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Innovation through Networks: Technology and Cooperative Relationships

ABSTRACT
The objective of this paper is to understand relationship dynamics for buyer and supplier firms in high technology markets and identify variables that influence the characteristics of long-term relationships for such firms in a competitive network. A framework of cooperative relationship development in technological contexts is constructed based on interdependency of different technologies on each other, technological capability of the suppliers and external environmental factors, to support the theoretical understanding about buyer and supplier relationship dynamics.[2]

INTRODUCTION

Every firm has certain objectives behind a relationship and the firms cooperate because they have reciprocal dependencies (Håkansson, 1987). This reciprocal dependency between firms creates leverage for the firms to each other's competencies. The reciprocal dependencies could be gaining access to new markets and technologies, getting know-how and skills of the resources outside the firm. In high technology environment, sharing of risk and cost for R&D expenditures, and development of products and innovative processes are the motivating factors for long-term relationships with the suppliers. Through long term relationships high technology firms avoid uncertainty and maintain sustainable competitive advantage over other firms in the network (Ring and Van De Ven, 1992).

This work-in progress paper aims to develop a framework to increase our understanding of relationship dynamics by analysing the factors that influence the interaction process and characteristics of relationships at the interface of technological innovations introduced in the network of high-technology based firms. This paper is part of a research project which, examines the answer for the following broad research question; 'to sustain international competitiveness how does a transition from a firm's capability to competence recognition influence the internationalisation perspective of technology based firms.' In this context this paper focuses on relationships as a governance mechanism for activities and resources of firms involved in new product development processes in an industrial network. There is an explicit literature about 'how' inter-organizational relationships are developed in buyer seller context (Håkansson, 1982; Håkansson and Snehota, 1995), and its extension to the

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[2] **Key words:**
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technical and product development relationships, (Ford, 1991). The complex nature of interaction in a network calls for more research in different dimensions of industrial network and factors that trigger and influence the characteristics of inter-organizational relationships in the context of high-technology based firms. Most of the studies focus on inter-organizational relationships as a self-contained unit of analysis and there is a need for understanding about the factors that govern the features of inter-organizational relationship development (Ebers, Cheung, and Turnbull 1998; Hagedoorn 1993). This paper examines the dynamics and characteristics of the buyer-seller relationships in high technology markets where rapid changes in process and product technologies introduce change in the organization and influence long-term buyer-supplier relationships. The growing amount of studies on International Joint Ventures, and Strategic Alliances in technology-based firms does not address this from network perspective (Thomas and Ford, 1995). Prominent examples of studies with explicit network approach are Håkansson, 1987; Håkansson 1989; Laage-Hellman, 1989; Laage-Hellman and Axelsson, 1986; Lundgren 1991 and Waluszewski 1995.

The paper begins with an analysis of the interaction model in the context of high technology firms to lay down a criterion for factors influencing relationship development process in buyer and supplier firms. Technological innovation is found to be embedded in its two dimensions: *Technological and Organizational Change*. How do companies develop inter firm cooperative relationships capitalizing on their capability, avoiding technological uncertainty in the environment and fostering organizational innovations to adapt to the changes in buyer and supplier firms is emphasized to support the propositions. On this basis a framework is developed between organization, entrepreneur, and technological innovation as an integrated mechanism that fosters and develops relationship development process, and is then incorporated into an interaction model for high technology firms.

The unit of analysis is at firm level focusing on relationships as governance mechanism for exchange of activities and links between actors in the network. The focus of research in the present paper is on two parties relationships for technological innovation process with interaction model as head start, and later on, to encompass the entirety of activities between firms it will be extended to the analysis of a network of firms in the similar context. Therefore, in this paper the two models, Interaction model and Network model being part of the same theory will be addressed as the starting and later stages of relationship development process respectively. Two firms are also part of a network, which is a function of an environment; ignoring network perspective at this dyadic level is unavoidable. The variables of the analysis relate to the elements and the process of the interaction. The emphasis is on the elements, which are considered to influence the process of interaction.

A REVIEW OF LITERATURE

Ever since the Schumpeter's theory of profit and growth of innovations for a firm (1950) and Penrose's work (1958) on the growth of a modern firm and linking it to the very essence of the entrepreneur, innovations and entrepreneurs have taken an active place in inter organizational research. Later on Ansoff's work (1965) of strategy formulation with emphasis on technology as one of the competitive resource strength, highlighted the importance of technology as complementary force between organization and innovation in defining a firm's relationships with other firms. Von Hippel in 'Customer Active Paradigm' (CAP) provides customer's input for innovative ideas for the product development. Interactive nature of technological development is identified in conceptual

work of the Industrial Marketing and Purchasing Group (Håkansson, 1982) and later on Ford (1990), who identifies relationships as a resource for mobilizing activities and flow of information and resources for technological development in an industrial network.

Joint Ventures and Strategic alliances have also been considered as cooperative interaction mode. The literature on strategic alliances and joint ventures is based on grounds of collaborative behaviours, different forms of the collaborative behaviours and the factors that effect its long term and short-term success. Strategic alliances focus on inter organizational modes of cooperation, inter-firm networks in high tech industries, and the effects of strategic technology alliances on company performance and mostly take up resource based view of firm (Duysters, and Hagedoorn, 1995).

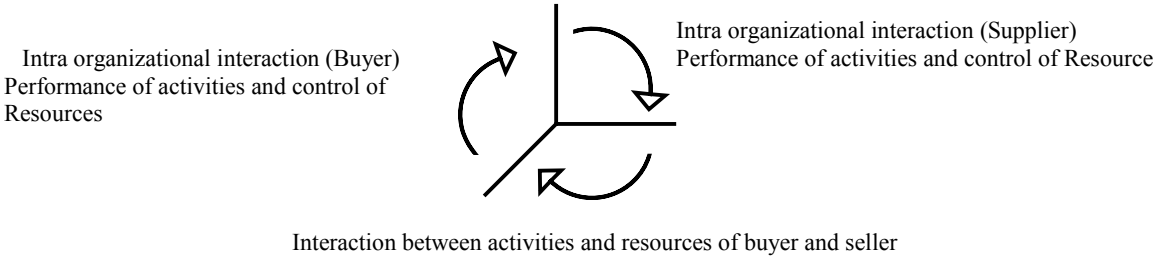
Ford and Thomas (1995) identify that this literature focuses on difficult technological and business environment facing firms. The environment is difficult because of increasing R&D expenditure; internationalisation of R&D; rapid changes in product developments; externalisation of technology sourcing; and increased protectionism of technology. Firms do receive benefits through joint ventures such as avoiding duplication costs for R&D in geographically dispersed networks (Zander 1991), access to new technology and markets, internalisation and maximization of knowledge (Prahald and Hamel, 1991), and improved competitive positions (Hagedoorn 1993; Prahald and Hamel, 1991; Hagedoorn and Schakenraad, J 1994). These views of joint ventures and strategic alliances focus on outward objectives and inward strategic value of collaborative technological activity. However, the external environment as one of the most important factors of analysis does not complement in this point of focus. The emergence of external environment as being the part of the organization itself introduces the network view of technological development in industrial structures (Ford 1995). High technology based firms reinforce external linkages with research institutes, in-licensing, joint ventures and acquisitions, vertical links with suppliers and with customers for efficient technological development.

INTERACTION APPROACH

The Interaction perspective proposed by the IMP research group provides the theoretical grounds of the framework (Ford 1991, Håkansson, 1982). The explanatory value of i*nteraction approach* for describing different dimensions of interaction of buyer-supplier relationship development is widely acknowledged as it gives equal weight to the buyer and supplier characteristics explaining the interdependent relationships between organizations and the importance of knowledge and physical resources as a basis for inter-organizational network development process (Campbell, 1985) and encompasses all the elements involved in the interaction process.

The assumption that activities and control of resources are interwined and do not operate independent of each other results in coordination mechanism modes and firms choose the best mode to operate efficiently (Håkansson H., and A. Lundgren 1995). The interaction between buyer and seller and the control of activities and resources through relationship governance is a continuous process and is in turn effected by each other. Therefore it is assumed that due to the connectedness in the activities and the dynamic nature of the network, change emerges and moves on to other parts and relationships play an important part in originating and transmitting this change (Halinen, Havila, and Salmi, 1999). Three dimensional interaction approach and its connectedness in dimensions is shown in Figure 1.

Fig 1. Dimensions of Interaction between buyer and supplier



Exchange activities and contact patterns

Interface contacts in the buyer and supplier is a complex level of interaction in which members form both the organizations are involved at different stages. This interaction forms a flow of information and resources system between the two parties. The interaction process between buyer and sellers starts with short-term episodes of interaction that could be product or service, information, financial, social, or technological exchange. In high technology based firms these short term episodes are sharing and enhancement of research and development activities, technological knowledge between the parties, cross fertilization of scientific technological fields, technology transfer, etc. (Hagedoorn, 1993). With gradual development in all these episodes of interaction firms build up relationships, either short term or long term depending on the objectives of the firms.

The relationship development process from its beginning, rests on inter organisational contact pattern. These contact patterns are different people operating in different departments of the firm and have a significant bearing on the relationship development in their capacity of the existing bodies of knowledge between the buyer and the seller's organization. Role of entrepreneurs as contact patterns in fostering and initiating the innovative activities and as coordinators of all the activities between the buyer and supplier firms is important, when cooperative relationships are analysed in the context of development of new project or process technologies. The entrepreneurs appear to be the mechanisms of coordination by mutual sharing of learning of process and product innovations vis-à-vis relationship development process in a network.[3]

Innovation and Entrepreneurial potential

Innovation is an interplay of knowledge between the actors, ability to apply that knowledge practically and using the knowledge by mobilizing resources, and then coordinating these resources between actors with efficient combination of firm specific technological capabilities (Hakkanson 1987). For this interplay, relationships among the actors are a dynamic element and network is a source of transmitting the innovation. Therefore,

[3] Individual actors have been considered as an indirect source of co-ordination within the networks (Håkansson, 1989) corporate technological behaviour: co-operation and Networks). This may suggest that the actors are as important as relationships but not necessarily the sufficient condition for co-ordination as relationships are the governing mechanisms in interaction between the buyer and the supplier. In this paper, entrepreneurs are identified as catalysts and source of coordinating the new ideas with supplier firms.

technological innovation is in fact a dynamic relationship among different variables. Potential of the individuals (entrepreneurs) in development of relationship between buyer and supplier as knowledge sharing bodies in both firms for creating technological innovation is one of the dynamic variables to influence cooperative relationships.

A company's activities are affected by the activities of the other companies that surround it even if the objective of analysis is a dyad, considering this aspect of networks help to explain the behaviour and its rationale for individual actors actions. Actors act according to what they perceive and how they take the environment and their positions in that environment. At this stage, technological issues take practical meanings. Understanding of the network by understanding how individual actors take it is considered more effective in explaining the behaviour of the firm. Therefore, technology is an important variable in analysing inter-firm relationships as this explains what actors do in the network and why they do so, giving the reasons for their particular behaviour (Ford 1995). This may imply that technological innovations drive organizational change and is embedded in technological and organizational change.

Product Characteristics and Market Structure

The nature and characteristics of the product has a significant effect on the relationship as a whole. High technology products can be classified according to the complexity, frequency of transactions, degree of standardization, importance of product to the buyers switching costs and uncertainty. If transactions happen frequently, the relationships are more independent. The complex natures of high technology products influence the relationship between buyer and seller. High technology products have manufacturing complexities, specification complexities, application complexities, and also commercial complexity. The more complex the product, the more interdependent is the buyer-supplier relationship. The characteristics of the relationship between buyer and seller and the nature of interaction shapes the whole process in an overall atmosphere of relationships that could be characterised in terms of power-dependence relationship, close or distant relationships, conflict or cooperation or mutual expectations which develop over a period of time within a certain relationship, (Campbell, 1985) therefore atmosphere as a separate variable is not highlighted in this paper rather; the cooperative nature of the atmosphere is emphasized as a need for resource dependencies. Firms identify the nature of the atmosphere according to their own resources and the relationships these firms have with other firms therefore, the atmosphere is a collection of all the variables affecting the interaction process.

Environmental Uncertainty and Technological Capability of Supplier

Suppliers have been considered as an important source of technological change. Håkansson (1989) identifies that 27 percent of the 123 firms had no technological collaboration with suppliers and firms need to identify the supplier to build up the relationship and buy the specific technology. The relationship development process between buyer and seller cannot be analysed with out considering the other relationships existing in the same market and industry. Availability of different options in buyers and suppliers choice of selection for each other varies with the extent of buyer supplier concentration in that particular market. This concentration of buyer supplier in an industrial environment does not affect the availability of choices only but in the case of high technology firms also increases the

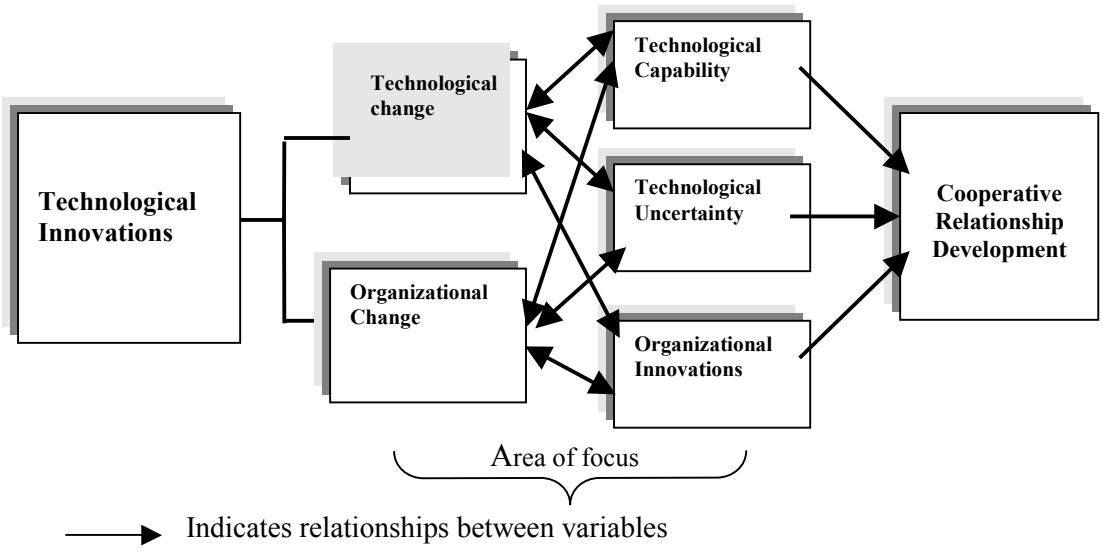
uncertainty in the environment. If there are large number of suppliers available, firms have better choice to negotiate and more easier to shift to another supplier offering the same product with better specifications. High-technology firms operate in an environment responsive to changes, products are added quickly and marketers are uncertain if the product is going to gain the volume or fail in the market as improved technologies are emerging quickly. Three types of uncertainties have been realized by Håkansson, Johansson and Wootz (1976) from a buyer's perspective; Need uncertainty, market uncertainty and Transaction uncertainty. It is a supplier's job to identify which dimension of uncertainty the buyer is facing and adapt according to that. In this context the need solving capability and the transfer ability of supplier is discussed in the later section.

This review leads to the following propositions:

Proposition 1
In high-technology based firms, technological innovation processes in buyer and supplier firms is the basis of exchange relationships and entrepreneurs are the mechanisms of coordination in interaction between buyer and supplier's firm for the innovative activities.

Proposition 2
Technological capability of supplier firm determines the extent and characteristics of relationships between buyer and supplier firm and reduces uncertainty.

Figure 2. Research Framework



This analysis into the elements of the Interaction model leads to a research framework, which provides guidelines for nature of characteristics for relationships; either long term or short term. Here, three variables as technological capability of supplier, technological uncertainty in the network, and organizational innovations as an internal medium to absorb or become part of the technological and organizational change, have been identified to affect the nature of cooperative relationships.

DISCUSSION

Technological development – a reason for interaction

Technology is broadly categorized into three interrelated types; Product, process and marketing technologies are combined together to produce a complete unit of product with application specifications. High technology firms do not produce all of these three types of technology at the same time and depend on suppliers or other firms to get the intermediary products (Thomas & Ford 1995). High technologies have interdependent nature and high-technology firms look to their suppliers to achieve a stronger competitive position and sustain it over a long period of time.

Technology is one of the critical characteristics of the interacting parties. The application technology of the buyer is dependent on the production technology of the supplier and ties the relationship between the two. The definition of technology adopted here is taken from the theory of the technological competence (Cantwell 1989). It is the search for any improvement, change, or learning process, and can be in the physical and non-physical form. From this definition it can be derived that technological innovation is any new idea, change or development in the existing technologies of all three types. Technology is specific to the context in which it is created and is a function of the skills of those who have developed and created it. The contact patterns of any organization, size and the structure, therefore have significant bearing on the development of technological products and processes. The process of technological innovation is embodied in technological and organizational change. This means technology is not the only catalyst in cooperative relationship development process, although it is a catalyst for increasing the effectiveness and coordination among actors[4].

Why Cooperative relationships?

Hagedoorn (1993) while analysing 'why companies cooperate in their efforts to innovate,' examines a large sample of 4000 strategic technology alliances in a number of industries with inter firm cooperation and innovative activity or technology exchange as their motive for alliance. The motives are seen in the context of both organizational settings of partners and also the industrial contexts, which affect the patterns of motives for strategic alliances. Here, strategic alliances are defined as inter firm cooperative agreements, which are aimed at improving the long-term perspective of the firms. Identifying technology complementarities and reduction of the innovation time span as most important motives, he states:

> …these outcomes could be interpreted as supporting the notion that cooperation has to be understood in the light of attempts made by the companies to cope with the complexity and interrelatedness of different fields of technology and their efforts to gain time and reduce uncertainty in joint undertakings during a period of growing technical intricacy. (Hagedoorn J., 1993:378)

[4] Role of technologies is enhanced in geographically dispersed innovation networks. See Zander 1999.

The above-mentioned motives help firms identify their distinctive capabilities in terms of technological innovations and firms develop these technological innovations through its interaction in the relationship with other firms. This creates an identity and position of the firm in the network. Through the cooperative strategies based on similar motives both the supplier and buyer firms create a net of relationships with mutual actions and compete on the synergistic potential of that net in pursuit of a competitive goal.

The analysis into the research focus starts by the process happening inside the firm and in the environment that generates and influence relationship development between two firms. Firm has a very specific role in the development of innovations as the critical interaction between the competencies and the tangible and intangible resources, originates from a firm (Leonard 1992). Changes in the external environment effect the development of a firm's capabilities. The entrepreneurs structure this dynamic interplay between the firm's capabilities and the changing external conditions, recognizing inter-firm learning with suppliers firms as a source of technological innovation. Firms develop dynamic capabilities to respond to changes in the new technologies. Hamel and Prahald (1994) and Leonard (1992) emphasize that managers are the important source of coordinating and managing the resources of the firms to generate competitive advantage. Entrepreneurs respond to radical changes in the environment, renewing their capabilities and organisations.

As technological innovations are changes in the processes or products of the firm and an outcome of interplay between the competencies of the firm and its resources, for diffusion of the process or product innovations a change happens in the organizational system such as changes in training systems, rendering of services, and interaction with contractors, suppliers and with the buyers of a particular service or product. This may lead to a shift in the position of the firm relative to other actors in the network. Even the most technology driven innovation firms (software firms) require organizational change. Successful organizational change, in turn, requires both technological vision and strategies to deal with portfolio of relationships. It is important to recognize the complex interrelationships among technology, organizational practices, and strategy when considering technological development projects so that managers can coordinate change in processes between buyer and supplier firms and make it a part of an integrated system. (Brynjolfsson, Renshaw and Alstyne, 1997)

Organizational Innovations

Organizations operate in dynamic and complex environments due to technological advances and global marketplaces. Technology makes it possible for organizations to exploit new relationships and opportunities. Chakravarthy (1997) and Kotter (1995), emphasize formulating competitive strategy rethinking, focus on organizational core competencies and integrating the competencies with those of the supplier's firm to communicate the interaction between organizational cultures of buyer and supplier firms, enhance organizational learning, and knowledge sharing for successful diffusion of technological changes between the firms.

A study by Lipparini and Sobrero (1999) on supplier manufacturer relationships with focus on the supplier's capability and involvement in the production processes results in dominant pattern of buyer-supplier interaction as active contribution by supplier, clear involvement in increasing internal efficiency and promoting problem solving ideas and solutions. It shows that entrepreneurs act as catalysts of innovative skills located outside

the firm, coordinating the information flows which are generated by interaction with external sources by using governance mechanisms of relationships. They show that the percentage of supplier's involvement is 11 points higher when entrepreneurs from the buyer firms are also involved in the new product development activity. [5]

To ensure the predictability of relationship high-technology based firms develop long-term relationships and learning about each other's resources, abilities, power and routines has important feature in the product development process. When this learning is institutionalised firm develop knowledge about the structure of the network that helps them to understand change more efficiently when new technologies are introduced in the system. Entrepreneurs develop, maintain and exploit the company's portfolio of technologies, which includes interrelationship between process, and product technologies of buyer and supplier firms. This process of managing technology has its strategic dimensions and supplier firms develop competitive strategies on these dimensions. Relationships of the supplier firms with buyer of their high tech product or process technology rely on these competitive relationships.

Response to Uncertainty-Competitive advantage

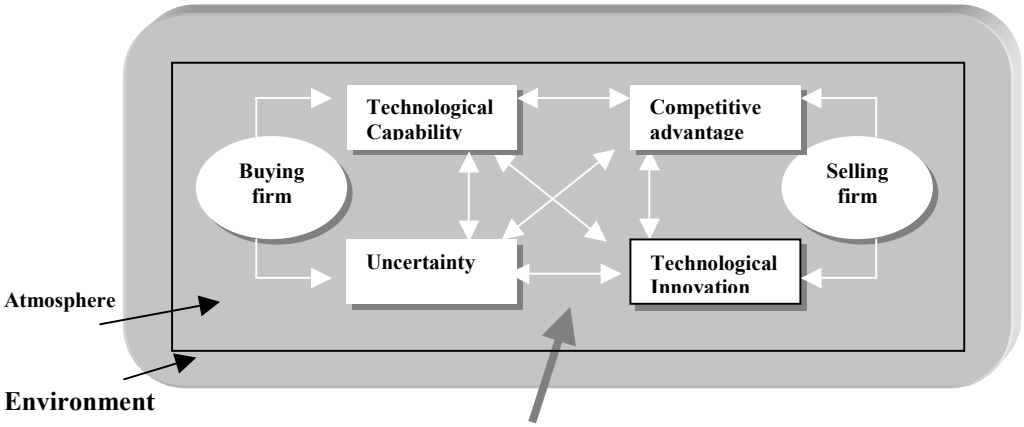
Technology driven markets highlight the uncertainty that suppliers and buyers face when new products are offered in the market. High market growth rate, high entry rates, spin-off companies, high rate of technological innovations, and absence of universal product standards manifest turbulence in markets and technology (Cunningham 1995), also identifies that suppliers face more uncertainty if they know less about their customers, product markets, and its competitors. Buyers view uncertainty in the context of obsolescence of technology and stimulate suppliers to provide solutions for technological innovations. Many other studies such as Clark and Fujimoto (1991); Håkansson (1987, 1989); & Imai et al (1985) also highlight supplier's involvement in influencing innovation in product development process to reduce uncertainty.

To deal with high uncertainty seller firms adapt their need solving and transfer abilities to the perceived uncertainty of the buyer. This adaptation process is done when the interaction between buyer and seller firm is high through knowledge sharing, investing more for the buyers and seller firm and by developing organizational structure and strategies that demonstrate their need solving and transfer abilities (Håkansson, Johansson and Wootz, 1991). When firms identify their strategic directions with respect to major market forces, they develop a trend towards technological uniformity, to overcome uncertainty and ensure their competitiveness. Therefore firms adopt their strategic directions in terms of technological innovations and mobilizing the organizational relationships in the industry (Cunningham 1995) and technology is one of the factors in deciding firms' competitive strategy in the network and shapes the relationships between buyer and seller firms.

Based on this discussion an Interaction Model is developed for buyer and supplier firms to give an insight into the process of technological innovations and the interdependency of relationships between the variables is highlighted through arrows.

[5] See 'Co-ordinating Multi-form innovative Processes: Entrepreneur as Catalyst in Small-Firm Networks, In Mark Ebers (eds.), The Formation of Inter-Organizational Networks, Oxford University Press, (1997), 199-219.

Figure 3. **Resource mobilization for all these activities by the actor firms generates governance mechanism of relationships between the two firms.**



These elements are integrated in a framework of interaction model for buyer and supplier firms, as this is an interaction process in the both firms at the same time therefore relationship play their part as a governance mechanism is keeping all the activities coordinated and any change in the activities or elements of interaction process influences the cooperative relationship between the dyad. This interaction model would later help to incorporate the network approach with governance mechanism of relationships to mobilize resources for technological innovations from both buyer and supplier side to maintain their competitive positions in the network. This figure also shows that the role of an entrepreneur in technology-based firms is the management of all these activities through the mechanism of relationships.

FUTURE IMPLICATIONS FOR RESEARCH

This broad research framework will be tested through a pilot study and theoretical and empirical examinations of technological innovations and technological capability of supplier form as an influencing factor for defining the characteristics of cooperative relationships in high technology firms will be examined in detail. This research in future would try to answer the following questions;

- How successful organizational entrepreneurs build relationships jointly with technical competence of suppliers in order to achieve competitive advantage in a network of firms?
- How do successful entrepreneurs guide their organizations through the process of cooperative relationship development at the interface of technological capability and technological competence in an industrial network?

- What are the roles of technology and strategy in shaping the characteristics of relationships in the context of high technology based firms? Is it a process (1) internal to the organization or arising from external sources; (2) economic or technological in origin (3) a function of competitive pressures or of technological imperatives?
- And, what are the practical implications of this model for managers of high technology based firms?

As it is very difficult to grasp the concept by incorporating all the variables in one study therefore, in future the focus will be on technological capability of the supplier firm and the terms buyer and suppliers would be replaced by actual names such as parent firm and the corresponding R&D firms for that parent firm.

REFERENCES

Ansoff, H. I.; 1957, "Strategies for Diversification;" Harvard Business Review, September-October, pp. 113 –124.

Brynjolfsson, Erik, Amy Austin Renshaw and Marshall Van Alstyne. 1997, "The Matrix of Change," Sloan Management Review 38, Vol. 2, winter.

Campbell N. C. G., 1985, "An Interaction approach to Organizational Buying Behaviour," Journal of Business Research Vol. 13, pp. 35-48

Chakravarthy, Bala, 1997, "A new strategy framework for coping with turbulence," Sloan Management Review 38, Vol. 2, winter

Cantwell J., and Paniccia I., "Technological change and vertical integration: Analysis of international vertical integration in multinational companies," In Massimo G. Colombo (eds.), The changing boundaries of the firm: explaining evolving inter-firm relations studies in Business Organizations and networks, Routledge, 1998. pp. 158 -186.

Cantwell, J., 1989, "Technological Innovation and Multinational corporations," Oxford: Basil, Blackwell

Duysters, G. and J. Hagedoorn, 1996, Internationalization of corporate technology through strategic partnering: an empirical investigation, *Research Policy*, 25, pp.1-12.

Metis Y. S. Cheung, & Peter Turnbull, "A review of Nature and development of Inter-organizational Relationships: A network Perspective," In Peter Naude and Peter W. Turnbull (eds.), Network Dynamics in International Marketing, Elseiver Science Ltd, 1998, pp. 43-69

Ford, D., 1991, "Understanding Business Markets: Interaction, Relationships and Networks An interaction approach." IMP group In International Marketing and Purchasing of Industrial Goods, Wiley, Chichester, pp. 10-27

Halinen, Havila, and Salmi, 1999, ”From Dyadic change to changing Business Networks: An Analytical framework, Journal of Management Studies 36, Vol 6 November.

Håkansson, H., ed. (1982), International Marketing and Purchasing of Industrial Goods: An Interaction Approach. Chichester: John Wiley & Sons.

Håkansson, H., 1987, Product Development in networks, in Industrial Technological development: A network Approach, H. Håkansson (ed.), London: Croom Helm

Håkansson, H., 1990, Corporate Technological Behaviour London: Croom Helm

Håkansson, Johansson and Wootz, 1976, “Influence Tactics in buyer-seller processes,” Industrial Marketing management, Vol. 5, pp. 319-332.

Håkansson H., and Lundgren A., 1995, “Industrial Networks and Technological innovation,” In K. Möller & David Wilson (eds.), Business Marketing: An Interaction and Network Perspective, pp. 300-320.

Håkansson, H., Snehota, I. (eds.), (1995): Developing Relationships in Business Networks, London: Thompson

J. Hagedoorn, 1993, “Understanding the Rationale of Strategic Technology Partnering: Inter organizational modes of cooperation and sectoral differences,” Strategic Management Journal, Vol. 14, pp. 371-385.

Kotter, John P., 1995, “Leading change: why transformation efforts fail,” Harvard Business Review 73, vol. 2 March-April, pp. 59-67.

Laage-Hellman, Jens, 1989, “Technological Development in Industrial Networks”, Doctoral Dissertation, Uppsala University.

Lundgren, A. (1995), “Technological Innovation and Industrial Evolution,” London: Routledge.

Leonard-Barton D., 1992, “Core Capabilities and Core Rigidities: A paradox in managing new product development,” Strategic Management Journal 13, pp. 111–125.

Malcolm T., Cunningham, 1995, “Competitive Strategies and Organizational networks in new technology markets,” In Möller, Wilson (eds.), Business Marketing: An Interaction and network perspective, Kluwer Academic Publishers, pp. 321-349.

Prahald, C. K., and G. Hamel 1990, "The core competence of the corporation,” Harvard Business Review, 3, 79-91.

Penrose, E., 1995, “The Theory of the Growth of the Firm,” revised ed., Oxford University Press.

Prahalad C.K., 1993, “The Role of Core Competencies in the Corporation,” Research Technology Management, pp. 40–47, November – December.

Ring, P.S., and Van De Ven A. H., 1992, "Structuring Cooperative relationships between organizations," Strategic Management Journal, Vol. 13, pp. 483-498

Schumpeter, J. A., (1950), Capitalism, Socialism, & Democracy, New York, Harper.

Zander, I., 1999, "How Do You mean 'Global': An Empirical Investigation of Innovation Network in the Multinational Corporations, Research Policy, vol. 28, pp. 195-213.