short arms-length contracts	Non Equity Alliances			Equity Joint Venture	Complete Merger or acquisition or Greenfield subsidiary
	Relational contracts (Eg: turnkey or training)	Medium term relationships (eg: Licensing)	Medium to Long term supply chain relationship		

(Contractor & Lorange, 2002)



A strategic alliance involves at least two partner firms that:

- Remain legally independent after the alliance is formed
- Share benefits and managerial control over the performance of assigned tasks and
- Make continuing contributions in one or more strategic areas, such as technology or products (Yoshino and Rangan, 1995).

The questionnaires were designed and the survey implemented according to Dillman's (2000) tailored design method.

We used management doctoral students to assess whether the content of the items tapped the conceptual domain of the focal construct (DeVellis, 1991). This yielded a set of fine-tuned questionnaire items that we used in survey with CEOs of Portuguese firms involved in strategic alliances. The questionnaires were sent to CEOs of 70 Portuguese firms with international alliances. This wave of survey mailings was followed, four weeks later, by a reminder. Of the 70 CEOs and senior executives who received questionnaires, 28 responded.

### Dependent Variable

We measured Knowledge transfer and innovation using a three item Likert scale reflecting (1) the extent to which the firm has learned about the technology/ process know-how held by its partner, (2) the extent to which the firm has greatly reduced its initial technological reliance or dependence upon the partner since the beginning of the alliance, (3) the extent to which the technology/process know-how held by the firm's partner has been assimilated by the firm and has contributed to other projects developed. With a Cronbach's alpha of 0.81, the performance scale demonstrated high reliability (DeVellis, 1991; Nunally, 1978).

### Independent Variables

#### *Governing cost*

We measured governing cost using a three item Likert scale reflecting the extent to which the firm has committed time and resources for planning, monitoring and managing the alliance activities. With a Cronbach's alpha of 0.89, the performance scale demonstrated high reliability.

#### *Organicity and Mode of Communication*

We measured Organicity and Mode of Communication using a six point and one point item Likert scale developed by Khandwalla (1976/1977). The Cronbach's alpha of 0.91 demonstrated a high reliability for the organicity construct.

### *Test of Hypotheses*

Hypothesis 1 predicts that lesser the organizing cost for the alliance, the more will be the firm's ability to internalize partner knowledge and reduce partner dependency. The coefficient for internalization in our model is positive and significant ( $b = 0.476$ ,  $p = 0.1$ ), thus supporting alternate of Hypothesis 1.

Hypothesis 2a predicts that lesser the organicity in the alliance structure, higher will be the internalization of knowledge. The coefficient in our model is negative but not significant ( $b = -0.525$ ,  $p = 0.2$ ), thus partially supporting the arguments.

Hypothesis 2b predicts that higher the organicity in the firm's organizational structure, higher will be the recombination and application of knowledge from the said firm. The coefficient in our model is positive and significant at 0.1 level ( $b = 0.434$ ,  $p = 0.1$ ), thus supporting Hypothesis 2b and past findings reported in the literature.

Hypothesis 3a predicts that higher the openness in communication within the alliance structure, higher will be the internalization of knowledge by the said firm. The coefficient in our model is negative and not significant ( $b = -0.049$ ,  $p = 0.8$ ), thus not supporting Hypothesis 3a.

Hypothesis 3b predicts that higher the openness in communication within the firm's organizational structure, higher will be the recombination and application of knowledge from the said firm. The coefficient in our model is positive and significant ( $b = 0.368$ ,  $p = 0.1$ ), thus supporting Hypothesis 3a.

Overall the model explains 34% of the variance at a significant level of 0.042 which is quite encouraging for this exploratory effort.

### **Discussion and Future Research**

Our research provides significant insights about how the alliance management issues affect the extent of internalization of knowledge, skills and competencies and the application and recombination of internalized knowledge in the firm's innovativeness when it takes an alliance route to innovation. Specifically, the study points out the need to look more intensely into the structure and management of alliances if your need is to learn for innovation. Researchers and managers ought to take into account the type of governance and structure to understand the potential for learning. In our study, the alliance governance cost, flexibility and the mode of communication came as significant factors in the context of learning for innovation. We hope that our study will encourage future studies that will look in more detail the effect of alliance management issues in the context of learning for innovation.

### **References**

- Amit, Raphael and Paul J. Schoemaker. 1993. Strategic assets and organisational rent. *Strategic Management Journal*, 14 : 33-46
- Barney, J. B. 2007. *Gaining and sustaining competitive advantage*. New York: Addison-Wesley.
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99-119.
- Baum, J. A. C., T. Calabrese, and B. S. Silverman. 2000. Don't Go It Alone: Alliance Network Composition and Startups. Performance in Canadian Biotechnology. *Strategic Management Journal*, 21: 267-294.
- Black, J.A., Boal, K.B. (1994), Strategic resources: traits, configurations and paths to sustainable competitive advantage. *Strategic Management Journal*, Vol. 15 Summer, pp.131-48
- Burt, R. S. 1992. *Structural Holes - The Social Structure of Competition*. Cambridge, Massachusetts, and London, England: Harvard University Press.
- Child, J. 1974. *Management and Organization*. New York: Halstead Press.
- Contractor, F., & Lorange, P. 2002. The Growth of Alliances in the Knowledge-Based Economy. In F. Contractor & P. Lorange (Eds.), *Cooperative Strategies and Alliances* (pp. 3-22). London: Pergamon
- David, P. A., and D. Foray. 1995. *Accessing and Expanding the Science and Technology Knowledge Base*. STI Review.



- DeVillis, R. F. 1991. *Scale development: Theory and applications*. Newbury Park, CA: Sage.
- Dierickx, I., & Cool, K. 1989. Asset stock accumulation and the sustainability of competitive advantage. *Management Science*, 35(12): 1504-1511
- Eisenhardt, K. M., and C. B. Schoonhoven. 1996. Resource-based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms. *Organization Science*, 7: 136-150.
- George, Gerard, Shaker A. Zahra, and D. Robley Wood. 2002. The Effects of Business- University Alliances on Innovative Output and Financial Performance: A Study of Publicly Traded Biotechnology Companies. *Journal of Business Venturing*, 17: 577-609.
- Godoe, H. 2000. Innovation Regimes, R&D and Radical Innovations in Telecommunications. *Research Policy*, 29: 1033-1046.
- Glaister, K. W., & Buckley, P. J. 1996. Strategic motives for international alliance formation. *Journal of Management Studies*, 33(3), 301-332.
- Hagedoorn, J. 2002. Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy*, 31:477-492.
- Hennart, J. F. 1993. Explaining the swollen middle: Why most transactions are a mix of "market" and "hierarchy". *Organization Science*, 4(4): 529-547.
- Hobday, M. 1994. The limits of silicon valley: A critique of network theory. *Technology Analysis & Strategic Management*, 6: 231 - 243.
- Inkpen, A.C. 2002. Learning, Knowledge Management, and Strategic Alliances: So Many Studies, So Many Unanswered Questions, in F.J. Contractor and P. Lorange (eds.) *Cooperative Strategies and Alliances*, Elsevier Science: Amsterdam, pp: 267–289.
- Khandwalla, P. N. 1976/77. Some top management styles, their context and performance. *Organization and Administrative Sciences*, 7(4), 21-51
- Khanna, T., Gulati, R., & Nohria, N. 1998. The dynamics of learning alliances: competition, cooperation, and relative scope. *Strategic Management Journal*, 19, 193-210.
- Kogut, B. 1988a. Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal*, 9(4): 319-332.
- Kraatz, M. S. 1998. Learning by Association? Interorganizational Networks and Adaptation to Environmental Change. *Academy of Management Journal*, 41: 621- 643.
- Macintosh, N.B., and Daft, R.L. 1987. Management Control Systems and departmental interdependencies: An empirical study. *Accounting, Organizations & Society*, 12(1), 49-61.
- Merton, Robert K. 1995. The Thomas Theorem and the Matthew Effect. *Social Forces* 74: 379-422.
- Nonaka, Ikujiro. 1994. A dynamic theory of organizational knowledge creation, *Organization Science*, 5(1): 14-37
- Nooteboom, B. 1996. Trust, opportunism and governance: A process and control perspective. *Organization Studies*, 17(6), 985-1010.
- Nunnally, Jum C. 1978. *Psychometric Theory*, New York, McGraw-Hill
- Osborn, R. N., & Hagedoorn, J. 1997. The institutionalization and evolutionary dynamics of interorganizational alliances and networks. *Academy of Management Journal*, 40(2): 261-278.
- Penrose, E. 1959. *The theory of the growth of the firm*. Oxford: Blackwell
- Peteraf, M.A. (1993). The cornerstones of competitive advantage: a resource based view. *Strategic Management Journal*, 14 (3): 179-91
- Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations*. New York: Harper & Row.
- Pisano, G. P. 1990. The R&D boundaries of the firm: An empirical analysis. *Administrative Science Quarterly*, 35: 153-176.
- Pisano, G. P. 1991. The governance of innovation: Vertical integration and collaborative arrangements in the biotechnology industry. *Research Policy*, 20: 237-249.
- Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York, NY: Free Press
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1), 116-145.
- Powell, W. W., K. W. Koput, H. L. Smith, and J. Owen-Smith. 1999. Network Position and Firm Performance: Organizational Returns to Collaboration in the *Biotechnology Industry*. *Networks In and Around Organizations*.



- Rothwell, R. 1983. Innovation and firm size: The case of dynamic complementarity. *Journal of General Management*, 8(6): 5-25.
- Ruttan, Vernon W. 2001. *Technology, Growth, and Development - An Induced Innovation Perspective*. New York Oxford: Oxford University Press.
- Sarkar, K. B. , R. Echambadi, and J. S. Harrison. 2001a. Alliance Entrepreneurship and Firm Market Performance. *Strategic Management Journal*, 21: 369-386.
- Schumpeter, J. A. 1955. *The Theory of Economic Development - An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Cambridge, Massachusetts: Harvard University Press.
- Shane, S. , and S. Venkataraman. 2000. The Promise of Entrepreneurship as a Field of Research. *Academy of Management Journal*, 25: 217-226.
- Stuart, T. E. 2000. Interorganizational Alliances and the Performance of Firms: A study of Growth and Innovation Rates in a High-technology Industry. *Strategic Management Journal*, 21: 791-811.
- Teece, D. J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, 15, 285- 305.
- Thompson, J.D. 1967. *Organizations in action*. NY: McGraw-Hill.
- Van de Ven, A. H., D. E. Polley, R. Garud, and S. Venkataraman. 1999. *The Innovative Journey*: Oxford University Press.
- Walker, G., B. Kogut, and W. Shan. 1997. Social Capital, Structural Holes and the Formation of an Industry Network. *Organization Science*, 8: 109-125.
- Westney, D. E. 1988. Domestic and foreign learning curves in managing international cooperative strategies. In F. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business* (pp. 339-346). Lexington, Mass.: Lexington Books.
- Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal* ,5:171-181.
- Williamson, O. E. 1975. *Markets and Hierarchies*: Free Press.
- Zaheer, A., McEvily, B., & Perrone, V. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science*, 9(2), 141-159.
- Zaheer, A., & Venkatraman, N. 1995. Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic exchange. *Strategic Management Journal*, 16, 373-392.
- Zajac, E. J., & Olsen, C. P. 1993. From Transaction cost to transactional value analysis: Implications for the study of interorganizational strategies. *Journal of Management Studies*, 30(1), 131-145.

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