

INTER-ORGANIZATIONAL RELATIONS IN AN ORGANIZED INDUSTRIAL
DISTRICT: OSTIM CASE

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ABSTRACT

INTER-ORGANIZATIONAL RELATIONS IN AN ORGANIZED INDUSTRIAL DISTRICT: OSTIM CASE

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Over recent years, the study of industrial districts, and inter-organizational relations has become a major theme of interest in network research. Theories characterized by an increased inter-relatedness between heterogeneous actors and knowledge fields point to a new form of inter-organizational relationship development. This is basically based on the idea of creating trust between firms to increase their chances of success and to keep pace with the development of all relevant technologies. In this thesis, we present some data from a research project we have conducted in OSTIM industrial district, Ankara, Turkey. First, we present the theoretical perspectives which appear relevant to such investigation, and which aims at developing a better a network model of the inter-organizational relations of district firms, as well as trust, informal contracts and centrality issues, particularly as regards technological innovation and technology transfer of firms, respectively. Moreover, the evidence presented in this thesis is unequivocal in noting that long term inter-organizational relations and trust may be a necessary and a sufficient condition for a small and medium sized enterprise (SME) to take its place in the center of a complex web of inter-organizational relations as seen in an industrial district.

Keywords: Inter-organizational relations, Trust, Informal Networks, Centrality

ÖZ

ORGANİZE SANAYİ BÖLGELERİNDEKİ FİRMALAR ARASI İLİŞKİLER: OSTİM ÖRNEĞİ

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Günümüzde endüstriyel bölgeler ve firmalar arası ilişkiler üzerine yapılan çalışmalar, firmalar arası ağ yapısı araştırmalarının önemli bir kısmını teşkil etmektedir. Bu alandaki teoriler, ayrı cinsten aktörler ve bilgi arasındaki güçlü yapısal ağ ilişkileri içerisinde, küçük ve orta büyüklükteki işletmeler (KOBİ) arasındaki güvene dayalı organizasyonel ilişkilerin gelişimi adına, KOBİ'lerin güncel teknolojiyi yakalayabileceğini ve KOBİ'lerin ortak pazarda hayatta kalma şanslarının artırabileceklerini işaret etmektedir. Bu tezin kapsamı dahilinde, Ankara'daki OSTİM Organize Sanayii Bölgesinde (OSB) yapılan bir projenin sonuçları, güven, enformal ilişkiler ve merkez teoremi üstüne kurulan ağ teorisi perspektifi kullanılarak firmalar arası ilişki ağlarının çözümlenmesi biçiminde sunulacaktır. Ayrıca bu tezdeki ispatlar, firmalar arasında uzun süreli ilişkilerin ve güvenin yapılandırılmasıyla, firmaların bir sanayi bölgesinde görülebilecek karmaşık ilişki ağlarının merkezinde bulunabilecekleri tezinin gerekli ve yeterli olabileceğini göstermektedir.

Anahtar Kelimeler: Firma İlişki Ağ Yapıları, Güven, Enformal İlişkiler, Merkez Teoremi

To My Parents

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CHAPTER 1

INTRODUCTION

Growing number of studies over inter-organizational relationships imply that analysts may take into account that networking is a potential source of successful innovation at all levels of geographical space. Accordingly, competitiveness of firms in a specific geographical area (industrial districts) will therefore reflect their capability to link up to inter-organizational innovation networks. On the other hand, it is also important to keep in mind that it has become evident that there is a considerable variation between regional innovation systems (RIS) both in terms of the extent to which small and medium-sized enterprises (SMEs) interact with different collaboration partners and in terms of whether this collaboration behaviour of SMEs is pursued with domestic partners. Moreover, the regional systems might be said to have become even more important than the phase of national system. Apparently, there are important differences in the way innovation is pursued, differences which are also reflected in studies over industrial districts. Therefore, any innovation policy faces the complex task of simultaneously building inter-organizational relationships that increase the coherence of the regional system while clustering SMEs to production and innovation networks.

Taking the argument a step further, industrial districts have been a contentious academic topic of increasing interest, especially over the last two decades. Moreover, we can observe increasing research activities among business networks and the potential for industrial districts to cluster among small and medium-sized firms (SMEs) and to bring about economic growth through productivity gains based on inter-organizational relations. The current popularity started in the early 1980s, following the pioneering work by Piore and Sabel (1984). As organizational studies become popular, industrial districts became a test site to analyze how the social division of labor among small- and medium-size enterprises (SMEs) works in regional economies.

In theory, Piore and Sabel (1984) conceptualized a variety of industrial districts depicting that the speed of technological innovation has increased exponentially during the so-called "Information Age", started after the 1970s. Since then, in effect, markets have become much more uncertain because of changes in customers' tastes rising un-standardized products, and demand for product quality, which became much more unpredictable. As a consequence, a flexible production system, based on the foundations of the social division of labor among technologically specialized SMEs embedded in regional networks in an industrial district, has a competitive advantage over mass production by vertically integrated firms. In fact, the theory was conceptually a paradigm shift of a revival of craft-based production by technologically specialized SMEs in the regional networks of "cooperative competition." In other words, production under vertically integrated large firms (Williamson 1981), which took advantage of economies of scale, simultaneous engineering (¹) became essential (Nakato, 2004).

After the pioneering work of Piore and Sabel (1984), many empirical studies opened new approaches to the study of SMEs embedded in the regional economies. These new perspectives, in general, reinterpreted the roles of SMEs as a key component of regional flexible manufacturing systems, based on their competitive advantage for agile, nimble, and quick action. Here, we can claim that the principle is no longer to increase the throughput of standardized services or goods to meet the demand of the expanding domestic market that characterized the old competition. Instead, the new principle of economic organization requires SMEs to heighten the organizational flexibility to rapidly produce and deliver innovative, differentiated products in small batches with shortened product cycles to markets around the globe. In response, SMEs in the developed countries have begun to concentrate their efforts in narrower ranges of organizational competence so as to master them, and construct long-term collaborative ties with similarly specialized firms to broaden the technological base. As inter-firm cooperation becomes one of the crucial sources of organizational flexibility and trust (²) has gained prominence in governing the inter-organizational exchanges (relations).

¹ It is a process of concurrent design and production of a variety of products for small quantities by SMEs

² Here, trust is defined as "an actor's expectation of the other party's competence, goodwill and behavior"

From this point of view, this new organizational principle, network forms of organization, manifests in a variety of arrangements in today's business world, including industrial districts, franchising, joint-ventures, strategic alliances, and business groups (Powell 1990; Powell and Smith-Doerr 1994). Industrial districts represent a more radical departure from the conventional picture of modern capitalism that predicts the inevitable triumph of the big enterprises regarding to their economies of scale.

Industrial districts (³) are social settings particularly conducive to the collaborations among specialists for physical proximity, crosscutting social ties, and existing community institutions in the districts. They also are exceptionally favorable to the development of SMEs because the latter can rely upon the external sources to grow instead of engaging in expensive vertical integration. The continuous prosperity of districts of mature labor-intensive industries, such as those of northeastern Italy, southwest Germany, and western Japan, as well as the high-technology Silicon Valley, represents the promise of the new organizational principle.

But still, within these network forms of organizations, there are very few academic studies focused on industries within an industrial district, where a variety of linked, but different, industries were embedded. As an example, Whittaker (1997) depicted complex subcontracting networks in the industrial district as a mix of horizontal and vertical inter-firm networks among SMEs from a qualitative approach. Nakato (2004) gives an example over subcontracting networks in the Ohta industrial district from the viewpoint of knowledge management for innovations from a variety of fieldwork approaches. However, we may argue that the complexity to deal with extremely enmeshed business networks embedded in a large-scale industrial district was beyond the reach of the previous studies, as those studies primarily employed qualitative fieldwork methods.

In effect, the theory and related empirical studies generally assumed the existence of randomly distributed complex inter-organizational relation networks in industrial districts

³ Industrial districts are generally the geographically defined productive systems characterized by the spatial clustering of firms complementarily specialized in the production of a homogeneous product.

(Sabel 1990). In other words, other studies almost entirely neglected the fact that there are underlying structural patterns behind the randomly entangled regional supplier-buyer networks and knowledge networks in each of those industrial districts. In particular, the notion of firms embedded in the complex web of inter-organizational relations, through which the SMEs were connected to the regional production systems, was largely absent from those studies.

Moreover, recent studies showed us that the knowledge created within firms in an industrial district can be used by others economic agents, because pieces of that knowledge can be codified and transferred among firms, thus generating positive externalities and fostering innovative activities (Griliches, 1979). Extending this body of research with a greater attention to the specificities of knowledge flows and their impact at the firm level (Malerba et al, 2003), knowledge spillovers have been defined as public good bounded in space (Breschi and Lissoni, 2001). According to this approach, most of the knowledge flowing is mainly “tacit”, context specific and difficult to codify, and this is particularly true for innovative ideas. As a consequence, it can be primarily transmitted through personal contacts and direct relationships requiring spatial proximity. Following the “Marshallian” concept of industrial districts, it is argued that such knowledge flows better among organizations located in the same area (Krugman, 1991). Therefore geographical industrial clusters offer more innovation opportunities than scattered location (Breschi & Lissoni, 2000; Saxenian, 1994), and firms located in regions characterized by knowledge agglomeration processes have greater opportunity to access that knowledge than their distant located competitors.

While the classic perspective on industrial district views the district as an environment inherently conducive to the creation of direct relationships, in which knowledge circulate spontaneously (Brusco, 1982; Marshall, 1919; Piore and Sabel, 1984), empirical studies, highlighted the presence of focal firms within industrial clusters - and in more general terms within local economic systems - playing a leading role for the transmission of technology and knowledge (Agrawal and Cockburn, 2002; Boari and Lipparini, 1999; Lazerson and Lorenzoni, 1999; Saxenian, 1991). They act as leading firms in the local innovation network, generating new knowledge and technologies, spinning out innovative companies, attracting

researchers, investments and research facilities, enhancing others firms R&D activities, stimulating demand for new knowledge and creating and capturing externalities. In line with this latter view, we advance the hypothesis that the presence of focal firms in a cluster substantially increases spillovers at the local level, by creating technologically-advanced new knowledge and favoring the absorption and dissemination of external knowledge into the cluster.

While there were technical limitations that prevented the conventional approaches from unveiling the underlying complex inter-firm relationships and knowledge spillovers in detail, first, social network analysis offered a methodological breakthrough to overcome such limitations. Nakato (2004) depicts that, in fact, the study of networks has been increasing, especially since the late 1990s as there has been quiet important advancement in information technology, which has made complex calculations of large datasets possible. At the same time, the sophistication of data analysis software packages for large-scale network analysis, such as Pajek (Batagelj & Mrvar 2002), has become a driving force.

This thesis analyzed extremely complex, regional business networks based on a large relational data set, from the viewpoint of strongly linked firms embedded in the OSTIM industrial district in Turkey. Methodologically, the analysis in this thesis employed techniques of dyadic social network analysis ⁽⁴⁾ and applied them with some conceptual network theories. Through the large-scale social network analysis, the research project depicted the relation-based structural patterns behind the seemingly and randomly selected business networks, which wove through pre-determined 77 firms embedded in OSTIM industrial district. While there is hardly any formal theory of industry-based social structure embedded in a large-scale industrial district in existence, the present study took a deductive approach, by hypothesizing that there should be strong network structures peculiar to each of the linked, but different, firms deeply embedded and structured with informal relations and trust in the complex web of relationship networks in an industrial district. Thus, specifically, we examine (1) if the focal firms are more likely to take a “central part” in the network and they strongly

⁴ Dyadic social network analysis is the analysis of regularities in a social system of actors and relations that can be studied at the level of sub-graphs of a pair of actors or relations and all the ties between them. See Wasserman (1994) for more detail.

show a higher degree of local interconnection, so that they can easily transfer knowledge to other local firms. (2) if the years of a relationship are crucial for a focal firm to be at the center of a network and to develop other longer-terms of relationships and finally (3) if The probability of being a focal firm in a web of relations between two organizations increases with the level of prior trust. The purpose is to provide a more rigorous ground for these arguments in specific with respect to the industrial district theory in general.

Moreover, in the context of this thesis, we will show that there exists enough evidence to suggest that, on contrary to the arguments of many researchers, different business relations would also seem to be linked to changes in cooperative and collaborative relationships between firms.

In this manner, we can argue that SMEs' business activities should be strongly influenced by the social structure. Accordingly, some research questions were articulated, as follows. How were the networks of relations developed in which we observe the entangled chains of manufacturing processes in organized and complex web of geographically bound, subcontracting business networks? As a variety of firms from different sectors were embedded in the regional manufacturing systems, which firm (s) fulfill an important aspect for developing relations and for the spillover of knowledge and technology in an industrial district? What were some of the underlying structural and relational patterns, embedded in the enmeshed regional business networks? And Are trust and informal relations important in the context of business relations?

As for the organization of this thesis, after this introductory section, the second chapter draws upon a brief theoretical arguments of presentation of an overview of important concepts and properties of industrial networks and clusters describing a number of important issues outlining within the strand of literature; the concept of inter-organizational relations. In Chapter 3, just like the previous section of this thesis, again, the aim is to further investigate some plausible hypothesis of inter-organizational relations in industrial districts (ID) and clusters of firms, and provide an explanation in light of the peculiar features of trust and informal relations. Chapter 4 presents the methodology with an outline of inter-organizational

relationship development processes regarding trust, commitment and informal relations. The methods of the data collection and application of enterprise surveys will also be presented in this chapter. Chapter 5 includes the first stage of the survey conducted, which comprises the data used in the analysis and testing of hypothesis of this thesis in the geographical area within the boundaries of OSTIM, also including a brief history of the OSTIM industrial district. Finally, Chapter 6, the concluding part, summarizes the findings from the present research with some discussions.

CHAPTER 2

SOME STYLIZED FACTS ON NETWORKS, CLUSTERS AND INTER-ORGANIZATIONAL RELATIONS IN AN INDUSTRIAL DISTRICT

Industry clusters and networks have gained significant attention among policy makers and scholars alike, as an alternative and purportedly superior organization form to that of markets and hierarchies. The networking idea has been especially attractive as a means by which small and medium sized firms can collaborate to compete more effectively in the global marketplace. The premise is that clustering and networking among smaller firms provides them with the potential to achieve collectively more than they could individually, in accessing and competing in world markets. Through inter-firm linkages, smaller firms can build the capabilities of scale and scope that were once the domain only of large firms. As competition has intensified internationally and governments have sought to address structural deficiencies that inhibit the competitiveness of their industrial bases, cluster development and network programmes have gained credence as policy measures to stimulate economic growth. (Ingley 1999)

Complementarily, Ingley (1999) states that the most recent consequences show us that over the last ten years, specific research have been directed at analyzing specific regional economies in terms of the extent to which they reflect the organizational principles of industrial networks and clusters. Moreover, Staber (1996) adds that it is more important to study the structure of inter-organizational linkages than to proceed from hypothesis which are mostly deliberate choices about institutional structures for cooperation and competition each having literally intended consequences.

In addition, the concept of inter-linkages among firms and the adoption of cooperative strategies by companies faced with continuous economic change are well documented in the literature associated with international competitiveness in business, industrial structures and economic growth and development. The research reflects the growing proximities, interconnectedness and interdependency occurring in response to the globalization and

regional integration of markets and economies. Early models drew upon the examples of "natural" local networks and clusters (or networks of clusters) (as compared to those instigated through formal interventions) of world-competitive industries that have evolved as systems of production based on high levels of specialization among agglomerations of firms in countries such as Italy, Germany etc. Increasingly more attention has also been drawn upon the forming of similar clusters and networks among Asian firms as intensity of literal studies are given to Chinese and Japanese firms. (Ingley 1999)

Moreover, it is notable that the notions of clustering and networking have been especially attractive as a means by which small and medium-sized enterprises can collaborate to compete more effectively in the global marketplace. At the same time, formal policy mechanisms have been introduced in several developed countries in recent years to address structural deficiencies and raise competitiveness by encouraging cooperation among small and medium sized firms (Ingley 1999). However, how can “networks” and “clusters” be defined for such an empirical research?

Thus, in this chapter, focusing on the cluster concept as a type of business network, examining first the rationale underpinning the notion of networking and clustering which draws primarily attention on the industrial districts literature, we start with a brief presentation of an overview of important concepts and properties of industrial networks and clusters describing a number of important issues outlining within the strand of literature; the concept of inter-organizational relations. Besides, the concept of clustering is thought to enable a better understanding of the structural evolution and expansion of industry and, even more important, to identify future growth areas. The 1980s, in particular, saw a proliferation of research and writing about small firms and especially about agglomerations of such firms in industrial districts where socially and politically based networks of cooperation enable them to compete successfully in national and international markets. In this part, clusters and networks are concepts which have become integral to the industrial district paradigm. Furthermore, we will present an interpretation of rather complex “network” and “cluster” concepts with a clearer distinction between their respective definitions. Finally, We will show how these theories relate to our research agenda.

2.1 Networks

The concept of network is popular both in daily parlour, business development programmes, and in theoretical constructs. Scientifically, the concept has formed the base for "network theories"(Burt 1992), "the network approach" (Johanson & Mattsson 1993), "the network perspective"(Nohria & Eccles, 1992), and some even talk about "the network paradigm" (Morgan and Hunt 1994).

A major question in the network debate has been the extent to which a network is a new way of looking at old phenomena, e.g. a new way of looking at industrial markets (Johanson & Mattsson 1993); a distinct form of organizing economic activity (Powell 1990, Grabher 1993), or is it, as Nohria & Eccles (1992) states, the only way to understand organizations: "From a network perspective, all organizations can be characterized as networks and indeed are properly understood only in these terms. So to say that an organization has a network form is a tautology".

Moreover, it is notable that SMEs can use inherent networks such as relation networks, personal contact networks (PCN), social networks, industrial networks and marketing networks to carry out their marketing activities both locally and globally. In contemporary literatures some benefits that SMEs can accrue from the above networking behaviour can be found. These are:

- Information gathering (Camagni 1991),
- Knowledge acquisition (Romijn & Albu 2002),
- Skill transference (Grabher 1993), and
- Marketing Networking (Gilmore et al. 2001), where SMEs may have limited resources available.

Moreover, according to Nohria and Eccles (1992), three reasons for why the term "network" has become the vogue in describing modes of economic organization can be found as;

- The new competition focusing on lateral and horizontal inter-linkages among and within firms. Examples are the theories of industrial districts, the just-in-time systems,

and the flexible production system with multinationals in the lead of a global network of sub-suppliers.

- The new information technology which has made possible an entirely new set of more desegregated, distributed, and flexible arrangements of economic activities.
- The maturing of network analysis both methodologically and theoretically.

And also, through the literature, authors explain that small and medium-sized enterprises (SMEs) can acquire learning at local and international levels through co-operative inter-firm arrangements, where co-operation may be defined as reciprocal involvement between firms vertically linked in design and production of determinate goods allowing access to the knowledge in possession of firms' downstream (Golden and Dollinger 1993). Moreover, although marketing is a key factor for small firms survival, they face certain problems as restricted customer base, limited marketing expertise and lack of funding among others (Stokes 2000).

2.1.1. Definition of Networks

In the beginning, we must underline that the term “network” is first used in social network analysis (Burt 1992, Nohria and Eccles 1992, Uzzi 1997), then, in the network perspective of inter-organizational research (Nohria and Eccles 1992, Powell, 1990), in the industrial network approach (Andersson et .al. 1994, Ford, 2002, Håkansson & Ford, 2002, Håkansson & Snehota, 1990), and even as a network paradigm within marketing research (Hunt & Morgan, 1994, Morgan & Hunt, 1994). Forsman & Nikodemus (2003) depicts that it is widely accepted that firms can exist in networks as a kind of third form of organization, as an alternative to the market as a regulating force, and the hierarchy with administrative power as regulators as researched previously in inter-organizational research and strategy methodologies (Powell, 1990), including Williamson (1991, 1996),

However, as pointed out in Forsman & Nikodemus (2003), the term is in different academic streams and (in literature, also by many different researchers) used with such an eclectic of meanings, that it is has little intrinsic meaning left which leads to confusion in literature.

However, Powell & Smith-Doerr (1994) come to the conclusion that the term network, despite its many meanings is useful. It can also be used as an analytical tool employed in economic sociology (Uzzi, 1997), or as a form of governance as in the industrial network approach (Turnbull et. al. 1996) and as making a research on industrial districts (Piore & Sabel, 1984) which will be exemplified in the future sections of this thesis. Forsman & Nikodemus (2003) emphasizes that still, researchers within the industrial network approach, argue that the network approach also provides a useful framework for analyzing interaction in business (Turnbull et. al. 1996), rather than being a form of governance. Moreover, from the management point of view, Webster (1992) defines “network organizations” as the corporate structures that result from multiple relationships, partnerships, and strategic alliances. From the term “network”, Webster (1992) depicts that the basic characteristic of a network is confederation, a loose and flexible coalition guided from a hub where the key functions include development and management of the alliances themselves, coordination of knowledge, financial resources and technology, definition and management of core competence and strategy, developing relationships with customers, and also managing information resources that bind the network. Furthermore, networks build up as activity links, actor bonds and exchange ties develop within relationships. The nature of these factors may change over time, deepening or becoming less important. Further, as relationships grow, they are combined and connected to others through direct and indirect linkages. (Benson-Rea & Wilson, 2003). Regarding this point of view, Johanson & Mattsson (1988) see networks as ‘stable and changing.’ Relationships change constantly through the parties’ efforts to ‘maintain, develop, change and sometimes disrupt the relationship.’ Likewise, Powell (1998) depicts that the collaborations speed up innovation (the ‘ladder effect’) which, together with the experience of collaboration, changes the nature of the interactions and inter-organizational relations, themselves. Finally, we must note that as competition has intensified both locally and internationally, and governments have sought to address structural deficiencies that inhibit the competitiveness of their industrial bases, network programmes have gained credence as policy measures to stimulate economic growth.

In order not to get confused in an analysis of a network approach, the unit of analysis is often a focal firm (Easton, 1992) or a focal net (Salmi, 1995). The focal net is defined as "the net of

direct and indirect inter-organizational relationships that the focal firm perceives as affecting its business in a certain market" and can be differentiated by aspects such as products, processes, technology or geography (Easton, 1992). In marketing, arguments have been raised for four different levels of analysis of the network, being the actor level, the dyadic relationship between two firms, group analysis of triads of networks of more actors, and finally the network level, with a network consisting of a limited number of actors (Iacobucci & Zerrillo, 1996). The network approach has also been criticized for being overly theoretical, but lacking empirical studies to support the theoretical conceptualizations (Turnbull et. al. 1996).

The view taken in this thesis is that a network consists of relationships connecting actors (individuals, groups of individuals, parts of firms, firm or groups of firms) that are cooperating in order to acquire resources they may not themselves possess. In addition, acknowledged as a complex approach and as adopted in this thesis, the view of the "network" draws up on the industrial network approach, complemented and mediated with insights from inter-organizational research.

2.1.2. Network-Based Industrial Systems

The basic point of departure for an industrial network approach is that firms operate in the context of interconnected business relationships, forming networks. Networks can take the form of inter-organizational relationships, which have been analysed extensively in the literature and they can take the form of informal relationships among the agents forming up an industry. In the same way, the interaction, or knowledge flow among the agents in an organization may be analysed as a network. The basic feature of networks is then; they represent various forms inter-organizational interaction and relations of two or more economic agents (firms, divisions of firms, or individuals) within an industrial system. Network ties may represent the flow of resources, accompanied by the embedded knowledge, as it is the case in most supplier-user networks. The ties can also represent the flow of scientific know-how in various informal communications (Özman, 2002). In addition, from a strategic viewpoint, Gadde et al. (2003) claims these network ties and inter-organizational

relations affect the nature and the outcome of the firms' actions and are their potential sources of efficiency and effectiveness (e.g., Håkansson & Snehota, 1995; Wilkinson & Young, 2002).

Moreover, the evolutionary approach in Industrial Economics has recurrently discussed the characteristics of inter-organizational configurations adequate to face the instability and complexity of the economic environment of a network. These studies show the emergence of multiple forms of productive and technological co-operation among firms, seen as inter-organizational set-ups (relations) that allow a better facing of environmental changes. (Britto, 2002) The intensification of co-operative links in a network has persuaded researchers to focus on the complex interdependencies between firms in the economy through the use of a 'industrial network approach' (Grabher, 1993; Hakasson, 1989, Karlsson & Westin, 1994).

Within this industrial network approach, the network based industrial system essentially refers to a governance structure in which intense inter-organizational collaborations are the main driving force behind rapid technological development. These inter-organizational relations between firms may take countless forms; supplier-assembler relations, R&D collaborations, joint ventures and various forms of ownership agreements, sharing of facilities and distribution channels, to name a few. A major process that accompanies the inter-organizational relations is the significant knowledge flow that takes place between the actors (Özman, 2002).

Furthermore, Özman (2002) depicts that the knowledge flow is considered to be externalities resulting from various formal and informal interactions between firms and individuals. From this point of view, increased networking is accompanied by increased pace of innovation and technological change as firms rely more on external collaboration. As a result of this networking process, the firm becomes a hub of complex communication links and inter-organizational relations within a larger network through which there is continuous information and knowledge flow.

Here, the main issue of the analysis must be the nexus between the network-based industrial systems and the strengthening of industrial competitiveness of firms. Britto (2002) describes that the literature about industrial competitiveness has faced some discomfort when it tries to discuss network relations and knowledge flows despite the recognition of relevant connections between the forms of competitive advantage and the effects of inter-firm co-operations. Probably, part of these difficulties can be attributed to the diversity of determinants of competitive advantage of firms in each industry and to the diversity of institutional forms of inter-firm cooperation that prevail in them. The multiplicity of institutional forms of inter-firm relations makes extremely difficult the identification the elements that should be correlated to forms of competitive advantage.

To simplify and analyze, like inter-firm relations of a firm, a wide range of systems in nature and society may be described as complex networks. ⁽⁵⁾ Traditionally these systems were modeled as random graphs. With recent advances in modeling, we may also say that such complex systems are increasingly analyzed with the topology and evolution of real networks governed by robust organizing principles. Consequently, various topologies have been studied as these real network researches gain roots with inter-organizational relations and knowledge flows analyzed with rapidly enhancing mathematical frameworks and graph theory. Moreover, such complex systems exist as a coherent field that have embedded interiors with many interacting parts, actors, networks and fields. Such systems exhibit complex spatial and temporal structures. (Wilkinson, 2003). From here, embedded networks arise from sets of relations among elements at different levels, where each level is a graph in which each node may contain another graph structure.

From this point of view, using a network approach refers to expressing various inter-organizational structures as groups of interacting agents, within a larger network in which there is continuous information flow. In this sense, various governance structures can be expressed as networks of agents which are closely in interaction with each other. In the industrial organization literature, several models have adopted the network perspective (Dow,

⁵ Internet can be given as the most basic and complex example of a network of interconnected routers, or human colonies.

1990; Radner, 1993; Bolton & Dewatripont, 1994). In these models, the firm is mostly expressed as a communication network. (Özman, 2002)

Moreover, Özman (2002) depicts that the network-based systems are self-reinforcing such that increased networking results in more rapid innovation, which further strengthens the rationale for external collaboration on the side of firms. As a significant result, the network-based industrial system is, thus, shaped as the firms in the industry are increasingly being involved in inter-organizational relations with other firms.

2.1.3. Some common properties of networks

Industry networks have gained significant attention among policy makers and scholars alike, as an alternative and purportedly superior organization form to that of markets and hierarchies. The networking idea has been especially attractive as a means by which small and medium sized firms can collaborate to compete more effectively in the global marketplace. The premise is that clustering and networking among smaller firms provides them with the potential to achieve collectively more than they could individually, in accessing and competing in world markets. Through inter-firm linkages, smaller firms can build the capabilities of scale and scope that were once the domain only of large firms. According to Axelsson & Easton (1992), an industrial network is dynamic in nature and is never in a state of equilibrium. In periods of change, the forces that once brought about the formation of the network are strengthened. The actors of the network try to elaborate existing ways of doing things, which will eventually lead to a inter-organizational level of network. To be clear, networking encompasses all the interactions of a company in the network.

According to the OECD report (2000), networks generally encompass a larger number of firms with membership subscription open to all those that meet the minimum requirements. In the report, networks are generally reported to come to an agreement with research bodies, education and training institutions as well as public authorities. Here, by contrast, harder networks are commercially inclined, involving a limited number of pre-selected firms that are sometimes formally and tightly linked through a joint venture or strategic alliances.

Furthermore, from the literature, we may conclude that networks facilitate accelerated learning process (Grabher 1993; Staber 2001; Evangelista et al. 2002; Furman et al. 2002; Acs & Vaga 2002). Furthermore the peer-based learning, which networking makes available, becomes the means of choice of learning for many small firms. For innovation, Acs & Vaga (2002) argues that often the entrepreneurs need to reconfigure their relationships with suppliers, which again networking does facilitate.

In sum, networking has the following characteristics as summarized below;

- Networking is interactive. Networking by any company affects and affected by the actions of others.
- Networking is dynamic process
- Networks are not planned. They emerge as a result of the interpretations and actions, and thus interaction, of the actors constituting the network.
- All companies network simultaneously
- All companies have restricted freedom to act
- Networking is not determined by type of company
- Networking involves working with through and in spite of others
- Networking can be multi-lateral or bi-lateral
- It is not based on cooperation or competition alone
- It is based on companies picture of its own and others' positions
- It is based on its views of likely relations of others (sort of embeddedness)

This approach enables us to see that networks are not formed, maintained, changed or dissolved according to any general laws or pre-determined pattern. Moreover, a network is a social construction, created by identifiable, autonomous but interdependent actors. However, through the continuous interaction between the network actors, routines and common world views will gradually emerge and make the network stable at the same time as new opportunities arising from the interaction will keep the actors on their tip-toes and the network dynamic.

2.1.4 Building of Networks: Long-term Relations

A network is built up by three important variables: actors, activities and resources. In a network, actors act, i.e. they perform activities, e.g. participate in an exhibition. The activities, carried out by an actor, are based on his subjective perception and knowledge of his position in the network. Actors, which can be individuals, groups of individuals, parts of firms, firm or groups of firms, perform activities in the network and control the resources (Håkansson & Johanson, 1992). The general assumption of the network approach is that firms enter cooperative relationships with other firms in order to get access to the resources of the network (Johanson & Mattsson, 1988). Naturally, there is a limit to the number of relationships that can be maintained simultaneously by a firm, and relationships, despite being viewed as long-lasting, may have to be terminated in order for the firm to be able to create new relationships. The network is, therefore, characterized by exclusiveness, as a firm has to purposefully create and maintain relationships. (Håkansson & Snehota, 1998) Still, the network of the industrial network approach cannot be managed, as one firm cannot be in control of all the interactions, rather the firm has to manage its own relations in the network.

The concept of "interaction" constitutes the activities of a firm, including the functional content of an activity and all sorts of social exchange (information, chatting, dining etc.). Through the interaction, i.e. through the ongoing or daily activities, actors (or firms) build inter-organizational long-term relationships with other actors in the network. The building of such long-term inter-organizational relationships is a process of selection and one has to imagine that much interaction never has long-term relationships as the outcome. Although long-term relationships tie the network together, it does not prevent changes. Networks are both stable and changing, and long-term relationships are continuously established, maintained, changed and dissolved as a consequence of the inter-organizational relations.

Therefore, the network relationships can not be analyzed or understood separately from other relationships in which the actors are involved, nor from the effects of other relationships surrounding them in the wider network (Håkansson, 1986). Thus the boundaries of the network are quite unclear, as the whole global industrial system is one giant and extremely

complex network since there always exists some path of relationships that connects any two firms (Mattson 1988, cited in Easton, 1992).

Thus, we can also define network building as a social process through which the actors gradually and voluntarily establish close relations of long-term duration. Clearly, these long-term relationships are gluing actors together, but this is not enough guidance to define or demarcate the network. To demarcate a network, only those actors who are interconnected and thus interdependence should be included.

As to structure, normally, it is defined as the permanent features over which individual firms have no control and hence, to which the firm must adapt in the short run. However, in the long-run, even structural features may, and normally will, change - not necessarily due to the action by one firm but due to the interaction among a set of firms. For the network-based industrial systems, theory highlights that the long-term inter-organizational relationships and interdependence between the actors define the structure of a network. In the words of Johansson and Mattsson (1988): "The degree of structuring of the network is the extent to which positions of the organizations are interdependent. In tightly structured networks, the interdependence is high, the bonds are strong, and the positions of the firms are well defined."

Thus, in summary, a network is tightly structured if:

- Long-term relations are established
- The routinization of network activities is high
- The number and level of personal interactions (as against formal system interaction) is high.
- The bonds (economic, technical, information, social legal etc) between the actors are strong.
- Interdependence in the form of mutual adaptation and asset-specific investments are high.
- The volatility or fluidity of the network, measured in terms of changes over time in the number, importance and positions of actors; asset specificity, and the structuring of the bonds, are low.

2.1.5 The Significance of Networks in Current Research and Small Worlds Concept

Stability and development within the network are closely related and periods of gradual and continuous non-linear change are often followed by periods of more radical change, the two processes being in a dialectic relationship to each other (Bianchini, 1991; Gulati, 1998; Lorange, 1996; Schmitz, 1995, cited in Ingley 1999). As mentioned before, industrial networks are dynamic in nature and are never in a state of equilibrium. In periods of gradual change, the forces that once brought about the formation of the network are strengthened. The actors try to elaborate existing ways of doing things, which will eventually lead to a more integrated network. Eventually, radical change in the existing network can come about due to both tension in the network and to change in the environment outside the network. Uzzi (1997) notes this phenomenon as a “paradox of embeddedness”.

In an attempt to analyse the structures of various network structures with respect to network-based industrial systems, researchers tried to find new approaches either by constructing them to model different relations and interactions or by means of viewing existing relations in the data. With the recent advances in mathematical and statistical frameworks that describe ranging network properties, complex networks that arise in the real life as built in this research study can now be better studied and analyzed. Understanding network nomenclature and the types and characteristics of such network relations can improve our expectations and allow us to better understand the effects of knowledge exchange and inter-organizational relations. The case study examined in the course of this research revealed the presence of small world networks as a cluster of firms in an industrial district. Terminology will furthermore be explained in detail. But, what we must underline is that observing the interactions between the network layers and between hubs and spokes within a network layer under analytical and statistical scrutiny can assist in our understanding of the characteristic knowledge flows, inter-organizational relations and finally, the properties of the networks. The emergence of small world networks revealed us the presence of hubs on the network. Moreover, these hubs represent socially active community centers in the real network model that we were able to verify their locations with various methods.

In terminology, the term “small worlds” was first used in Milgram’s finding that seemingly unrelated people are surprisingly close in social space (Milgram, 1967). Watts and Strogatz (1998) offered a minimal model that reproduced the macro features of the phenomenon. They proposed that small-world networks exhibit tight networks (or clusters) of local interaction linked by occasional non-local interactions whereby any node in the network could still easily reach any other node. Network scholars generally agree that small-world networks facilitate knowledge flow and relations.

The small-world network concept is built around the fact that despite the often large number of edges, in most networks, there is a relatively short path between any two vertices. This is described in terms of the distance across the shortest path between two connected nodes. A popular manifestation of this concept is the "six degrees of separation" concept (Milgram, 1967). In addition, we can conclude that in many real-world networks, we can face a small-world character like random graphs (Albert, 2001). Some of the characteristics of small world networks are a short average path length (⁶) and a relatively high networking (clustering) coefficient (⁷).

2.2. Clusters

The importance and benefits of a spatially concentrated industry was already identified by Marshall, nearly a hundred years ago in his studies of industrial districts in Britain (Cooke, 2001, Malecki, 2000a). Since then it has continued to capture the attention of economic

⁶ Technically, the average path length is defined as the length $l(v, w)$ between two vertices, v and w , as the minimum number of edges that need to be traversed to pass from v to w . Then the average path length L is simply the average value of $l(v, w)$, with v and w chosen uniformly at random,

$$L \equiv \frac{\sum_{v,w} l(v,w)}{\binom{n}{2}},$$

where the sum is over all distinct pairs of vertices, v and w , and n is the number of vertices.

⁷ Technically, the clustering coefficient varies between 0 and 1, with a value near 0 meaning that most of the vertices connected to any given vertex v are not connected to each other; conversely, a value near 1 mean that most of the neighbours of any given vertex v will tend to be connected to one another. The goal is to define a quantity C which varies between 0 (unclustered) and 1 (highly clustered).

geographers (e.g. Cooke, 2001, Hayter, 1997, Markusen, 1996a, Piore & Sabel, 1984, Scott, 1988, Storper, 1997 as cited in Forsman 2003). The term “cluster”, however, was brought to mainstream academic attention by Porter (1990).

Despite rigorous research of clusters, it has been argued that researchers often tend to neglect to address what actually defines a cluster (Rosenfeld, 1997, 2001, Cooke, 2001, Martin & Sunley, 2003 as cited in Forsman & Nikodemus 2003). Literature displays a wide variety of cluster definitions; however, the most popularized definition is that of Porter (Porter, 1998); "Clusters are geographic concentrations of interconnected companies and institutions in a particular field."

Moreover, in detail, Porter (1998) defines a cluster as a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. As mentioned before, the idea of geographic clustering among firms that cooperate and collaborate for economic advantage is not new. More recent history notes the existence of such industrial districts in the nineteenth century (Piore and Sabel, 1984). This perspective has been labeled the Marshallian model, which is reflected in economic development models to explain agglomeration principles.

In our research, the term “industrial clusters”, as postulated by Porter (1990), points out the concentrations of expertise among closely-linked industries and companies, in which extensive investment in specialized factors of production triggers a positive growth spiral. The focus is on the mutual connections and interaction between individual industries. Furthermore, clusters are formed through the flow of information or products between companies which are functionally linked together. The agglomeration of producers, customers and competitors, whether based in geographical proximity or linked by complementary expertise, promotes efficiency and increases specialization. In addition, agglomeration promotes positive externalities through increasing innovation, and especially through technological spillovers. This concept underpins Porter's "Diamond" model which defines the interplay of favourable factor conditions required to build a nation's competitive advantage, briefly.

Even though, Porter (1998), later, stresses the importance of the region and geographical boundaries, yet, it can be argued that the economic geographic community was critical and hesitant to use the concept. Porter's definition and cluster typology, or lack of such, has come under some rigorous, and constructive criticism from geographers. (e.g. Cooke, 2001)

Since Porter's definition, as presented previously, is often taken out of context and interpreted in various manners, it is plausible to adopt the more descriptive and comprised definition of Cooke (2001):

“[A cluster is] Geographically proximate firms in vertical and horizontal relationships involving a localized enterprise support infrastructure with a shared developmental vision for business growth, based on competition and cooperation in a specific market field.”

This definition better highlights Porter's inclusion of vertical relationships and horizontal inter-organizational relationships between firms and institutions, as well as the importance and inclusion of common identity. Consequently, Martin & Sunley (2003) criticizes the Porter's typology of geographical proximity as it seemingly spans from rural areas to nation states. They argue that if clusters operate on such a diverse range of spatial scales, and it is posited that knowledge spillover effects and externalities are scale-independent, then it undermines both the empirical and analytical significance of the concept. Thus, there exists a further need for cluster research to address and argue for the choice of scales. Neglecting the spatial scales also makes the concept less distinguishable from the network concept, another problematic concept that will be outlined in the following chapter.

Moreover, in today's global economy, which has integrated the production and management process, clusters can be seen as a competitive tool of networking, which facilitates the development not only of local economic strategies, but also the capacity to achieve competitiveness in global markets. In this way, the different examples of clusters development around the world provide "evidence that even as competition and economic activity is globalised, the competitive advantage can be localised" (Enright, 2001). Simultaneously, during the last few years, various studies in dissimilar industries (Porter

1998; Enright 2001; Peters and Hood 2000; Romano et al, 2001; Felsenstein and Taylor 2001; Rosenberg 2002, cited in Felzenstein (2002) have concluded that the geographical implication of clusters has an effect on the development of local wealth, not only attracting foreign investors (FDI), but also generating global networking and helping in the export and internationalization process of companies as part of 'regional clusters'. On the other hand, Morgan and Hunt (1994) have suggested that in order to be an effective competitor in the global economy requires more cooperation or networking between firms, which will lead to establish or maintain a marketing competitive advantage. Thus, this argument can be seen as a strategic issue for small and medium-sized enterprises (SMEs), especially those located in open and small economies, which must seek out different alternatives of differentiation, obtaining in the end a marketing competitive advantage (Brown and Bell 2001).

Recent studies underline that firms must respond to an increasingly competitive global market place, where international activities and the inter-nationalization processes are more important than ever before. Furthermore, some authors, (Brown and Bell 2001), state that although small and medium sized enterprises tend to be more flexible and have a tendency to respond quickly to the changes in the environmental conditions, they need to realize the importance of co-operation and networking with other firms that operate in a cluster.

Hence, from this point of view, we can argue that clusters provide general benefits to firms, especially in the value chain inputs as well as in the general aspects of the production process

2.3. Basic Properties of Clusters: Interaction and Cooperation

According to Nakato (2004), the creation of networks of firms as self-help devices for small and medium-sized enterprises (SMEs) is based on the idea that contacts and cooperation with other firms is the best way for an SME to solve its problems and that this mutual learning process could be facilitated by some kind of external assistance and brokerage. The core idea is that a cluster is better equipped to succeed than individual companies and industries acting separately without the benefit of resources that complement each other. This is especially so for small and medium enterprises attempting to compete in globalizing markets.

Again from this point of interest, Porter (1998) argues “clusters” as they are made up of interconnected companies and associated institutions linked by commonalities and complementarities. The commonalities may be shared labor pool, common technologies and other production factors, common buyers or distribution channels, common culture, common location, common opportunity and threats. Finally the complementarities can be expressed in buyer-supplier relationships, the production of complementary goods and sharing of complementary resources. These common and complementary aspects bring about the high-level interaction, which is either trade or non-trade based, between the elements involved. We may say that there exists a dense network of inter-firm relationships in a cluster structure. As we have mentioned before, networks include firms (customers, suppliers, also multi-sectoral) and public and private organizations with supporting functions (training and upgrading, industry-related services, promotional agencies, research institutes, administration, etc.). The relationships in the network are characterized by features such as competition, cooperation, and interdependence (Bergman & Feser, 2002). Moreover, as the high-level interaction is the basic element of clustering, it is not surprising that, in practice, identified clusters are either sectorally specialized or may sometimes include several sectors linked to each other by trading patterns or other types of interaction.

The interactions within the network can be of different types; namely, vertical, horizontal and lateral links.

Vertical links refer to links between firms at different production and marketing levels of a production chain. The relationships can be simple buyer-seller relationships as well as initiatives of inter-firm learning along the supply chain, such as developing products together or cooperative relationships of firms with customers or suppliers through which improved services or more favorable conditions are achieved.

Horizontal links refer to links between firms at the same level of a production chain. The relationships, which may be informal or formal, are on the basis of complementary assets or the opportunity to learn from 'peer' firms. The examples may be exchange of information,

experiences and possibly machinery and equipment between cooperating firms at the same stage of the value-added chain. Formal horizontal links may include cooperation between a limited number of firms for joint implementation of activities (e.g. procurement of machinery and equipment and production factors, collaboration in order to offer larger quantities for sale, joint logistics, and marketing). Finally and briefly, lateral links refer to links between firms at different sector/branches. (Albu, 1997).

In addition, inter-organizational relationships between the elements of clusters can be formal, i.e. formalized by way of agreements or contracts, or in the form of formal member unions, trade unions, or network groups; or informal, i.e. informal agreements based on mutual trust.

Consequently, firms in clusters are enmeshed in more or less complex networks of inter-firm relationships (Albu, 1997). The interactions between the elements, as the basic feature characterizing the cluster formula, is the most critical factor in the competitiveness of a cluster, as we will discover later. Findings show us that the economic success of these interactions, and hence of the cluster, is mainly based on the trustful social relations and collaborative attitudes of the elements involved. Therefore, another characteristic of the ideal type successful regional cluster is close cooperation between the economic agents acting within the cluster. Any close cooperation between firms and institutions, as well as within firms, demands the establishment of a certain degree of mutual trust between people.

Therefore, we may say, binding the cluster together are these commonalities, complementarities, interdependencies and trustful interrelations. However, it should not be forgotten that, although the role of trust and cooperation among cluster's firms is great as emphasized by many scholars, economic self-interest is ultimately the glue that binds the cluster together (Bergman & Feser, 2002).

We analyzed the main property that of clusters have in common, the interaction between the elements involved in clusters, above. But, moreover, clusters are characterized by a dense network of inter-firm relations with the rise of either simple sell-buy trade relations or non-trade based relations arising from the collaborative attitude of the "socially proximate" firms.

That social proximity indicates common social and cultural conditions such as common culture, history, ethnicity, residence, family ties, shared identity and values etc. as the most constructive element of effective inter-firm relations; the "mutual trust".

We must also underline that inter-organizational relationships in a cluster could be the relationships along the production value chain (vertical), the relationships between the entities at the same level of value chain (horizontal) or relationships between the elements from different related sectors (lateral). Moreover, these relationships between the elements could be formal, i.e. formalized by way of agreements or contracts, or in the form of formal member unions, trade unions or network groups, or informal, i.e. informal agreements based on mutual trust.

2.4. Comparing two concepts: Clusters and Networks

Definiton of two concepts, networks and clusters are rather similar and hard to distinguish. Thus, in order to distinguish these two concepts, which are often used with one another in literature, we observe very few attempts made to differentiate the characteristics of networks and clusters. Forsman & Nikodemus (2003) depicts that Rosenfeld (1997, 2001) is mainly concerned with policy networks. They present that Cooke's classification is an adoption of Rosenfeld, albeit he clearly outlines what he defines as a network.

Table 1 : Characteristics of networks and clusters.

CHARACTERISTICS	NETWORK	CLUSTER
Membership	Restricted	Open
Relationships	Competitive through cooperation	Competitive with cooperation
Actor amalgam	Common business goals	Collective vision
Base for interaction	Formal partnerships	Informal interaction
Scale	Limited, inter-firm	Large
Basis of knowledge transfer	Relationships	Location/proximity

Source: Forsman & Nikodemus (2003), adapted from Cooke (2001)

The main distinctions between networks and clusters are shown in Table 1. Forsman & Nikodemus (2003) underlines that as an actor establishes relationships in order to get access to the resources within a network, there is a limit to the number of relationships each actor can maintain (Håkansson & Snehota, 1998). This results in a restricted membership. Clusters, on the other hand, can include lots of firms and other actors (Cooke, 2001), as exemplified in the much-cited case of Silicon Valley.

Furthermore, from this perspective, clusters enjoy knowledge spillovers from co-location. Factors that may explain the basis for knowledge spillovers, and thus the *raison d'être* for clusters include staff recruitment and workforce mobility, observation of rivals, comparability of solutions, and the circulation of gossip and rumors. (Henry & Pinch, 2001, Malmberg & Maskell, 2002) A common denominator for these processes are that they do not require the firms in the cluster to have a formal relationship or close interaction. (Forsman et al. , 2003) They can have formal or informal agreements and co-operation, but it is not a prerequisite. These processes, however, and their effects on localized knowledge transfer and generation still remain empirically under-researched (Bunnell & Coe, 2001, Howells, 2002).

In the case of networks, the content of the established relationships is increased collective competitive strength through the cooperation between the actors, as they can pool their resources and knowledge and work towards a common goal. Whereas the cooperation in the network is on a more aggregate level, i.e. the firms as a group increase their competitive strength by cooperating; the relationships in a cluster contain both cooperation and competition on the firm level. The long-term relationships between the actors in the network develop a joint understanding and trust that facilitates knowledge transfer.

A further complication in separating between the two terms has been the recent policy interest in networks and inter-firm cooperation (Rosenfeld, 1997). This fascination can partly be traced to the success of northern Italy's industrial districts of small firm networks in the 1980s (Storper, 1997) Forsman & Nikodemus (2003) points out that policy makers became convinced that the basis for the region's success lay in the rate of inter-firm cooperation/networks. However, Rosenfeld (1997) notes, these networks were not the source

for a local production system, but rather a result of mature and dynamic clusters. Conceptually, another confusing view about clusters is related to the industrial districts, which is sometimes used on par with cluster, although the industrial district is a rather distinctive form of industrial agglomeration of SMEs in the same industry (Amin 2000).

A cluster, according to Voyer (1997), is “regional or urban concentrations of firms including manufacturers, suppliers and service providers, in one or more industrial sectors. These firms are supported by an infrastructure made up of universities, research institutes, financing institutions, incubators, business services and advanced communications/transportation systems”. Voyer (1997) presents a list of factors which tend to be formalized when contracting to local development authorities on the likelihood of creating a cluster in their community. These factors are important to highlight the main characteristics of a cluster and they stress:

- the recognition of the potential of knowledge-based industries by regional/local leaders
- the identification and support of regional strengths and assets;
- the catalytic influence of local champions;
- the need to have an entrepreneurial drive and sound business practices;
- the availability of various sources of investment capital;
- the cohesion provided by both informal and formal information networks;
- the need for educational and research institutions; and most importantly,
- the need to have “staying power” over the long term”

Moreover, the broad attention to clustering has resulted in many researches over cluster innovation. Innovation is important both as an activity in its own right and as a spur to economic development – and competitiveness – generally, but it can be argued there is, at the very least, a lack of agreement in the academic literature about what innovation is; about why, where, and how it takes place; and about what precise forms it assumes at the local level. It also should be stressed that innovation is not an isolated event – it is dependent both on its corporate, temporal and its spatial context for expression. Again from literature, one currently prevailing view is that the basic unit of assessment of innovation is a cluster of inter-acting firms operating, often in a particular industry, within a fairly small spatial compass and the

firms are 'embedded' in their local area in terms of production linkages including inter-organizational relationships and communication flows. In many of these cases, we can say that the firms interact with each other in terms of labour supply, access to common (tacit) knowledge, producer-supplier linkages, access, venture capital provision, or some combination all of these factors (Scott, 1990; Sternberg, 1996; Keeble and Wilkinson, 1999 cited in Hart 2002)

As mentioned briefly above, from business point of view, the emphasis must also be on the clustering of businesses and support institutions gives rise to the formation of an environment conducive to the improvement of the innovation capabilities, which stems from increase in learning capabilities of the involved elements (Caniels & Romijn, 2001). Innovation capability is the main factor contributing to the competitiveness of the economic agents in today's knowledge based economy. If this fact is placed at the center stage, it is understandable that the contribution of clustering to the innovation capabilities being the central issue of the clusters debate. Besides different interpretations of the innovation process seen within clusters have in existing literature, we must underline that all of these interpretations can be associated with learning mechanisms, which forms the basis for the enhancement of innovative capabilities, contributed by clustering of businesses (Albu, 1997).

Moreover, Baptista and Swann (1998) introduce a new concept to the clusters, of the formal knowledge component "... a strong collection of related companies located in a small geographical area, sometimes centered on a strong part of a country's science base". Moreover, we must emphasize that there is also a large literature on Regional Innovation Systems (RIS), which puts the aspects of knowledge and learning in a distributed context of multiple actors as the core concern much related to clustering. ⁽⁸⁾

Again from this point of view, the interactions and the cooperation within clusters are analyzed as the main factor contributing to the formation of an innovation environment by facilitating the inter-firm learning. Bortagaray et al. (2000) stresses that clusters feature processes of interactive learning and collective action. In this regard, Porter's definition of

⁸ For a summary of this research, see OECD (1997)

clusters emphasizes the importance of ‘willingness to cooperate’ and ‘closely knit social-cultural links’ Therefore, the interaction between different actors in the innovation process in clusters, particularly between users and producers of intermediate goods, and between businesses and the wider research community, is crucial for successful innovation. Hence, the ideal cluster structure, characterized by dense network of inter-firm and firm-institution relations in spatial proximity, is crucial for innovation process. The means of such an interaction in a cluster structure could be collaboration of businesses along the production value chain (vertical) and between the businesses at the same level of value chain (horizontal).

Furthermore, it is notable that it has been increasingly acknowledged in the literature that networks and clusters are central to effective innovation management. While it is recognized that innovation networks have existed for many years, information technology has led to the widespread diffusion of modes of networking which were previously far less common’ (Freeman, 1991). Hence, Tidd (1997) contributes the need to develop a revised research agenda inclining the growing complexity, a focus on the role of innovation, and the formation of networks. At the same time, Granovetter (1985) points out, all activity is embedded in complex networks of social relations which include family, country, educational & professional background, religion, gender and ethnicity. Certainly, we believe that it is impossible to consider decision-making without examining networks of personal relationships. As pointed out by Sako (1992), *trust* between individual employees and a firm’s customers and suppliers is also an essential feature of business relationships.

On the other hand, the various interpretations of clusters show us that different studies of clusters in literature give rise to different typologies of clusters according to level of agglomeration, development stages, manufacturing types and kinds of inter-firm relations etc. Here we must emphasize that different kind of relationships can form different types of clusters. The differentiation of relationships can be based in the degree of formalization (formal or informal relationships), the coordination mechanisms, (market-like or hierarchy like), and the aim of the relationships (capacity, subcontracting, specialization, joint innovation processes etc.) (Albino et. al. 2000, Mitra 2000)

Hence, the question here must be how these inter-firm business relationships contribute to the development of further organizational relations (formal or informal) and the total competitiveness of clusters. The answer to this question and inter-firm relationship models will further be analyzed in detail in chapter 4.

CHAPTER 3

INDUSTRIAL DISTRICTS

In the previous section, we put forward the current progress of networking and clustering. In addition, we can depict that in many countries and industries, industrial clustering and networking has offered a competitive alternative to the advantages achieved through a larger production scale, and through the ensuing economies of scale for several decades

Moreover, it is arguable that the typical uniformity in the growth process of SMEs systems, experienced during the seventies and eighties in famous Italy's local systems, has come to an end. (Nakano 2004) From the current researches, we can clearly define new diversified patterns of growth and the range of options chosen expanded when attempting to draw international comparisons. As we can accept that there is no common and unidirectional development pattern which have been followed by different avenues to face the new competitive challenges posed by the globalization of markets and technology.

As in the previous section of this thesis, again, the aim is to further investigate some plausible hypothesis of inter-organizational relations in industrial districts (ID) and clusters, and provide an explanation in the light of the peculiar features of trust and informal relations. By the variety of visions on the notion of ID in the literature, and by the very vast array of experiences of enterprise clusters and agglomerations that have been recorded worldwide, we can see that this task is even harder to deal with because none of the IDs is strictly equal to another, as also demonstrated by the variety of product specializations, degree of complexity of organizational and network systems, cultural and social backgrounds. Moreover, the scope and variety of inter-firm organizations is continuously expanding, in relation to the globalization of technology and the increasing internationalization and localization of economic activities.

Aiming this, we shall first briefly review the literature on the typology of IDs, and in general on the variety of visions for the phenomenon of industrial clustering, focusing on the

explanations of their dynamics and changes in inter-organizational relations as analyzed in the literature. We shall notice how growing attention has been paid to the formation of IDs, and to models geared up to explaining the shift from one mode of internal organization to another.

3.1. Definition of Industrial Districts (IDs)

The interest surrounding the concept of the industrial district started more than one hundred years ago, quite silently, with the mainly descriptive work of Alfred Marshall. However, in Marshall's writing the term ceased to be a purely "descriptive device" and, albeit timidly and unsystematically, began to acquire the standing of a socio-economic concept. A concept located between the sector and the firm, useful to justify the resilience of the small firm sector, and the morphological complexity of the famous Italian industrial structure. Then, a socio-economic concept is developed to be able to integrate, within the framework of the analysis of the industrial organization of clusters, the influence of the external environment and of the local "community" (Becattini and Rullani, 1996).

Belussi (2001) argues that for most economists, the Marshallian writings, either in his *Principles* or in the later contribution of *Industry and Trade* is regarded the genesis of the concept of industrial district. Economists studying the particular form of industrial organization called the "industrial district", which has become an important issue in economic analysis in the last twenty years, often refer to the theoretical contributions of Alfred Marshall to the study of the industrial organization, developed primarily as the theoretical starting point which explains some important features of industrial dynamics and firm competitiveness at territorial level. Belussi (2001) underlines that although Marshall in his analysis explicitly used some terms like industrial district, industrial atmosphere, and external economies, he did not intend to build a theory explaining the origin and evolution of the industrial district model, nor to raise the set of questions intimately interwoven with his discovery of the character of many forms of industrial organization. Instead, Marshall attempts to analyze the working mechanisms of markets and structure of firms.

According to Belussi (2001) if a cluster is effectively characterized by, at least, some degree of division of labor, then it can be defined as an industrial district. So, this type of definition of cluster matches the ideal-type of industrial district as described in the literature if the following key elements are satisfied:

- there is a strong, relatively homogeneous cultural and social background linking economic agents and creating a common and widely accepted behavioural code, sometimes explicit but often implicit
- there exists an intense set of backward, forward, horizontal and labor market linkages, based both on market and non-market exchanges of goods, services, information and people
- there is a network of public and private local institutions supporting the economic agents acting within the clusters.

Moreover, Belussi (2001) argues that, rather than the concept of variety of formation of public and private networking, we can easily witness Marshall's emphasis on the importance of institutions and collective experience (built in the national culture or in territorially homogeneous areas) in shaping and reshaping over time attitudes, abilities and skills of individuals. The link between division of labour, competition and differentiation is indicated in a very influential passages of the Marshall's Principles such that;

"increased subdivision of functions, or "differentiation", as it is called, manifests itself with regard to industry in such forms as division of labour, and the development of specialized skill, knowledge and machinery: while "integration", that is, as growing intimacy and firmness of the connections between the separate parts of the industrial organism, shows itself in such forms as the increase of security of commercial credit, and of the means and habits of communication by sea and road, by railway and telegraph, by post and printing-press"

In literature, Marshallian districts are viewed essentially as static aggregation of small firms, related to the decentralization of tasks, whose nature, functioning, internal and external inter-relations are not systematically investigated. Besides as underlined in Marshallian (1920) work, the process of division of labour is not, thus, properly investigated and analytically described until we find in the late empirical studies of the Italian district economic literature,

or in the modern post-Marshallian readings (Loasby, 1992) which focus on the significance of increasing returns, complexities, differentiation, and transmission of knowledge and information in industrial organisation.

Moreover, in his original formulation of the industrial district, Marshall (1920) envisioned a region where the business structure is comprised of small locally owned firms that make investment and production decisions locally. Scale economies are relatively low, forestalling the rise of large firms. Within the district, substantial trade is transacted between buyers and sellers, often entailing long-term contracts or commitments. Reading through the lines in the seminal work by Marshall (1920) linkages and co-operation with firms outside the industrial district appears to be minimal. What makes the industrial district model so special, in Marshall's account, is the nature and quality of the local labour market, which is internal to the district and highly flexible. Individuals move from firm to firm, and owners as well as workers live in the same community, where they benefit from the fact that "the secret of industry are in the air", i.e. there is an industrial atmosphere, as he defines it. Workers appear to be committed to the district rather than to the firm, and moreover labour out-migration is assumed to be minimal. The district is seen as a relatively stable community which enables the evolution of strong local cultural identity and shared industrial expertise.

Continuously, during the 1980s and 1990s, on the basis of the results of various studies which have looked at the industrial district concept or at specific "local production systems", marginalist economics was already entering its long-term of contrasted decline. (Belusi, 2001) The issue of the industrial district started to represent a new cognitive device useful for analysing the economic reality from a "systemic perspective". From this point Belussi's findings are very clear:

“...The Marshallian industrial district constitutes, thus, a localised thickening (in this spatial determination we find its weakness and its strength) of inter-industry relationships, that show a consistent stability during time. ... The unity to which Marshall refers to is not the technologically defined industry but the area or the industrial district.”

However, as the post-Marshallian perspective took a new drift, the most recent “industrial districts” concept have been a contentious academic topic of increasing interest, especially over the last two decades. Scholars advocating the notion of industrial district consider the decline of the Fordist production model as the initiator of new industrial organization. The Fordist model was characterized by vertically integrated production systems. Due to the industrial development and new needs of customers on industrial markets, a more flexible organization was requested. Industrial districts have been characterized by the flexible specialization, which means organizing the production vertically between independent small and medium-sized firms. These new approaches reveal that the term “industrial district” turns out to be formed of many different organization of labor and many different socio-cultural fabrics that have been hidden. In what may be regarded as a common definition, industrial districts are taken as forms of organization governed by trust and co-operation. This also explains why the term is easily confused with the concept of network. What is striking in the extensive literature on industrial districts is the variety of approaches and the different phenomena that are taken into account. As an annex, Nakato (2004) states this popularity of IDs has started in the early 1980s, following the pioneering work by Piore and Sabel (1984). As organizational studies shifted their focus, industrial districts became a test site to analyze how the social division of labor among small- and medium-size enterprises (SME) works in regional economies.

Theoretically speaking, Piore and Sabel (1984) conceptualized flexible specialization theory, based on their study of a variety of industrial districts. They contended that, as the so-called "Information Age" started after the 1970s, the speed of technological innovation increased exponentially. Since then, in effect, markets have become much more uncertain because of changes in customers' tastes and needs for quality products, which became much more unpredictable. As a consequence, in the relentlessly moving, volatile markets, a flexible production system, based on the foundations of the social division of labor among technologically specialized SMEs embedded in regional networks in an industrial district, has a competitive advantage over mass production by vertically integrated, large firms. In fact, the theory was conceptually a paradigm shift from the logic of the "first industrial divide," or Fordism mass production of standardized goods, in the early twentieth century, to the "second

industrial divide," or a revival of craft-based production by technologically specialized SMEs in the regional networks of "cooperative competition." In other words, in place of sequential design, execution, and delivery for bulk production under vertically integrated large firms (Williamson 1981), which took advantage of economies of scale, "simultaneous engineering"—the concurrent design and production of a variety of products for small quantities by SMEs—became essential (Sabel and Zeitlin 1997).

After the pioneering work of Piore and Sabel (1984), many empirical studies about industrial districts followed (Deyo, Doner, and Hershberg 2001; Romo and Schwartz 1995; Saxenian 1994; Semlinger 1993; Uzzi 1997; Locke 1995; Pyke and Sengenberger 1992; Glasmeier 1991; Goodman and Bamford 1989; Grabher 1993; Harrison 1994; Hirst and Zeitlin 1991; Lazerson 1995; Zeitlin 1992, cited in Nakato 2004).

Today, modern economic growth theories can explain that economic activities determine cognitive spillover within geographically bounded regions, producing localized agglomeration and development economies. We have already mentioned that this process, which gives rise of an industrial district, is often tight related to activities already existing in the region. The variations can be observed through different ways:

- strategies of investment in research and development activities;
- “unintentional” production of new knowledge during the activity of research and development;
- interaction around already existing knowledge that can give rise to new technological developments;
- interaction between enterprises and university localized within the area.

But still, while flexible specialization theory celebrated the important roles that the SMEs had been filling in the regional economies, there are very few academic endeavors that focused on industries within an industrial district, where a variety of linked, but different, industries were embedded. (Nakato, 2004)

In effect, the theory and related empirical studies generally assumed the existence of randomly distributed complex inter-firm networks in industrial districts, as Sabel (1990) called the organizational structure “moebius strips organizations”. In other words, those studies almost entirely neglected the fact that there are underlying structural patterns behind the seemingly randomly enmeshed, regional supplier networks in each of those industrial districts. In particular, the notion of industries embedded in the complex web of subcontracting networks, through which the SMEs were connected to the regional production systems, was largely absent from those studies. In other words, the theory largely ignored the fact that those SMEs filled distinctive roles across a variety of linked, but different, industries, deeply embedded in each of those large-scale industrial districts. (Nakato, 2004)

Consequently, despite there were limitations that prevented the conventional approaches from unveiling the underlying complex inter-organizational relationships in detail, social network analysis offered a methodological breakthrough to overcome such limitations. In fact, we can face increasing number of studies of large-scale networks, especially since the late 1990s. A factor largely responsible for this movement obviously has been the advancement in information technology, which has made complex calculations of large datasets possible. At the same time, the sophistication of data analysis software packages are developed for the analysis of large-scale network analysis, such as Pajek (Batagelj & Mrvar 2002) which is also used as a tool to test our hypothesis in this thesis.

Again, another focus on research over IDs is that researchers endeavour to explore long term competitive advantages of industrial clusters, as the dynamics of geographically bounded industrial clusters has been an important area of research in recent years. An earlier review of available evidence, mainly from developed countries, showed the following to be the main attributes of dynamic industrial clusters (Schmitz and Musyck, 1995)

- Geographical proximity: A large number of predominantly small and medium sized firms are located in geographically bounded space.
- Sectoral specialisation: The cluster as a whole specialises in a specific industrial sector. Besides, there is significant intra-sectoral division of work, whereby different units within the cluster specialize in specific processes or component manufacturing.

- Close inter-firm collaboration: Close inter-firm linkages substitute for vertical integration of all activities within a firm.
- Inter-firm competition: Competition among firms is essentially based on innovation rather than on basis of lowering wages.
- Social embeddedness: A socio-cultural identity that facilitates trust, reciprocity and social sanction.
- State support: Very supportive regional and municipal government complements the work of active self-help organisations.

3.2. Advantages of Industrial Districts

One of the main sources of positive effects the setting of industrial districts conferred on individual firms is the geographic proximity between firms. With geographic proximity, it was easier for firms to enter into frequent face-to-face contacts, joint-problem solving, mutual adjustments, as well as other kind of direct exchange relationships at low costs. Geographic proximity was especially favorable to the conception and execution of complex joint-project that requires recurrent back and forth communications between collaborators. These characteristics of direct or indirect inter-organizational links increased firms' adaptability to the uncertain market, and heighten their survival chances. Industrial districts are forms of increased information diffusion. Following part elaborates this concept.

In an uncertain business environment, firms can hedge the risks of production bottleneck or over-capacity by externalizing part of their production and having subcontractors share risks (Storper 1997). This strategy not only helps firms to manage market uncertainties; it permits them to gain the benefits of specialization and minimize the danger of technological lock-in. However, decentralized production raises the transaction costs of the inter-firm exchanges, especially when exchanges are frequent, complex, and less predictable. Economic geographers such as Scott & Storper (1985), argues that spatial agglomeration alleviates costs associated with inter-firm transaction in a decentralized production system (Storper 1989). It

is especially true when the inter-organizational exchanges involve much tacit knowledge (⁹) acquired through learning by doing that is difficult to be standardized and codified to communicate over long distance.

Furthermore, firms also enjoyed the benefits of specialization in a decentralized production system. Firms that attempted to internalize the whole range of processes in house would have difficult time specializing and therefore would have products of inferior quality. Cooperative ties with specialist firms enabled firms to concentrate their energy on a defined range in the whole process in order to master it, and then rely upon complementarily specialized firms to supply the rest. In most industrial districts, firms engaged in small batch production by flexibly combining firms of difference specialties to produce a wide variety of products for overseas markets.

Moreover, decentralized production system in an industrial district also enabled firms to benefit from the external economies of scale. The concept of external economies of scale was advanced by prominent economist Alfred Marshall in his analysis of industrial districts. Furthermore, while district firms enjoyed the benefits of external economies of scale and specialization, non-district firms had trouble in finding specialist shops that had deep knowledge on meeting the special requirements. They either had to incorporate these jobs into their factories and bore the costs of bottlenecks and over-capacity; or they had to rely upon job shops that did not have strong knowledge in bicycle industries.

3.3. Categorizations of Industrial Districts and the Dynamics of Industrial Organization

As cited literally, the literature on enterprise clusters and industrial districts is sizeable, and was started by the classical contribution of Alfred Marshall (1920) on the importance of external economies for industrial districts. Then, following the increasing complexity and variety of real world inter-firm organization, several categorizations of industrial districts have been proposed.

⁹ Knowledge characteristics is explained in section 3.5

Consequently, on one hand, the concept of Marshallian Industrial District, and its Italian Variant, was first introduced by Alfred Marshall, who noted that small firms in the same industry realize economies of scale external to the firm through co-location (Marshall, 1896). In the eighties and nineties several scholars resuscitated his insights to explain the superior economic performance of regions such as the Third Italy , Silicon Valley in the US, and others. They emphasized concepts such as the 'industrial atmosphere', the local long-term socio-economic relationships among local firms, involving trust and a blend of competition and collaboration, and the role of local institutions, the latter especially in the Italian version.

On the other hand, the Hub-and-spoke ID is the second type of district empirically detected in the US and elsewhere by several studies (Markusen, 1996b). It occurs where one or more firms/facilities act as anchors or hubs to the regional economy, with suppliers and related activities spread around them like spokes of a wheel. A single large — often vertically integrated -firm (e.g. Boeing in Seattle and Toyota in Toyota City) or several large firms in one or more sectors (e.g. Ford, Chrysler and GM in Detroit, or the biopharmaceutical industry in New Jersey) may act as hubs, surrounded by smaller and dominated suppliers. The spokes may represent strong ties, as in the previous example, or loose ties, such as the externalities enjoyed as agglomeration economies (Guerrrieri & Pietrobelli 2000)

Furthermore, Guerrrieri & Pietrobelli (2000) cites Garofoli (1991) to propose a typology of models of local development that has been rather influential in his study of the Italian evidence of how production is spatially organized. As this classification applies beyond the industrial sector, it is based on structural variables such as the production structure, the enterprises' size, the inter-firm relationships, the background of the entrepreneurs, the features of the local labour market, the sources of innovation, the social structure, the local institutions and economic policies. Guerrrieri & Pietrobelli (2000) simplifies their findings even further into two categories that appear to emerge from these studies. On one hand, there are areas where enterprises cluster, either for a decision made outside or for a historical tradition, and share the same environment and institutions. On the other hand, there are areas where the local production system is complex, and characterized by intense horizontal and vertical transactions, and by a marked reliance on local factors. Inter-firm and inter-institution

synergies and relations are widespread and effective, transactions occur smoothly and generally a lack of hierarchy is observed.

As each typologies of IDs developed in different applications and approaches, a different and interesting approach explicitly introduces asymmetries among the clustered enterprises, and it is centered on the concept of 'leader-firms' which is also the focus of this research thesis. In literature, we face such “leader-firm” (focal firm) sets up numerous inter-firm linkages, and is located at the centre of them. It does not need to be a large productive firm. Such linkages may take several configurations as presented by Figure 1:

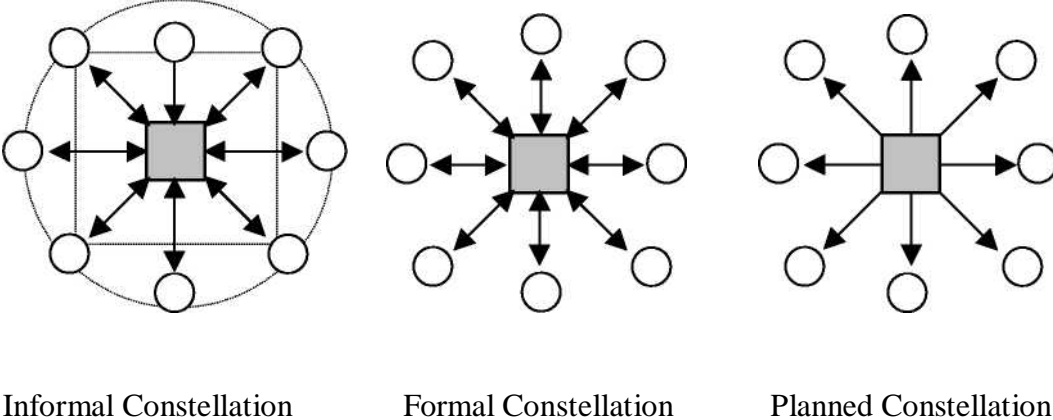


Figure 1: Enterprise Constellation

Source: Adapted from Lazerson and Lorenzoni, 1999

Moreover in Table 2 we describe the key elements of each category of enterprise cluster: the more one moves to the right hand-side of the table, the more the target becomes that of dynamic efficiency and competitiveness, and inter-firm relationships get more complex. The role of the leader-firm also changes from simply designing the project and assembling individual contributions, to that of coordination, strategic planning, investment and provision of strategic services.

Table 2: Categories of Enterprise Clusters

Key elements	Informal	Formal Constellation	Planned Constellation	Enterprise Network	Enterprise Group
Target	Static efficiency through cost reduction	Static efficiency, also through quality improvements, and shorter time to deliver	Dynamic efficiency (via adaptation and innovation) and competitiveness	Dynamic efficiency and competitiveness	Competitive efficiency, that is more than simple production efficiency
Leader-firm activities	Project design, assembly, commercialisation	Still leader, but other firms' role acquires importance	Not only the final assembler; also in charge of co-ordination, strategic planning, provision of key services and investments	Provision of strategic services	Provision of strategic services and finance
Role of other firms	Passive	More important: realised that their structure and behaviour affect all the constellation	More active; closer and frequent relationships among themselves; some may play intermediate role between leader and others	Active	Active; they do not simply execute leader's directives; diffuse entrepreneurship favours innovation
<i>Leader-other firms relationships</i>	<i>Leader dominates</i>	<i>Closer interaction;</i>	<i>Co-ordination</i>	<i>Co-ordination</i>	<i>Strategic interaction led by the leader-firm</i>
Rules governing the relationships	Short-term contracts; price is main variable	Long-term trust-based relationships; price loses its central relevance	Long-term contracts, little agents' turnover; routine in the relationships facilitates agreements	Strong identification with the network: common culture and attitudes, clear difference from outside firms;	Financial participation (control) of the leader in the group's firms
Factors of Development and Competitiveness	Presence of localisation economies; better socio-economic environment would improve performance		Dynamic external economies play a central role	Strength lays in global-local relationships	Localisation and urbanisation economies affect the organisation's performance

Source: adapted from Lazerson and Lorenzoni, 1999

3.4. Industrial Districts: Inter-organizational Relationships

The interest in interactions, relationships, and networks developed during the 80s-90s. However, inevitably, lots of different approaches and studies blurred the meaning of the terms slightly because the concepts and terms now also were used in different settings like consumer relations etc. But from our point of view, with the network approach, however, the advantages of relationship development processes in industrial districts were achieved more insights as a large body of knowledge about interactions, relationships, networks as well as industrial districts was developed.

In their pioneering study, (Marshall, quoted in Best, 1990), the problem with today's body of relationship and network literature is explained to be that it is fragmented and it's different pieces does not seem to fit together. They summarize the reasons for this fragmentation as follows: Firstly, research from very different backgrounds addresses the issue of inter-organizational relationships by structuring the different contributions. Here the research backgrounds range from social science, organization studies, technology, and innovation management, purchasing, and marketing, research in different parts of the world were followed different trends using different methods (¹⁰) So for this reason, comparisons became even harder because the different streams do not always acknowledge each other's work.

As the foregoing point, there are many different aims and objectives that are addressed in the different studies. Some tried to describe and understand business realities, others tried to prescribe and manage relationships.

Hence, the objective of this section would be to develop a framework that will enable us to put the different pieces of inter-organizational relationship research into perspective. As such, we will not offer a meta analysis of research in inter-organizational relationships and networks or a review of such research. However, we want to point out in which dimensions the relations can apparently be analyzed and, as such, in the next section, we offer a platform

¹⁰ e.g. where the European community largely looked into understanding interactions in business markets by means of qualitative studies, US researchers focused on relationship management issues using quantitative studies. (Ritter et al. 2003)

of a case study of understanding such research streams. Such a case study would allow us to compare and to contrast different relations of success and, as such, would be of help in developing a general hypothesis about business networks in industrial districts. As mentioned before, the thesis concludes with the contributions in this issue and by pointing out further research areas.

Frankly, literature shows us that a firm's success in industrial districts depends directly on its inter-organizational relationships. These working relationships are embedded in business networks comprised of connected relationships. Moreover, these relationships and business networks enable firms to attain outcomes, such as profitability and marketplace success, that they could not achieve acting alone. Therefore, the final guiding principle of strategy in industrial districts may be such that firms should accentuate working relationships and business networks.

Apparently, working relationships and business networks are complex phenomena that exist at multiple levels. We can think about them at the level of the individuals who participate in them as part of their work activities. We can also think about them at the level of the functional areas or sub-units that relate to one another, such as the relationship between marketing and manufacturing within a business unit. At this level, the relationships may be within the same firm or across firms, as in the relationship between marketing in a supplier firm and purchasing in a customer firm. Finally, we can think about them at the business unit level, as where the actors are firms engaged in working relationships, such as a customer firm and supplier firm working relationship; a distributor firm and manufacturer firm working partnership; or a customer firm, distributor firm, and manufacturer firm business network.

The industrial-district environment places each district company within a web of relationships which deeply influence its activities and performance. Within this context, the business idea embodies, since the company's start-up, such inter-firm relationships as an essential feature of its survival and performance potential. Such relationships can lead to several different aggregation forms: some aggregations result from linking a sequence of processes; others result from linking complementary products; other aggregations result from the chance to

exploit scale economies at a functional level. Besides the form such inter-firm relations may take, the crucial aspect is that a district company is inevitably part of a larger system of interconnected elements. Its entrepreneurial behavior will hence deeply reflect such interconnectedness, both at a competitive and financial level, and at a social level. In other words, a district company's success is deeply influenced by the varied and complex interrelationships resulting from the mere fact of belonging to the district. Hence, it is essential to understand such relationships, their variety and characteristics and how to effectively manage them.

Whilst research started by looking at interactions between organizations, it was soon realized that these interactions build up an inter-organizational relationship over time. These relationships have also been called inter-firm relations and alliances. Over the years, the following characteristics of an inter-organizational relationship have been discovered leading our way to an understanding of industrial markets. (Ritter et al. 2003)

There is a long-term orientation in a relationship when concerned as an ongoing interaction between the two actors involved in. The interaction model, individual interactions and exchanges are seen as short-term episodes that contribute through routinization, institutionalization, and adaptation to the development of a relationship, a long-term exchange pattern (Håkansson, 1982). From this point of view, we must underline that relationships change over time and, as such, are not static. Moreover, different relationships can be quite different or, even stronger, some argue that each relationship is unique. (Ritter et al. 2003)

Furthermore, another issue is that relationships do not come free of costs. Firms have to invest money, resources and time to make them work. Therefore, access to external partners' resources should be seen as a lengthy and costly investment process (Mattsson, 1988; Plinke, 1989; Valla, 1986; Williamson, 1979 as cited Ritter et al. 2003)

A relationship has an atmosphere that can be described in terms of the power-dependence relationship which exists between the companies, the state of conflict or cooperation and overall closeness or distance of the relationship as well as by the companies' mutual

expectations” (Håkansson, 1982). This idea of atmosphere can be found in several other constructs developed to describe relationships: trust (Anderson and Weitz, 1989; Donney and Cannon, 1997; Geyskens et al., 1996; Moorman et al., 1992 cited in Ritter et al. 2003), commitment (Anderson and Weitz, 1992; Dwyer et al., 1987; Grundlach et al., 1995; Moorman et al., 1992; Young and Denize, 1995 cited in Ritter et al. 2003). Recently, the notion of relationship quality has developed which combines some of these ideas into one overall construct.

Relationships are also mainly maintained for an economic purpose. (Håkansson and Turnbull, 1982). These functions can be directly related to the individual relationship (direct functions) or might have a purpose in the future of that relationship or in other relationships (indirect functions) (Håkansson and Johanson, 1993).

Further research on relationships has focused from the individual relationships towards a wider structure due to the new forms of connectedness acknowledged the fact that relationships do not exist in isolation or independent from each other. (Ritter et al. 2003) Moreover, the findings show us that the generalized connectedness of business relationships implies existence of an aggregate structure, a form of organization we have chosen to qualify as a network (Håkansson and Snehota, 1995).

As defined in the previous section, networks can be described in terms of actors, activities, and resources (Håkansson and Johanson, 1992). These elements influence each other: Actors perform activities and control resources, activities transform resources and are used by actors to achieve goals, and resources give actors power and enable activities. Networks can also be described in terms of the different bonds between different actors and resources.

Networks can be seen as self-organizing systems where there is not necessarily a “leader” or “captain”. In case such leaders have been identified, these structures have been called “strategic networks” (Jarillo, 1988).

3.5. Industrial Districts: The Formation of Focal Firms

Malipiero et al. (2005), depicting the classic perspective in the literature views, the district as an environment inherently conducive to the creation of direct relationships. Empirical studies, highlighted the presence of focal firms within industrial clusters (districts) (and in more general terms within local economic systems) playing a leading role for the transmission of technology and knowledge (Agrawal and Cockburn, 2002; Boari and Lipparini, 1999; Lazerson and Lorenzoni, 1999; Saxenian, 1994).

Malipiero et al. (2005) summarizes this latter stream of literature as underlying the following distinctive features that characterize several industrial districts:

- firms in the network are heterogeneous and not interchangeable in term of roles and tasks (Boari and Lipparini, 1999)
- a few firms have a higher capability to design and manage a large and differentiated network of relationships with other firms (Lorenzoni & Baden Fuller, 1995; Dyer, 1996; Uzzi, 1997)
- industrial districts are as much a product of larger firms acting as disseminators of technology and knowledge (Schmitz, 1995; Lazerson and Lorenzoni, 1999).

In the previous section, we strongly emphasized the importance of the development of many districts showing how some firms and their network of organizations can play an important role in collective learning processes, acting as drivers for innovation development and cluster growth (Boari and Lipparini, 1999; Lorenzoni and Baden Fuller, 1995). Lorenzoni and Baden Fuller (1995) define these leading firms as “strategic centres” that can assure the survival and development of the entire district, thanks to their superior coordination skills and ability to helm other firms to innovation and new growth opportunity. These organizations act as focal firms in the local innovation network, generating new knowledge and technologies, spinning out innovative companies, attracting researchers, investments and research facilities, enhancing others firms R&D activities, stimulating demand for new knowledge and creating and capturing externalities. For example, Lissoni (2001) showed how the mechanical cluster of Brescia (in east Lombardia) is fairly dependent on few firms that coordinate cluster

activities, fostering incremental innovation and welfare for the whole district. Another example of leading firms' centrality for cluster development is represented by Benetton (Camuffo and Costa, 1993), who developed many relationships with smaller producers and distributors in order to outsource and subcontract, stimulating efficiency and innovation development from its partners.

Malipiero et al. (2005) depicts that more empirical evidence on the role of leading firms for the economic growth and innovation development of the local context can be shown, as this is not restricted to Italy. Richards (2004) shows that the Scandinavian clusters of wireless hardware did benefit from the huge growth of the two major companies, Ericsson and Nokia. Although dominated by these two major players, the region saw the development of many mini-clusters of hi-tech start-ups.

We clearly set up the knowledge theory in the previous chapters. Based on this stream of pre-defined theories, and with specific regards to the absorption, generation and transfer of knowledge within industrial clusters, we argue that focal firms might play a leading role in two ways. First, they act as engine of innovation, internally generating new and sophisticated knowledge by virtue of superior technological resources and capabilities. Those large firms can play a critical role for the whole district in which they are located, for instance in growing the skill base, nurturing technical competencies, offering technical and managerial training, encouraging spin-offs and assessing the necessary managerial connections. Second, by leveraging on their intellectual and social capital, they can act as "technological gatekeepers" for the whole district, thus enhancing the absorption of new information into the cluster and facilitating its internal dissemination. (Malipiero et al. 2005)

Moreover, technological gatekeepers are the key firms within a district system who play a crucial role in scientific and technological information dissemination. By virtue of their comprehensive network of external and internal contacts and their advanced knowledge base, the gatekeepers play an effective boundary-spanning role by bringing a considerable volume of relevant scientific and technical information into the network. They are effective internal

communicators and disseminate information to others within the R&D systems, via a gatekeeper network.

3.6 Sources of Relationships in an Industrial District: Knowledge

As mentioned earlier, knowledge is crucially created, stored and utilized locally in a decisive manner. In this section, we do not intend to explore all possible local-global production configurations, but, we will refer to the specific cases of knowledge relations based on inter-organizational relations.

As a focal point, first, to understand the formation of relationships, the idea of “relationship” must not only be promoted as conceptually, as an input, but also be assumed as information and knowledge that can easily be transacted on the market. The most recent contributions of economic theory have pointed out that knowledge involves various degrees of complexity, specificity, cumulateness, transferability, approachability, and tacitness in a relationship. Here, as the most intensive source, technology is often tacit because its use often requires a type of knowledge that cannot be taught, articulated, codified, and, thus, simply imitated. This is why tacit knowledge is not easily transferable. It tends to remain localized in the place where it has been produced within firms, economic and social networks. (Belussi 2001)

Using the contributions of Bathelt et al. (2004), we can trace a clear-cut distinction between these two forms of knowledge. First, codification refers to a form of "objected" knowledge (a set of justified true beliefs), thus an explicit form of knowledge that is related to scientific results: the output of basic research and innovative activity. This type of knowledge is related to a body of facts, information, principles and practical understanding of science. Intuitively, this is opposed to tacitness, a subjective property of knowledge, linked to the abilities that an actor possesses on the basis of pieces of knowledge developed through practical experience like skills, etc. Tacit knowledge is closely associated with the complex of technological activities developed in research and development (R&D) departments (which often involve industrial secrets, patent protection, and short learning curves). In skill-based sectors, production is often modified regarding the tacit knowledge ingrained in workers, technicians,

middle management and inventive entrepreneurs. Moreover, it is notable that the current research on knowledge proved us a symbiotic relation is established between the two forms of it. Codified knowledge may be utilized only through recourse to tacit knowledge.

In detail, there still exists some confusion within both fields on the matter of codified and tacit knowledge and to what extent they should be differentiated. Nonaka and Takeuchi (1995) conclude that explicit and tacit knowledge are not exclusive, but rather complementary. They argue that knowledge can be converted from one form to the other. This view seems to be shared to an extent by some economic geographers (Malecki 2000a, Storper 1997), even though the views between the disciplines differ in regards to what extent it is possible to convert tacit knowledge into codified. If a distinction should be made between tacit and codified knowledge, the tacit dimension of knowledge can be seen as a central component for localized knowledge. It is generally seen as more geography-bound and -dependent than codified knowledge (Cooke & Morgan 1998, Florida 1995, Gertler 2001, Lundvall et. al. 2002 as cited in Bathelt et al. 2004).

We must also underline that extensive research has been conducted on inter-organizational relations and transfer of knowledge between firms (Alter, 1993, Kogut, 1988, Powell, 1998, Powell, Koput, & Smith, 1996, Powell, 1987, Prahalad & Hamel, 1990, Wathne, Roos, & von Krogh, 1996 as cited in Bathelt et al. 2004). The outcome of the knowledge transfer depends on several factors, where the notion of absorptive capacity (¹¹) has received extensive attention.

Furthermore, much of the literature on the economic benefits of industrial districts and clusters stress the fact that the key advantages are derived from the agglomeration economies afforded by the cluster. These agglomeration economies arise primarily from the ready access afforded to firms by co-locating with key suppliers. Porter (1998) stresses that the location of a firm within a cluster contributes to enhanced productivity by providing it with superior or

¹¹ Absorptive capacity is the ability of the receiver to assimilate, value and use the knowledge transferred. According to Cohen and Levinthal (1990) "... the notion of absorptive capacity is that the organization needs prior related knowledge to assimilate and use new knowledge".

lower cost access to specialized inputs, including components, machinery, business services, and personnel, as opposed to the alternative, which may involve vertical integration or obtaining the needed inputs from more remote locations. Sourcing the required inputs from within the cluster reduces the need to maintain costly inventory and the consequent delays that can arise with shipments from distant locations. It also facilitates communication with the key suppliers in the sense that repeated interactions with the supply firms in the value chain creates the kind of trust conditions and the potential for conducting repeated transactions on the basis of tacit, as well as more codified, forms of knowledge (Porter, 1998).

While not diminishing the importance of these agglomeration economies, a more recent stream of analysis suggests that the underlying dimension which confers competitive advantages on the firms located in the industrial districts is ready access to a common knowledge base. The central argument in this literature is that the joint production and transmission of new knowledge occurs most effectively among economic actors located close to each other. Proximity to critical sources of knowledge, whether they are found in public or private research institutions or grounded in the core competencies of lead or anchor firms, facilitates the process of acquiring new technical knowledge, especially when the relevant knowledge is located at the research frontier, as in the field of biotechnology research, or involves a largely tacit dimension. Knowledge of this nature is transmitted most effectively through interpersonal contacts and inter-firm mobility of skilled workers. From this perspective, "a key feature of successful high-technology clusters is related to the high level of embeddedness of local firms in a very thick network of knowledge sharing, which is supported by close social interactions and by institutions building trust and encouraging informal relations among actors" (Breschi & Lissoni, 2001)

Building on this stream of the literature, Maskell (2001) has proposed that the primary reason for the emergence of clusters and industrial districts is the enhanced knowledge creation that occurs along two complementary dimensions: this type of formation affords firms benefits along a horizontal dimension through the reduced costs of coordinating dispersed sources of knowledge and overcoming the problems of asymmetrical access to information for different firms; as well as facilitating the actual flow of knowledge between firms along the vertical

dimension. The horizontal dimension of the cluster consists of those firms that produce similar goods and compete with one another. The advantages of proximity arise from continuous monitoring and comparing what rival firms are doing which acts as a spur to innovation as firms race to keep up with or get ahead of their rivals. The vertical dimension of the cluster consists of those firms that are complementary and interlinked through a network of supplier, service, and customer relations. Once a specialized cluster develops, firms within it increase demand for specialized services and supplies. Further, once the cluster has emerged, it acts as a magnet drawing in additional firms whose activities require access to the existing knowledge base or complement it in some significant respect (Maskell 2001).

Moreover, the tacit characteristics of the knowledge affect the transfer. Scholars disagree whether only codified knowledge can be integrated through networks. Knowledge with a more tacit dimension is difficult to manage and represents a more important strategic asset than explicit knowledge. Similarly, there is a fear that in collaborative relationships with competitors involving knowledge transfer, the firm will "nurture their competitors in unintended ways" Furthermore, as tacit knowledge is often institutionally and organizationally specific, collaboration and cooperation is likely to be more successful between firms in similar contexts. (Lei et. al., 1997).

Forsman et al. (2003) claims that the knowledge acquired through collaboration and cooperation with other actors may be used for different purposes. First, the firms are cooperating to achieve some kind of relationship specific knowledge or jointly create new knowledge. Second, the cooperation itself brings with it general knowledge on how to cooperate with others. This so called relational experience can then be used in other cooperative agreements. (Kale et. al., 2000). Also a study of Powell et. al. (1996) supports these findings, as they note that firms already are collaborating tend to increasingly enter cooperative relationships and simultaneously become better at collaborating

At this point, we can say that there is a growing acceptance in the literature that, to capture the impact of inter-organizational relations on industrial district formation and knowledge diffusion (or spillovers). So, for this reason, we believe that the focus of research needs to

move from the industry and the individual firm to the inter-organizational knowledge exchange and learning in a business network. Our understanding of these networks is limited. We can say that most studies have focused too narrowly on the perspective of the network flagship. As a further complement, we need research that explores as well implications for network suppliers, especially lower-tier suppliers from developing countries. Some basic implications can be traced from the case research in this thesis also.

Furthermore, a knowledge-based theory of the cluster necessitates an awareness of the fact that knowledge flows present in a cluster frequently involve a combination of both local and global sources. Bathelt et.al. (2002) states that successful clusters are effective at building and managing a variety of channels for accessing relevant knowledge from around the globe. However, the skills required when dealing with the local environment are substantially different than the ones needed to generate the inflow and make the best use of codified knowledge produced elsewhere and these differences must be managed by the cluster. They maintain that an accurate model of the knowledge-based cluster must account for both dimensions of these knowledge flows. They refer to these two kinds of knowledge flows as “local buzz” and “global pipelines” respectively. According to Storper and Venables, buzz arises from the fact of physical co-presence. It incorporates both the broad general conditions that exist when it is possible to glean knowledge from intentional face-to-face contacts, as well as the more diffuse forms of knowledge acquisition that arise from chance or accidental meetings and the mere fact of being in the same location. Consequently, buzz refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place or region. This buzz consists of specific information and continuous updates of this information, intended and unanticipated learning processes in organized and accidental meetings, the application of the same interpretative schemes and mutual understanding of new knowledge and technologies, as well as shared cultural traditions and habits within a particular technology field, which stimulate the establishment of conventions and other institutional arrangements. Actors continuously contribute to and benefit from the diffusion of information, gossip and news by just 'being there' (Gertler, 1995). So conceptually, buzz is the force that facilitates the

circulation of information in a local economy or community and it is also the mechanism that supports the functioning of networks in the community (Storper 1997).

Continuously, participating in the buzz does not require particular investments. This sort of information and communication is more or less automatically received by those who are located within the region and who participate in the cluster's various social and economic spheres. It is also almost unavoidable to receive information, rumours and news about other district or cluster firms and their actions. This does not imply however that an agglomeration of firms always creates the same sort of buzz. Intensive local buzz is neither a direct consequence of co-location, nor is all sort of buzz equally relevant to the firms of a cluster. In fact, the diffusion of buzz within a cluster can go smoothly, but it can also be somewhat blocked depending on the structure of social relations between the local actors and firms and the history of interactions between them (Bathelt and Glückler, 2002). Especially in cases where distrust and malfeasance exist, it is unlikely to have high-quality local buzz. Since there are different configurations of localized production systems, we can also expect that different types of buzz may develop.

Bathelt et al. (2004) depicts that buzz is never just saying 'hello' to some other actors. It refers to the network of communication and information linkages which develop within a cluster. This occurs in negotiations with local suppliers, in phone calls during office hours, while talking to neighbours in the garden or when having lunch with other employees and so on. Hence, the nature of buzz is spontaneous and fluid. Co-presence within the same economic and social context generates manifold opportunities for personal meetings and communication. These meetings can be planned or occur spontaneously. They can be nondesigned, nontargeted and more or less accidental. Moreover, as pointed out by Uzzi (1997), 'network ties link actors in multiple ways (as business partners, friends, agents, mentors), providing a means by which resources from one relationship can be engaged for another which is particularly the case in the context of an industrial district which has a rich history of social interaction and offers opportunities for multiplex relationships, face-to-face contacts and meetings. Over time, these structures of social relations stimulate fine-grained information transfer, joint problem-solving arrangements and the development of trust and reciprocity (Bathelt et al. 2004).

Therefore, different modes of communication operate in a cluster's social and economic context (e.g., chatting, gossiping, brainstorming, in-depth discussions, problem analysis). Co-location and visibility generate potentials for efficient interpersonal translation of important news and information between the cluster actors and firms.

Also, being located in the same place enables firms to understand the local buzz in a meaningful and useful way. This is because co-location within a cluster stimulates the development of a particular institutional structure shared by those who participate. Firms develop similar language, technology attitudes and interpretative schemes. Also, we can add that trust exists in local milieus as something inherited, that any 'insider' will benefit from by default. (Maskell et al. 1998) This process of relationship building will be inspected in the next part. But here, we must underline that these interactions consist of agents which are bound together through day-to-day interaction, based on the same expertise, a common set of technological knowledge and similar experience with a particular set of problem-solving techniques. Then, communities of practice thus lead to the generation of distinct routines, conventions and other institutional arrangements. Learning within these communities is due to convergence in the sense of mutual relationships, shared ways of interacting, knowledge about other agents and their competencies, shared language and attitudes and the like. This enables particular decisions to follow earlier particular decisions and specialized communication to follow earlier specialized communication. Industrial districts can become important catalysts for the formation of such communities. In this case, they develop into local frames to understand the meaning and significance of local buzz which in turn serves to stimulate the generation of local buzz and its rapid diffusion.

Finally, in this context, it is almost impossible to avoid acquiring information about other firms in the cluster and their activities through the myriad number of contact points that exist. Pipelines, on the other hand, refer to channels of communication used in distant interaction, between clusters and external sources of knowledge. Important knowledge flows are generated through network pipelines. The effectiveness of these pipelines depends on the quality of trust that exists between the firms in the different nodes involved. The advantages

of global pipelines derive from the integration of firms located in multiple selection environments, each of which is open to different technical potentialities. Access by firms to these global pipelines can feed local interpretations and the usage of knowledge developed elsewhere into a cluster. Firms need access to both local buzz and the knowledge acquired through international pipelines. The ability of firms to access such global pipelines and to identify both the location of external knowledge and its potential value depends very much on the internal organization of the firm, in other words, its "absorptive capacity." The same can be said of local and regional clusters (Bathelt et. al. 2002).

3.7. Business Networks and Relationships between Actors

Continuously, as firms in an industrial district build a number of close, collaborative relationships, or alliances, the inevitable next step is to understand how to better interrelate the set of relationships. Thus, here, a business network is a set of two or more connected business relationships. 'Connected' means the extent to which exchange in one relation is contingent upon exchange (or non-exchange) in the other relation. Moreover, two connected relationships of interest can themselves be both directly and indirectly connected with other relationships that have some bearing on them, as part of a larger business network. A focal relationship is connected to several different relationships that either the supplier or the customer has, some of which are with the same third parties. ⁽¹²⁾

Another important aspect of analyzing and managing business networks is network roles. In constructing business networks, certain managers operate as brokers, creatively marshalling resources that other actors control. Three broker roles that significantly contribute to the success of business networks can be sketched out: the architect (focal firm), who facilitates the building of specific networks, yet seldom has a complete grasp or understanding of the network that ultimately emerges; formally connects specific actors into an ongoing

¹² A type of business network of particular interest is the alliance network, which is a clique of interrelated and coordinated business relationships. Firms engage in alliance networks to create new markets, to bring together resources that are beyond any two firms, to gain consensus on a "dominant design" that will speed the adoption of an innovation, and to spread risk across a greater number of firms.

network; and focuses on activities that enhance network performance and needs to have a broader network horizon. These network roles may be more apparent in some business networks

Moreover, for business networks, to possess advantages beyond the sum of the involved dyadic relationships, consideration must take place within those relationships about their connectedness with other relationships. A firm needs to consider how a relationship with its partner firm will be viewed by other actors in the network. Through a relationship, a firm can signal other actors about its availability and willingness to have relationships with them. Conversely, having a relationship can make a firm repulsive to other actors, even though the firm may desire a relationship with them. A firm needs to consider how complementary and irreconcilable the activities it undertakes with its partner firm are with its activities in other connected relationships. Finally, a firm needs to consider how transferable resources developed with its partner firm are to other connected relationships and how particular they are to that single relationship.

3.7.1. Characteristics of A business Network

We can analyze business networks with three components: actors, activities, and resources. Actors are firms, such as customers and suppliers, or other organizations, such as regulatory agencies, that perform activities and control resources. Actors perform activities such as transactions (e.g., order management cycle) and create value through transforming knowledge resources. Resources refer to anything that actors explicitly value, such as technical know-how, equipment, personnel, or capital, that they can use to generate greater value for themselves and others. Even though a firm may possess a given resource, for strategic purposes, it may instead look to other firms to collaboratively develop the resource

The part of the network within the network horizon (¹³) is the actor's network context. The network context is structured in terms of the three earlier components: the actors, who they are and how they are related to each other; the activities, what activities are performed and the

¹³ Network horizon refers to how extended an actor's view of the network is. It depends on the actor's experience as well as on the structural network features, such as the connectedness of relationships.

ways in which they are linked together; and the resources, what resources are used and the pattern of adaptation between them. The contexts are partially shared by the network actors, at least by those close to each other. Yet, because of differential knowledge and experience, every actor has a different network context.

In this ambiguous, complex configuration of firms that constitute a network, in which the relations between firms have such importance, the actors develop network identities. This refers to how the firms see themselves in the network and how they are seen by other network actors. Network identity captures the uniqueness of each firm in its set of relationships. As such, it is time dependent and context related. It communicates a certain orientation toward others, such as being positively connected, having a multiplex relationship, or having no relationship. Network identity conveys a certain competence in terms of an actor's perceived capability to perform certain activities, and it has a certain power content. For example, an actor that is able to mobilize and leverage the substantial resources of a connected partner will be viewed as strong.

In sum, the three characteristics that are increasingly found in business networks (particularly alliance networks) area as follows;

- Business networks are organized around developing and realizing an envisioned market place opportunity. From a business market management perspective, a meaningful way to bound a network is around a defined market place opportunity.
- The relationships between firms are not simple, but multiplex relations, where the firms are potentially suppliers, customers, and competitors to one another for the same market place opportunity
- Business networks are increasingly international in composition unlike domestic business networks.

3.7.2. Business Relations

While these formal cooperative arrangements are important and noteworthy, there is also a reason to consider the less formalized (informal), but close and long-lasting, exchange

relationships between supplier firms and customer firms - business relationships — in business markets. Such business relationships are less recent than the cooperative arrangements as mentioned before, and we find examples of them far earlier. In fact, they seem to be fundamentally associated with market economies. Less spectacular than the formal cooperative arrangements which have appeared on the scene more recently, these older, but also cooperative, business relationships are less illustrious in that they emerge out of ordinary market relations. Nevertheless, they have strong implications for trust and, depending on the extent to which this trust scheme is exploited, can contribute just as much to the development of inter-organizational relations of a firm as more informal collaborations and co-operations.

We can find extensive empirical data on business relationships that have been previously collected and analyzed (Håkansson 1982). The data demonstrate that most business linkages are engaged in business relationships with a limited set of important customer firms. The analysis also demonstrates that the relationships of the firms are, indeed, long lasting. The average age of business relationships at the time of the investigation was fifteen years. Moreover, Håkansson (1982) states that transaction cost is turned out to be one of the reasons for continuing business with a particular supplier. Production cost is another. It was stressed that close coordination of production activities provides firms engaged in long-lasting relationships with the possibility of lowering joint production costs. The case studies as exemplified in Håkansson (1982), also show that close, long-lasting relationships contribute to more effective product and process developments than is otherwise possible.

Similar to other findings, other results show us that relationships are established and developed through interaction between the firms. The relationship development process means that an initially weak interdependence between firms, associated with ordinary market relations, can be transformed into a strong and mutual dependence, which, in turn, allows the relationship partners to coordinate their interdependent activities and, thus, realize the gains mentioned above. Through interaction, firms are able to demonstrate their willingness and ability to do what they claim they intend to. This takes time, however, and therefore relationship development takes time. We must also point out that it requires managerial

efforts of various managerial levels and with different areas of expertise, must meet and exchange information repeatedly.

Moreover, in a business network, we must also examine the effects of interaction in one relationship on learning in other relationships, that is, on how routines have a bearing on those relationships.

From this point of view, one of the basic assumptions of the business network perspective is that each business relationship is unique. A business relationship has its own history and involves a specific set of individuals with their unique experiences and competencies. Nevertheless, there is reason to consider the possibility that experience from one relationship may also be applicable in another. This process is called “relationship learning”. An explanation of this generalization process can include establishment of relationships, establishment of trust between actors, engagement in joint production rationalizations, and product development cooperation and collaborations. It is also conceivable that the routines developed in one relationship can be applied in other relationships.

Moreover, experience from interaction in a business relationship can also lead to learning that develops links with other relationships. In any one relationship, a number of activities are performed, which are coordinated between the two firms. Since each firm is usually engaged in a set of relationships, however, there are also advantages to be gained by coordinating activities across relationships. Such coordination may entail several supplier relationships, or several customer relationships, or both supplier and customer relationships along a value chain. Also, the development of routines for coordination across relationships may also be a key type of business network learning. Cross-relationship (both formal and informal) coordination may be important for both similar relationships and those that are complementary to the focal relationship.

We have, thus, discussed learning based on experiences of interaction in one particular relationship and distinguished business relationship development, briefly. However, business relations may also be affected by interaction in several relationships. Firms that are exposed to

a variety of relationships experience a wider range of relationship events. Moreover, it is generally acknowledged that more variation or diversity often stimulates informal relations. They are, therefore, likely to encounter more different kinds of relations and to experience more cases of informal relations and are therefore also likely to be more strongly motivated trust

3.8 Informal Relations

We already know that industrial districts are geographical zones characterized by small firms specializing in a particular area of production. As such, while firms continuously interact with each other, the strict conditions of informal relations structures begin to appear. Moreover, local economies are often capable of equaling, and sometimes of outdoing, those varieties of organization of relations that are more familiar to network theory. The basis for the success of relation of firms appears to be diffuse patterns of cooperation and collaboration. From the network theory, we already know that particular phases of the production process are put out to specialized firms who cooperate with each other in making the product, unlike the standard vertically integrated firm, where all stages of the production process are hierarchically organized within a single organization. Theory depicts that in an industrial district, production is often organized by "final firms," which engage with customers on the final market, take orders, and draw up plans or specifications. They then subcontract out the actual process of production to a host of smaller subcontractors, each of whom may specialize in only one phase of production, and then assemble the finished product and bring it to market. Yet, as argued before, this process has become relatively widespread in certain parts of Italy and has arguably been the source of Italy's economic success in many sectors over the past three decades. Furthermore, this pattern of production is found in quite different sectors of production; not only more "traditional" sectors such as textiles, clothing, footwear, and jewelry, but also more advanced ones such as mechanical engineering and medical equipment.

Very clearly, it can be claimed that the form of production seen in these industrial districts requires a high degree of cooperation between firms. Formal contracts are relatively rare; besides informal contracts are often observed. Moreover subcontracting relations depend on

word-of-mouth agreements. We also mentioned several times that no single firm can keep pace with the development of all relevant technologies and, consequently, they have to access both internal and external know-how sources in a district (or from outer districts), and, in turn, the firms themselves constitute the most important external knowledge sources by developing new relationships. One way of organizing these business relations and, consequently, flows of information and know-how, consists of informal networks of relations in which individual complementary contributions reinforce each other.

Moreover, to keep pace with technological progress or to catch up with the technological frontiers, a single firm has to master a great number of different business relations. In other words, with growing complexity of the innovation process it becomes increasingly difficult to use immediately all the relevant new scientific and technological insights within this prospect. The current potential of technological proximity of different innovative and imitative actors in a district has stimulated new mechanisms of collective action, and several ex-ante relationship mechanisms including more formal forms such as R&D joint ventures or the establishment of anticipated technological standards, or more informal practices, such as reverse engineering, and information exchange networks among engineers and scientists (see Foray, 1995a and 1995b). Here, reverse engineering means that the involuntary leakage of new technical information, whereas informal communication in networks, can be understood as a voluntary information exchange. Von Hippel (1989) also introduced the concept of informal networks of know-how trading and found empirical evidence for this case in several industries. Furthermore, existing literature (e.g. Rogers, 1982; Von Hippel, 1987; Schrader, 1991) suggests that knowledge diffusion through informal channels happens as information trading. This type of informal exchange of knowledge between firms is a frequently observed phenomenon in product development, production and diffusion of technological innovations. Information trading refers to informal exchange of information between employees working for different and sometimes competing firms (Von Hippel, 1987). This informal know-how trading is the form of a voluntary relationship mode to exchange technical or other information and can be interpreted as a process of actively initiating technological spillovers.

As expected, informal networking means any action that can contribute to disclosure, dissemination, transmission and communication of knowledge. Many different methods such as talking, listening, showing, debating etc. at different occasions such as exhibitions and conferences, and even telephone calls, can be employed in some haphazard way to convey and receive knowledge and the underlying concepts (Kobayashi, 1995). The informal network is set up when, at congresses, conferences or other technical and business meetings, entrepreneurs or their respective engineers assess the other participants with respect to their technological fields and capabilities. They build a list of possible useful contacts on which to draw when it no longer seems promising to struggle alone with technological bottlenecks (see Von Hippel, 1989). In this respect information technology (IT) also gains importance in the establishment of informal networks with means for a rapid exchange of information and data on which firms already draw heavily via electronic mail, the Internet etc. During this process of mutual contacting, an informal network of relations are useful for establishing technological relations. The formation of this relationship network is supported by the feature of non-rivalry over technological know-how which is responsible for the most salient aspect of informal networking, the acceleration of diffusion of new technological know-how by people communicating and learning what others know.

Apparently, theory show us that when similar firms are located in clusters (or industrial district-like environments), firms share a common series of values and knowledge so important that they form a cultural environment. As mentioned above, in this environment, firms are linked together by very specific formal and informal relations in a complicated mix of cooperation and competition (Brusco, 1990). In Saxenian's (1994) comparison of the regional agglomerations in Silicon Valley and Route 128, disparity emerges in the creation and character of networks. In Silicon Valley, informal contact between individuals is important, mutual, beneficial and widely observed. With a culture supporting informal relationships and a variety of regional institutions providing network services by arranging trade fairs, conferences, seminars and social activities, the individuals (co-workers, competitors, former co-workers, suppliers, customers etc.) keep meeting each other resulting in the formation of relationships and informal contacts. These are maintained and strengthened by ongoing activities. Technical and market information is exchanged, because

the Silicon Valley culture let them discuss details about their work. In the Route 128 case, informal contacts were few and the culture discouraged networking, exchange of knowledge and problems. The informal activity in Silicon Valley is rather extreme, but the level of interaction and information flows is of high importance for the evolution of clusters in general.

In Maskell et al. (1998) the creation of informal networks of relations may go through several phases, from relations between two individuals to entire networks. The transformation starts with transfer of knowledge between two individuals. Repeated interactions between the two lead to falling costs of future interactions by development of routines and conventions, which decrease costs. This makes the relationship stable. Both vertically and horizontally related firms may benefit from a climate of trust commitment and mutual understanding. This will ease more informal contacts and interaction both at the level of the firm and the employee (Maskell, 2001).

3.9. Trust and Commitment in Inter-organizational Relations

As mentioned in the previous section, trust plays an important role on the development of long-term informal and formal relations. Clearly, trust can be seen as key element in the cooperation and collaboration relationship. Thus, this allows actors to respect the assumed commitments among the firms in the specific network. As soon as trust among players has been established together with the strategic business relations, the operational dialogue and communication can then be made easier and possible through ITs.

On another aspect as mentioned in the previous section is that trust and commitment are key factors in the establishment and development of long-term relationships among firms (Dibben 2001; Coulter and Coulter 2003; Coote et al 2003) and helps in the development of business networks (Gadde et al. 2003). The issues of business relations involve certain elements of trust, because its goal is to achieve satisfactory long term and quality relationships (Crosby et al. 1990; Coulter and Coulter 2003).

Since the 1990s a great deal of research, and with different perspectives, has documented trust as a key issue in business relationships and inter-firm co-operation (Crosby et al 1990; Coulter and Coulter 2003). Moreover, Morgan and Hunt (1994) presents that their studies have reported a positive relationship between similarity and trust among participants. Accordingly, similarity is related to the extent to which firms or individual participants share common background, values or social norms. However, it must be underlined that to define and measure trust, commitment and familiarity and other issues related to relationship marketing is rather complex and hard to model.

According to Coulter and Coulter (2003), trust may be seen as a complex construct that includes integrity, honesty and confidence that one party places in another. This also involves the issues of credibility among parties. Then, this involves an active participation of the 'soft social elements' of any inter-firm cooperation, when one firms trust the other. Consequently, trust is an important influence to interpersonal and inter-group behaviour as well as it is a critical element of competitive success in firms (Wolfe 2003).

In accordance with our previous discussions, firms are embedded in networks where both economic and social factors are crucial in the development of co-operation. (Gadde et al. 2003). The way that they handle these relationships is not easy and will depend on different internal factors of the firm, as well as, their relationship with others. In this respect, some authors (Håkansson and Johanson 2001) argue that firms need to use their positioning in a network with the aim to have access to joint resources achieving and performing a better competitive advantage. Then, companies learn how to use their capabilities and complement them with the use of complementary resources that networks bring. In others words, they learn from each other by “learning-through-interacting” (Lundvall 1992). Then, firms do not work in isolation and they build interdependencies systematically (Håkansson and Ford 2002; Gadde et al 2003).

One important consideration of the role of trust and commitment among firms is that they participate in any forms of collaborative networks, is that these co-operative activities impact considerable on the productivity of individual firms (Gadde et al 2003). Therefore, for firms,

it is relatively important to develop their strategies in this associative environment that can be found in geographically concentrated areas, as the case of industrial districts and clusters. Then, firms can possess a competitive advantage

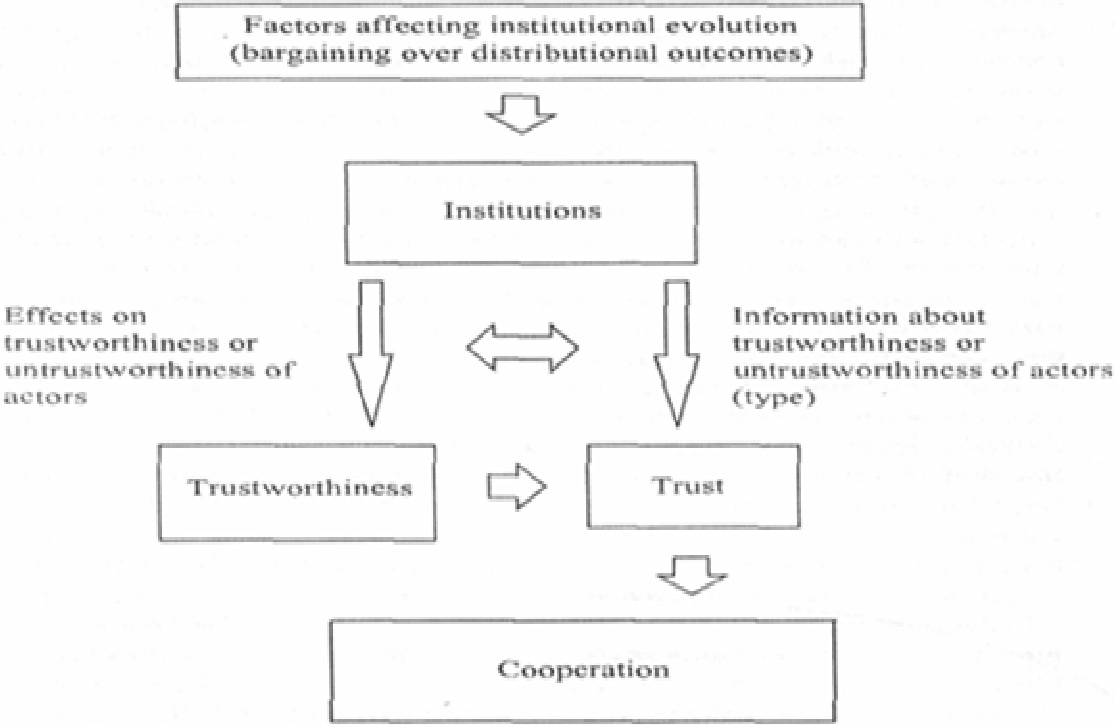


Figure 2: Factors affecting institutional evolution

Source: Farrell & Knight (2003)

difficult to imitate when international competition and globalisation are the trends in an open and interconnected world of relationships.

The underlying intuition is that if actors in a network or a district may exert an independent effect on trustworthiness, and thus on how social actors trust or distrust each other, then it follows that the evolution of inter-organizational relations that will surely be expected to have an impact on trustworthiness, and thus on trust, and thus on cooperation and collaboration among other firms in the district. In turn, changes in trustworthiness and in trust between actors are likely to lead to changes in the extent and form of business relations between actors.

Thus, the model we set out clearly specifies a set of causal relationships that may plausibly affect trust and cooperation between actors (see Figure 2).

The existence of trust in an inter-organizational relationship implies some level of expectation between the firms involved both in formal terms with regard to compliance of a contract, as well as with respect to informal behaviors and competences. Here, a trust-based informal relationship implies that strong sanctions may not be a necessary fallback to problems in the relationship. Moreover, we must depict that the development and maintenance of inter-organizational trust is an alliance management issue. In the literature, we can see that firms, that are using a strategy of networking to gain access to external technologies and expertise, must accept a certain visibility within the network. (for the focal firms, this takes the form of centrality) This demands the attention to be paid to maintaining and promoting a trustworthy reputation for good business practice. Firms also develop and protect good levels of trust between the firms in an industrial district. The development of trust is one area that can bring into focus the relationship between internal and external networks, as there is no guarantee that good external relationships will be projected in good internal relationships. Hence, developing relationships built upon trust was a crucial aspect of network building. Fox (2000) postulated the concept of 'low' and 'high' levels of trust in terms of inter-organizational work relationships. Such differences in trust relationships may also be found within external collaborations.

Moreover, if trust is regarded as a problem to be overcome in inter-organizational relationships, it must be recognized as one with many aspects. Zucker (2002) identifies a number of areas in which the process of trust building takes place. These include a mixture of organizational and personal factors such as reputations, shared goals and the quality of interaction in terms of communication, competencies and behaviors that unfold as the relationship develops. He also claimed that trustworthiness is as much part of the intangible assets of the organization as is knowledge and expertise. From this point of view, interpersonal relationships based on friendship can develop much stronger bonds if the relationship is tested through satisfactory resolution of particular difficulties. In summary, it is becoming increasingly recognized that both internal and external networks play a role in

innovation strategies, and that successful network processes depend on a specific management expertise. Furthermore, the management of trust is a crucial element in network success. Our case study in Chapter 4 will be used to analyze these issues in detail.

CHAPTER 4

METHOD and DATA

This chapter first presents the purpose of the study which is followed by an outline of inter-organizational relationship development processes regarding trust, commitment and informal relations. Also, the methods of the data collection and application of enterprise surveys will also be presented.

4.1 Purpose of the study

Hence, this thesis sets out to study the structure underpinning OSTIM's inter-organizational relationship networks, we examine the effects of trust and commitment between specialized producers in the OSTIM district. As a respond to the interchangeable relationship factors in the context of OSTIM, we also explore partially external conditions, more specifically, the political structures and global commodity chains, that are both conducive and restrictive to the development and deepening of the logic of regional network-based industrial system.

In the following chapters, we will analyze the differences that the geographic agglomeration and business relations make upon district firms' performance. Studying inter organizational relations shows us that firms in the same industry generally utilize similar relations and furthermore exposes the inter-organizational characteristics that our analysis conventionally attribute to affecting the structural patterns of relationships and goals of firms in a district. To a certain degree, we can set these variables in a qualitative sense.

At the same time, studying OSTIM enables us to explore, from a new point of view, an essential issue of relationship development: how does a firm's relations contribute from low value-added activities to high value-added ones. Researchers generally emphasize the importance of trust and commitment in improving productivity of a firm towards raising competitiveness with specifying the dynamism of its industrial relations. It is largely accepted that differentiating the mix of industrial relations or establishing new ones does necessarily

imply moving up the ladders of value-added chain in an industrial district or moving closer to a key position in the network. In fact, studying OSTIM district offers us a unique chance to investigate how firms in this district develop, capture, manage, exploit, and retain the advantages embedded relations by moving closer to the key position in the network.

Equally important, OSTIM constitutes a suitable case for longitudinal analysis since the first manufacturing firm started in the mid-1960s, amid the very early stage of Turkey's industrialization history. Tracing its history helps us disentangle the complex historical factors for the emergence of Turkey's industrial structure that has been constituted of numerous specialized SMEs linking to each other in extensive subcontracting networks. Another trace of economic transformation can be found as there are a group of large corporations of firms dominate both domestic and export sectors in Turkey. Because of the fact that OSTIM has emerged at the early stage of Turkey's industrialization and has grown to be an import and export industry in the 1970s, examination of the evolution of OSTIM's organizational business relationship pattern, provides evidence to the broader question of why Turkey has developed a decentralized industrial system and excelled in the art of buyer-driven demand-responsive manufacturing.

These types studies of consumer manufacturing industries such as OSTIM also bears special relevance to the industrialization of the developing countries. Moreover, these structures are usually among the first steps along the progression of industrialization. Nevertheless, the growth of national wealth does not imply abandoning the traditional intensive consumer industries to go after the cutting-edged high-tech ones, as the sustainable intensive traditional industry-based growth in the Third Italy has clearly demonstrated.

The endogeneous approaches to tie relationships provides a good explanation of the factors that influence the propensity of firms to enter ties, but it creates the difficulty they may face in determining with whom to relate. This difficulty, which results from the challenges associated with obtaining information about the competencies, needs, and reliability of potential partners especially vivid in the case of inter-organizational strategic alliances. From business point of view, alliances are a novel form of voluntary inter-organizational relationships that involves

significant exchange, sharing, or co-development of relations and thus results in some form of enduring commitment between the partners. While strategic alliances can be a means to manage environmental uncertainty, there is also considerable uncertainty associated with entering those cooperative relationship ties. As argued before, imperfect information about potential partners raises search costs and the risk of exposure to opportunistic behavior (Gulati 1995; Gulati & Singh 1998). Thus, while both exogenous and endogenous factors inside or outside of an industrial district may suffice to determine whether an organization should enter alliances, they may not provide enough cues to decide with whom to develop relationships. Where and how do firms find those cues? And how do the particular cues they use shape the formation of inter-organizational networks?

Generally, these are the two questions addressed in this thesis. We propose that organizations tend to create stable, preferential relationships characterized by trust and rich exchange of information with specific partners (Dore 1983; Powell 1990). Over time, these "embedded" relationships (Granovetter 1985) accumulate into a network that becomes a growing repository of information on the availability, competencies, and reliability of prospective partners (Kogut et. al. 1992; Gulati 1995, Powell et. al. 1996). The more the emerging network relations internalizes, and with further increase in the informational value of the network, firms become to be the "leader" firms in the industrial networks and thus more likely to be embedded in the emerging network. In this iterative process, new embedded alliances bring about new partnerships modifying the previous relations network, which, then shapes the formation of future cooperative and collaborative ties. Thus, here in this thesis, we present the emergence of relationship networks in an industrial district as a dynamic process driven both by exogenous interdependencies that prompt organizations to seek cooperation and by endogenous network embeddedness mechanisms that help them determine with whom to build partnerships. Moreover, we can claim that inter-organizational networks are, thus, the evolutionary products of embedded organizational action in which new relations (or partnerships etc.) are increasingly embedded in the very same district.

4.2 Method and Data

In the field study, the application aims to identify inter-organizational relations (supplier-buyer) in the geographical area within the boundaries of OSTIM industrial district. Moreover, we further aim to verify our hypotheses about “leader” or “focal” firms as the target by using various criteria in an industrial area, and partly develop policies and other relationship instruments as we defined in our business networks discussion. The logical framework of this process is given in the previous parts conceptually and hence this section will be a guide for application of our case study. We expect entailing some deficiencies such as lack of data, or the questions on the accuracy and recentness of the data. Moreover, specific constraints in our research such buyer- supplier relationships are also other factors that will affect the research process. Taking the initial conditions of firms into consideration, we will try to conceptualize this relationship development process to our field, by making use of the logical framework constructed and again, partly try to develop policy recommendations based on our state of the art by using our framework knowledge as presented in the previous sections of the this thesis.

The purpose of our study is based on micro level network data, collected at the firm level in OSTIM industrial district in Ankara, Turkey. So, our analysis has required careful data collection through interviews on the field. Interviews were carried out with managers or the skilled workers in higher positions in the firm, and the survey was directed to only manufacturers from sectors of machinery and equipment manufacturing present in OSTIM. Buyer-seller firms are omitted. Manufacturing firms are randomly selected as inclined from the OSTIM Catalog (2004). This means that the analysis selectively included not only horizontal relationships among firms but also the vertical relations that operate as producers. Apart from general background and contextual information, the survey is built up with a fluent structure to discover “technological and innovation capabilities of firms” and “inter-organizational relations” as well. The questionnaire is prepared by Ass.Prof.Dr. Erkan ERDİL and Prof.Dr. Metin DURGUT. The sample questionnaire can be found in Appendix A.

Moreover, we must underline that we will follow the network analysis methods work over the selected data from our questionnaire carried out use Pajek, social networks analysis software.

(¹⁴). Moreover, while some pre-documented results in the literature are taken as complements, the main source of extensive data in the our analysis is collected from our two-stage questionnaire (see Figure 3) as an expert opinion survey. It is notable that the second stage of our analysis will be taken into consideration after a detailed analysis of the first stage questionnaire. The second part of the analysis and questionnaire is planned to be materialized with the newly selected firms in 2006. A structure of our design of our survey can be traced back in Figure

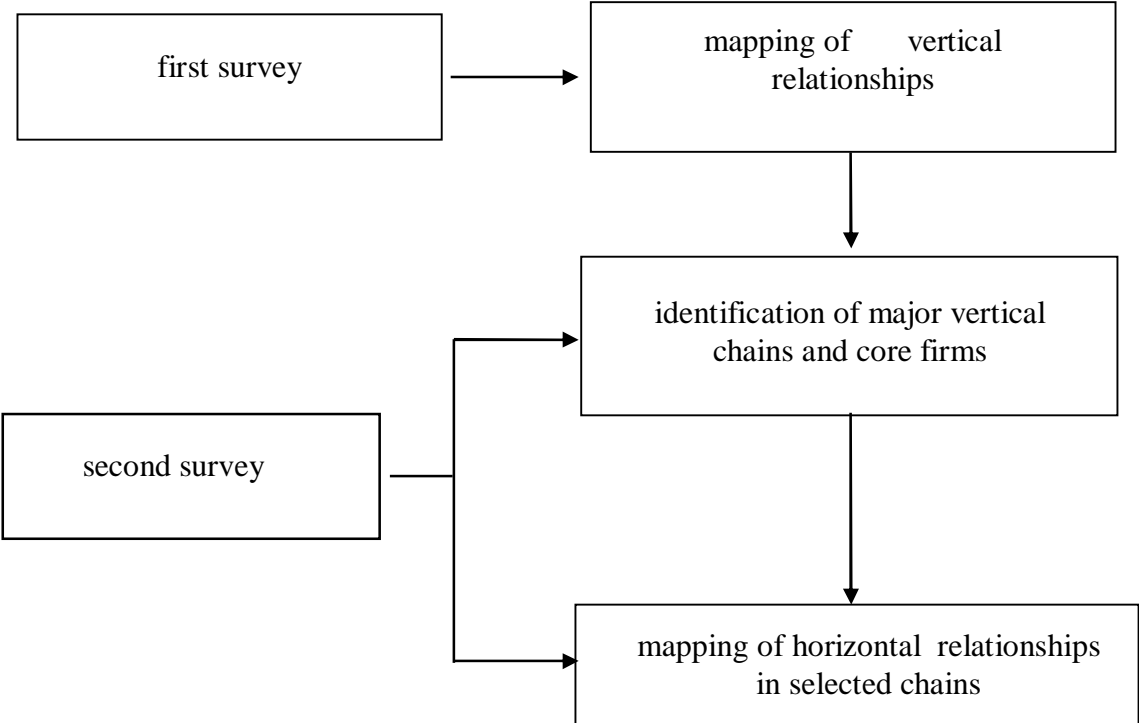


Figure 3 : The structure of the survey

In the first stage of our analysis, questionnaire is utilized to discover the crucial role of customers and suppliers for the innovation process and also to discover the high rates of vertical relations (both R&D or inter-organizational) in between manufacturing firms have been carefully and regularly selected from different sectors of OSTIM Furthermore, we believe that vertical relationship dimension offers a useful starting point to explore

¹⁴ For a detailed information on Pajek, see Batagelj, V & Andrej, M. (2000).

cooperative structures that contribute to firm innovation and business relations in local industrial systems. The OSTIM industrial district was chosen as a suitable vehicle for data collection as it displays both cooperative and competitive interaction. ⁽¹⁵⁾. The OSTIM context is rather unique; it is a small, seemingly close society exhibiting strong social bonds among some business actors but also displaying a highly independent business culture. In addition to sharing geographic spatial features, all manufacturers are legally categorized to belong to a single industry body in OSTIM. Thus, the industry boundaries and players are clearly delineated and actors are well known to each other. In such a small and seemingly homogeneous context strong norms and not not strict rules seem to have emerged within the industry, which can be identified and grouped. Thus the context of this study, the OSTIM industrial district, is a geographical industry group that exhibits complex linkages of many different kinds.

More detailed information about our survey is as follows:

- In the first stage of our survey, a total number of 77 firms are successfully interviewed from a selection of 100 firms.
- The lists of SMEs in each sector were provided by the OSTIM Catalog (2004).
- The areas of specialization in OSTIM were identified such that our selected principal activity sectors of SME's are; machinery and equipment, metal products, electrical systems and equipment, automatic control, plastics and rubber products, automotive parts, medical instruments, construction, machinery parts and services
- Randomly, from the related sectors the lists of SMEs in OSTIM were formed, which included 100 firms in OSTIM district. Surveys were personally done by managers between 1 June 2004 and 1 August 2004 by experienced personnel conducted, excluding 23 surveys with irrelevant answers or inconsistent information.
- Non-responses is due to disposition of non-manufacturing firms and generally, the lack of sufficient personnel in these firms for systematic data collection at the time being for the conducted survey and the unwillingness of small and middle-sized firms to devote time and energy for the survey work, which has 'no financial return to them' as some of the entrepreneurs indicated.

¹⁵ This view is verified with an interview by OSTIM administration prior to survey

- 63 firms out of 77 firms reported innovation activity during the period 2000-2003
 - new to product innovation: 52 firms
 - process innovation: 53 firms
 - product and process innovation: 41 firms
- Firm sizes are ; 0-10 workers: %52 of 77 surveyed firms; 11-25 workers: %34; and more than 25 workers: %14, respectively

As mentioned above, the research methodology involved face-to-face in-depth interviews with a theoretically sampled group of case study companies, one of which have crucial importance as it is in the middle of a relations network. The status of this firm will be analysed in detail so as to prove our hypothesis of this thesis. Moreover, the first stage of our research was carried out over one year and again as mentioned before briefly, aims to capture some elements of the longitudinal dynamics of the industry and inter-organizational relations phenomena under investigation within that particular “industrial system”. The spatial boundaries of OSTIM industrial district are defined by the ‘natural’ geographic boundaries. A total number of 77 pioneering firms were successfully interviewed. The interview firms are located within sub-regional clusters of the OSTIM. Moreover, we must depict that our survey was used to elicit a descriptive account of the nature and structure of relationships within the industry and over time. In our research, the firms had shown very similar characteristics in terms of size, product range, sales, market coverage and performance but exhibited very different approaches to relationships and strategy. Of interest were the firms’ differing approaches to relationship management. Data were collected from the head, ranging from co-heads of family-run firms to what one might term managers in higher positions. The aim was to seek information from the most knowledgeable members of the studied scene.

The questionnaire (see Appendix A for an example) mainly covered the following categories: basic company information (founding year, founding process, capital, employee number, main products, markets, ownership of the company), relationships with commissioning or subcontracting partners (length of relationships, how relationships got started, major events, frequency of interactions, coordination mechanism), relationships with foreign and domestic buyers, relationships with government agencies and industrial associations, as well as the

general observation of the business network environment. The company-specific open-ended questionnaires helped us to guide the interviews with specific events or statements and get specific answer rather than general principle.

Moreover, through the survey, it was possible to define the dimension of the considered inter-organizational relations IDs in terms of number of firms. (see next chapter) Successively, the focal firms of OSTIM were merely identified and selected for the case studies. The case studies were developed by the analysis which was carried out relatively in a shorter period, in order to provide a 'picture' of the current relationship portfolio of firms (both internally and externally) and also delineate future tendencies. In detail, the information on each firm was collected through our survey such that, based on the consultation of business documents provided by OSTIM, including business plans and annual reports, firms are selected through our criteria as defined above; the other carried out through interviews with the managers and owners of the firms. In particular, from the first investigation quantitative data, such as turnover, methods for external subcontracting and internal production, types of relations, types of innovations, ownership of companies, etc. were collected. Such data allow the degree of internalization of relations and relationship-building trends to be measured. The interviews dealt with the aspect related to internalized relations, the number of external and internal subcontractors, supplier-buyer relations and the main aims underpinning this process. The characteristics of business relations were identified in the previous chapter. Our analysis showed us the different phases of the business relations; the kind of trust and commitment; and the organization of the entire relationships portfolio. Finally, regarding inter-firm relationships, our interviews during the survey were intended to evaluate the proxies used to measure the level of collaboration and dependency, and the co-ordination mechanism characterizing the inter-firm relationships.

4.3 Hypothesis of the Research

The analysis of the data and the information collected through the interviews provides relevant indicators about the strategies, the modalities of relational behaviour, and the business networks of the leader firm. Based on the theoretical argument detailed in the

previous sections, propositions will be formulated below and tested with the empirical results of our survey.

We used two different analytical concepts employed in combination with our empirical theories in order to conduct the analysis: First, centrality of a leader firm in the networks according to their inter-organizational relations; and second, ego networks of leading (focal) firms.

As previously mentioned, technological gatekeepers play a role in the diffusion of external knowledge into the cluster so that they can therefore be conceived as 'central actors' in the local knowledge system as their position is that of early adopters of technologies to whom all other laggard firms turn to for technical advice and problem solving. In this sense, technological gatekeepers would diffuse knowledge in the district and shape the local knowledge system accordingly. Among all other localized firms, technological gatekeepers might be distinguishable for their degree of technological advancement and this would probably constitute a stimulus for other local firms to go and ask for advice. In this sense, then, firms with higher absorptive capacity could be important local sources of technical knowledge and show higher degree of cognitive centrality:

Hypothesis 1: *Focal firms with higher absorptive capacities are more likely to take a “central part” in the network and strongly show a higher degree of local interconnection, so that they can transfer knowledge to other local firms.*

At a different level, we argue that focal firms tend to present many characteristics similar to those of technological gatekeepers, acting as "bridges" linking the district as a whole to relevant external domains. By bridging "structural holes" between different networks, they can greatly enhance the process of knowledge creation and sharing (Burt, 1984). More precisely, the gate-keeping role involves the undertaking of two different and interrelated tasks. On the one side, the ability of monitoring the external environment beyond the borders of the cluster in search of valuable new knowledge to be eventually absorbed and used. On the

other side, the ability to diffuse the re elaborated knowledge to the other firms which are co-localized in the cluster, through a process that might be deliberate or not. (Malipiero et al. 2005)

As to the former dimension, , thus, it is likely that focal firms are better equipped to reach beyond their existing geographic context in order to identify, absorb and elaborate new technical knowledge generated by other key-actors (i.e. competitors, suppliers, complementors, universities and research centers) of the innovation process as in the specific context of industrial clusters. By virtue of their advanced technological assets and capabilities, they possess the necessary absorptive capacity to search and incorporate new knowledge (Cohen and Levinthal, 1990).

On the contrary, it is more likely that other (i.e. non focal) firms operating in the cluster lack the amount and sophistication of technological capabilities required to overcome local boundaries in the use of new information. For instance, limits in size and scope of business relations might not allow them to reach sufficient economies of scale in order to justify the creation of internal research facilities. (Malipiero et al. 2005) Moreover, such barriers might become particularly relevant in order to access new domains which are significantly novel and original, or lie at the frontier of technological development. Indeed, technological similarity enhances the likelihood of knowledge transfer between firms (Rosenkopf and Almeida, 2003).

Significantly, proposition is made quite explicitly throughout Industrial Networks Theory that business relationships are one of the most important resources at the disposal of the focal firm. The business relationships that the focal firm establishes, develops, and maintains with counterparts (e.g., customers, suppliers, competitors, third parties) are significant because they affect the focal firm's functioning and development, ultimately influencing its survival in business markets. It is apparent that the existence of the focal firm cannot be conceived of without business relationships. Hence, we know that business relationships are significant for the focal firm. Nevertheless, not all business relationships of the focal firm are equally significant and obviously some are more significant to it than others. Relationship

significance is but a perception of the focal firm (and of its counterparts), particularly of their members. Therefore, it is bound to vary over time within and between the parties involved.

Surprisingly, the significance of business relationships for the focal firm has not been object of systematic analysis. Tacitly shared by scholars and researchers, relationship significance is a only presumption, often asserted but not much discussed within Industrial Networks Theory. Supposedly, depending on informal relations and trust we propose a distinctive approach to set such significance strongly associated with the role of business relationships that accomplish for the focal firm.

As a final consequence, related to the knowledge theory, we expect that focal firms, given that they are best positioned in the relevant input and output markets, could have a higher ability to identify, filter and incorporate knowledge from outside the cluster. This higher propensity is not just a matter of amount of information absorbed, but also of its quality: it is likely that focal firms search for and use more original and useful knowledge from outside than other firms in the cluster. Based on the previous arguments, we thus can advance that focal firms use external knowledge to a greater extent than other firms operating in the cluster and these firms use more original external knowledge than other firms operating in the cluster.

Here, as the analytical tool not directly measured in the theoretical part of this thesis, the notion of our analysis is centrality and leadership. First, “centrality” of a node in a network structure has been a key analytical concept in the tradition of social network analysis. In this thesis, while there were several different measures of centrality in existence, years of relations-based approach of our selves determine the degree of centrality of a focal firm was adopted for the present analysis, due to various technical constraints derived from the data format. In particular, the bi-directional or symmetrical data structure, enclosed with both the listings of names from suppliers to buyers, and also from buyers to suppliers, presented us the extremely sparse nature of the network in OSTIM district, as which each of 77 manufacturing firms are asked to list up only to 3 (three) prime buyers and consequently 3 (three) suppliers from the web of its relations. In turn, this, particularly and practically, made it possible to

produce meaningful results from the analyses employing common centrality measures. As a cautionary note, here, as it is used in our survey, our centrality measure did not fully determine the relative positions of each of firms' suppliers and buyers in the network (Wasserman and Faust 1994).

In the context of subcontracting networks in OSTIM, the number of in-degree centrality that a firm had was determined by the aggregate number of listings of the firm as each of the three prime buyers and sellers, by the 77 firms fully interviewed. Pajek (Batagelj & Mrvar 2002) produced a partition of this small-scale network (a model of small world) based on the criterion of the years of inter-organizational relations that the firms developed, as prime buyers and sellers. In our analysis, the centrality of a firm indicates how important the buyer is for the suppliers, being located at a certain position in the network.

Moreover, Gulati et al. (1999) depicts that interdependence is the most common explanation for the formation of inter-organizational relationship ties such as strategic alliances. Continuously, a long stream of research suggests that organizations enter ties with other organizations in response to the challenges posed by the interdependencies that shape their relationship portfolio. Organizations build cooperative ties to access capabilities and resources that are essential to pursue their goals but that are at least in part under the control of other organizations in their environment. From this perspective, inter-organizational relations is, thus, a means by which organizations manage their dependence on other organizations in their environmental dependence.

At this point it is arguable that classic buyer-seller relationships, strategic alliances are important forms of voluntary cooperative inter-organizational ties. Firms build relations for a variety of reasons, including the need to share the costs and risks of technology development or large-scale projects, to develop existing markets or penetrate new ones, and to pursue resource specialization strategies (Mariti & Smiley 1983). Such objectives make firms interdependent with other firms that may have the capabilities and the resources to assist them in meeting their specific needs. Other things being equal, the higher the interdependence between two organizations, the higher their incentive to combine their resources and

capabilities through an alliance. Building on the insights of this research tradition, we expect long-term relationships, which are a crucial aspect of managing relationships development between organizations, to be a variable of the level of years of interdependence and basic relations between them. Thus:

Hypothesis 2 : *In an industrial district, increased with the level of interdependence between focal firms and other independent firms, the years of a relationship are crucial for a focal firm to be at the center of an ego network and to develop other longer-terms of relationships.*

Interdependence may be a necessary condition for organizations to enter alliances. In most cases, however, interdependence may not be sufficient to account for the formation of a long-term relationship between two specific firms. Indeed, not all opportunities for cooperation between interdependent organizations actually materialize in alliances. An organization confronted with the need to build an alliance to cope with an uncertain environment faces another type of uncertainty resulting from the identification of an appropriate alliance partner. Such uncertainty stems from the paucity of information about the true capabilities, the needs, and the behavior of potential alliance partners. From the business relationships theory, trust and commitment are the main exit points of this complexity.

If interdependence alone can not offer sufficient evidence for organizations to cooperate with one another, how do they decide with whom to build strategic alliances or relations? What will be the effect over terms of centrality? Hence, we propose that organizational decision makers (managers, owner of the firms etc.), depending on the degree of the trustworthiness, also playing a crucial role in the formation of new relations, also relying on the network of past partnerships to guide their future alliance decisions. The creation of new ties, in turn, contributes to the subsequent development of that same network, enhancing its capacity to shape subsequent alliance decisions.

Although rooted in classical sociological theory, the idea of this economic action embedded in social networks was revitalized by Granovetter (1985). According to Granovetter (1985), embedded economic action rest on "the widespread preference for transacting with

individuals of known reputation," for resorting to "trusted informants" who have dealt with a potential partner and found this partner trustworthy, or, even better, for relying on "information from one's own past dealings with that person." Personal relationships among key individuals have played a crucial role in producing trust between organizations in industrial groups and in contractual relationships. Closer to our concerns, personal ties are important for the formation and success of strategic alliances. Beneath the formalities of contractual agreements, multiple informal interpersonal relationships emerge across organizational boundaries, which facilitate the active exchange of information and the production of trust that foster inter-organizational relations.

Moreover, most organizations are embedded in a variety of inter-organizational networks, such as board interlocks, trade associations, and research and development ventures. Scholars have suggested that participation in such social networks can be influential in providing actors with access to timely information and referrals to other actors in the network (Burt 1992). This insight was strongly confirmed by managers in our own fieldwork who highlighted the importance of the network of prior alliances as a source of trustworthy information about the availability, capabilities, and reliability of potential partner firms. In the words of one of the managers interviewed,

"Our network of partners is an active source of information for us about new deals [at least new economic relations]. We are in constant dialogue with our partners, and their demand allows us to find many new opportunities with them and also with other organizations out there."

Existing network research and insights from our own fieldwork suggest that relevant information on the competencies, needs, and reliability of potential partners originates from organizations' previous direct formal or informal relations. Each of these sources of knowledge is related to specific network mechanisms that shape the creation of new embedded inter-organizational relationship ties depending on informal relations and trust.

As mentioned earlier, the role of informal networks in regional clusters has received particular attention in the literature during the late 1990s up to date. The concept of informal networks

has an important role in embedded relations, acting as channels of knowledge flows. Furthermore, knowledge spillovers through informal contacts can be considered as one of the externalities to be the main forces behind industrial clustering in developing countries. Then, companies located in a cluster, or industrial districts, share a set of common values and knowledge which is part of the 'local industrial atmosphere' that Marshall described. In this way, firms are linked together by specific informal relations in a complex mix of co-operation and competition (Porter 1998, etc.).

Moreover, Maskell et al. (1998), explain that the creation of informal networks go through several phases, from relations between two individuals to entire networks, where they easily transfer knowledge among them. Furthermore, these relationships are constructed both vertically and horizontally, where common understanding and trust are the common features (Maskell 2001). Complementarily, within these informal networks, trust facilitates long-term relationships between firms. In this case, continuity is highly valuable because the objective of inter-firm co-operation may change over time, for example, when entering new markets or new technological opportunities. Furthermore, it is only within a long-term horizon that trust in collaboration can occur. It is also notable that trust between firms has to exist on a general as well as on a personal level. It has to be engrained in organizational routines, norms and values.

Hypothesis 3 : *The probability of being a focal firm in a web of relations between two organizations increases with the level of prior trust*

According to Granovetter (1992), the analysis of interpersonal networks of a focal firm is predicted over stronger ties involve larger time commitments, stronger sentiments of friendship, familiar-ship, for one another, stronger feeling of similarity, and therefore, a better sense of community. On the other hand, meeting, conventions, special teaching sessions and social registers also offer good opportunities for the development of ties. Other streams of the literature suggest that informal networks is more likely to share 'small ideas' rather strategic knowledge (Breschi and Lissoni 2001) and that inter-personal communication is relatively more important for sharing knowledge with customers than with competitors (Lissoni 2001).

Then, a gap in the literature gives us spaces for conducting further studies on informal networking in clusters and industrial districts.

Complementarily, our approach is likely to present a network of relations defined as a long-term relationship between organizations as actors that share resources to achieve negotiated actions for joint objectives. These interactions of firms should be a long-term relationship because, in the short-term, members can take advantage of other members such that the relationship will not endure. It is again in the long-term that all members can benefit from the relationship, while in the short-term not all participants in the network may benefit. We must not forget that a network can be established only when it is based on mutual sharing of knowledge resources.

Summing up the argument, one can say that, in the past, the literature tended to look at the phenomena of trust as something more or less embedded, naturally, in specific social contexts and largely absent from expectations surrounding market transactions. More recently, however, with the emergence of the importance of network concepts, both researchers and policy makers have become aware of the positive economic benefits that might flow from collaborative, trust-based relations being grafted on to the paradigm of competition.

For the above reason, as well as for the influence of this informal relationships in exchange of information, our research includes the study of informal / business and non-business relationships with business relationships as means for the development of inter-firm cooperation and trust in the marketing and production activities in clusters and industrial districts.

CHAPTER 5

ANALYSIS AND RESULTS

This chapter presents the first stage of the our survey, which comprises the testing of our hypotheses in the geographical area within the boundaries of OSTIM. The findings of the research conducted in the field are presented in accordance with the logical sequence of the business networking principles as reviewed in the previous sections. The descriptive phase of our analysis, starts with the initial identification of current systematics of relationship ties which is carried out by reviewing industrial districts in Turkey and OSTIM, respectively. That stage is followed by the analysis of OSTIM relationship mapping in terms of its potential inter-organizational relations, the discovery and selection of the focal firm, and identification of the focal firms relations to be the ultimate target of the relationship mapping. The descriptive part is constructed by the in-depth analysis of the identified focal firm's interviews. The relevant background information that is required for the descriptive phase, including all theories is literally given in previous chapters

We also believe that the results of our analysis of the cluster of firms, as forming focal firms of concern, provides the necessary conditions to satisfy our hypotheses of the business relations structure and further to design new hypotheses and recommendations using the cluster approach as stated in the final chapter of this thesis.

5.1. Industrial Districts and Clusters in Turkey

Testing our hypothesis, our case study is designed in the OSTIM industrial cluster where the units of analysis are defined as manufacturing firms. As discussed earlier, with the help of this case study, analysis of our research is expected to compare inter-organizational relations of firms in a cluster, satisfying the pre-conditions of centrality in a web of relations as a focused approach to define focal firm capabilities playing an effective boundary-spanning role by bringing out new relations on the basis of trust and informal relations.

An examination of the broad characteristics of the Turkish business environment shows that small and medium-sized enterprises account for more than 90 percent of Turkish firms, but larger firms' contribution to value-added and exports are much higher (Taymaz, 1997). Big corporations are a relatively new phenomenon in Turkey: of the 405 TUSIAD member companies, only 22 were established before 1950 (Buğra, 1994). The 1950s were an important decade for many of the largest Turkish companies, reflecting the government's shift to more liberal policies. Many of today's leading Turkish construction firms, for example, were either established or made an important turn in their business during that decade (Öz, 1999).

Moreover, family-dominated management of firms of all sizes is a common phenomenon in Turkey as there is a lack of confidence in salaried managerial personnel. Educating young members of the family in top universities, integrating a professional manager into the family via marriage, and strong relationships established over the years between family members and professional managers, making the latter 'part of the family', appear to be common ways of achieving a delicate balance between professionalization and family control (Buğra, 1994).

According to Buğra (1994), all Turkish business tycoons have certain characteristics in common, including family support in commercial activities at the start of their life-cycle, the arbitrary choice of their initial area of activity, heavy engagement in unrelated diversification as the business grows, and good business relations especially in state circles. Rent-seeking behavior is common, and real-estate speculation is particularly widespread.

The high degree of state involvement in business activity, be it in the form of subsidized credits, input supply or output demand, has been detrimental to the Turkish business environment. Moreover, given the key role of government in the economy, good connections in government circles have contributed significantly to business success. The slow bureaucracy and unexpected changes in key policies, on the other hand, have caused problems for Turkish business people.

Regarding this brief outlook of historical background of economics and the formation of the production clusters in Turkey, the Turkish national policies related to the locations of industry are stimulating the formation of agglomerations of similar-sector enterprises, which is an integral feature of the cluster structure. Due to basic networking concerns, the enterprises in the manufacturing sector are encouraged to locate in the appropriately planned "small industrial estates" (KSS) and "organized industry zones" (OSB). These places are planned and managed according to different regulations and incentive methods to encourage appropriate enterprises to locate in these areas. The basic aim in developing this type of formation in regions is to provide the enterprises with an effective business environment that contributes their competitiveness and eliminates the drawbacks related to infrastructure, bureaucracy etc. As these locations are the places of agglomeration of enterprises, they form an environment that the clusters are likely to emerge (or exist) in by market-induced mechanisms such related to Marshallian aspects of the study. (Özcan 1995) Therefore, SMEs in Turkish Economy is attributed great importance and various technological and financial instruments developed for the provision of support. Since 1996, which was announced as SMEs year in Turkey, the situation of SMEs in Turkey has been handled by great attention. The importance of SMEs in addressing the triple challenge of more growth, greater competitiveness, and more jobs has been brought into ever-sharper focus over the past few years (Kuruüzüm, 1998). Also, the necessity of effective integration of the Turkish SMEs to EU economic area also stresses the importance of SME support policies to increase the competitiveness of the Turkish SMEs to make them stand the global competitive forces. While various public policy instruments are employed to support Turkish SMEs, the desired level of competitiveness could not be attained, and still, the problems related to finance, marketing, management, and quality are prevalent among SMEs of Turkish industry (Kuruüzüm, 1998).

Eraydin and Armatli (2005) depicts that the industrial agglomerations, which are denoted as 'Turkish industrial clusters' in this thesis, are the outcome of the economic and spatial transformation that has been taking place in Turkey since the beginning of 1980s. In fact, the 1980s became the turning point of economic policies in Turkey, from protectionist attitudes which dominated Turkish economic policy prior to this period to increasing reliance on market forces. While the new programme greatly freed up foreign trade and exchange, in

1984 major structural changes further liberalized trade by dismantling foreign exchange controls and quotas on imports, and by revising tariffs. The liberalization initiative has continued by export promotion policies, by the depreciation of exchange rates and direct subsidies. The efforts of economic transformation are further supported by several private, semi-public and public institutions. Economic transformations, the new competitive environment and the loss of protectionist policies also enforced spatial transformation. While the areas with relatively developed manufacturing capacities became the cores of export activities, the regions with a weak manufacturing basis had obviously difficulties in becoming involved in the newly-emerging trade relations with the external world.

A pioneering attempt to identify and analyze industry clusters in Turkey is done in the context of "Competitive Advantage of Turkey" (CAT) project, in association and consultancy with the Centre for Middle East Competitive Strategy (Akgungor, 2003). The initial attempts aimed at studying the regional concentrations of industries being inspired from the mega-level cluster analysis applications. The attempts focus on identifying national cluster templates by examining buy-sell relationships across industries through input-output based analysis. The complementary study by Akgungor (2003) was conducted aiming to investigate further regional concentrations of cluster templates and to identify high-point industries within the identified regional clusters. Moreover, in the study, classification of the clusters according to their potential for decline or growth in each of the geographical regions of Turkey is provided. While these initial studies provide valuable policy information for the regional development efforts, as the Akgüngör (2003) herself notes, the research should be expanded in order to explore the clusters at the micro level and further explore formal and informal ties across the industries and institutions.

What is striking during this spatial economic transformation is the increasing importance of some industrial agglomerations that are located far from the earlier manufacturing cores, in terms of production and exports. Obviously, these new industrial agglomerations are located in the different parts of Turkey (see Figure 4) and at the different stages of evolution.

These areas attracted a wide interest during the last decade and various studies have been prepared especially on Denizli (Eraydin 1998, 2002a, Erendil 1998, Özelçi, 2002, Armatlı-Köroğlu and Beyhan 2003, Öz, 2004), Bursa (Reyhan 1990, Eraydin 1992, 1995, Ersoy 1993, Saraçaoğlu 1993) and recently on Ankara (Tekeli 1994, Dede 1999).

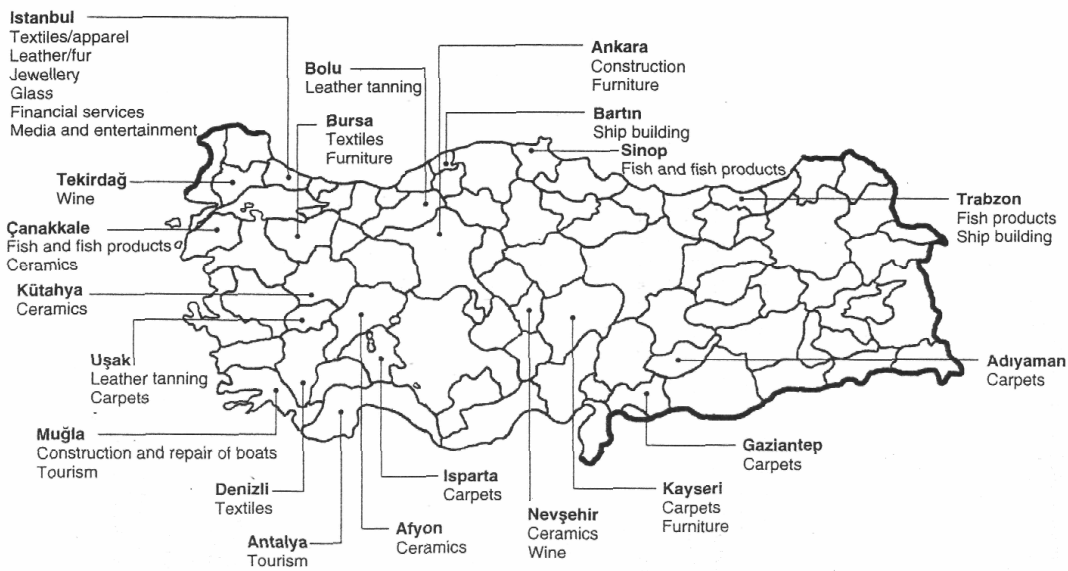


Figure 4: Selected examples of highly concentrated industries in Turkey.

Source: Öz (2004)

Although the clusters experienced in Eraydin & Armatlı (2005)'s work do not represent by the authors as idealized 'industrial districts' of the 1980s literature as put forward by authors, the basic characteristics of Ankara as referred in the Table 3 will show us that each formation have different features, and furthermore, will help us to discuss further how far the areas of specialization and structural differences of business relations are important in the networking patterns of relations of a focal firm located in OSTIM.

5.2 OSTIM Industrial District

OSTIM, which gather under a single roof of SMEs with approximately 5000 establishments, 40 thousand workers and industrial productions in 100 different sectors on an open area of 5

million square meters, is considered almost a city of SMEs. In OSTIM, which is the biggest of Turkey and one of the biggest industrialized production areas of the world, productions such as Machine Manufacturing, Metal Work, Electric-electronics, Work Machinery, Construction Equipment, Automotive, Plastic-Rubber, Medical Devices, and Defense Industry are made. In OSTIM, which unites the elasticity in production as that is the one of the most important characteristics of SME establishments with the advantages of wide machinery park, thousands of various types of products are manufactured in 100 different sectors. They take part in a wide variety of product mixtures from CNC tool workbench to stationary materials. With this powerful business relations, OSTIM also feeds many industrial establishments in the surrounding areas. (¹⁶)

Table 3: Structural Characteristics of Selected clusters in Turkey: Denizli, Bursa and Ankara

Factors/ Conditions	Denizli	Bursa	Ankara
The type of the manufacturing cluster	Industrial district	Innovative manufacturing cluster	High-tech industrial cluster
Area of specialization	Textiles, especially towels and bathrobes	Textiles for home furnishing	Machinery, electronics, the defence industry and software
The main character of the cluster	Traditional Small artisanal, and highly specialized family owned firms located in close proximity	Traditional/Modern Small Artisanal, and highly specialized firms as well as large multinational companies co-operating with these small enterprises	Modern/High-tech High-tech firms of different size
Main observed benefit	Co-operation in production and marketing for international markets	Collective competition in specialized fields	Weak collaborative environment Market relations with state institutions
Technical dynamic Social capital	Complementarities Collaborative action, trust and reciprocity Strong social networks	Specialization increasing shares of export in engineering industries, Adaptation and product development for international markets	Adaptation of new technologies for national market Access to qualified labour

Source: Eraydm & Armatlı (2005)

¹⁶ This section is summarized from OSTIM Catalog (2004)

Moreover, OSTIM, who has all support units for a quality production, is a considered as a giant factory that has caught the contemporary production technology. While carrying a universal laboratory characteristics of an industrial district, OSTIM manages to be one of the famous employment areas of Turkey. OSTIM is an organized industrial region with KOSGEB (the biggest SME support unit of Turkey), METEM (the biggest industrial training center in Turkey), with measurement laboratories, firms, banks, etc. OSTIM is also an ID which has succeeded to be a power unit with its companies doing businesses in the areas such as investment, radio and television, advertisement, foreign trade, with the contributions of industrialists and business men who perform activities in the region.

As a brief complement to the development and history of OSTIM, we can say that after 1967 implementing an intense planning period, construction stage started in 1975. Construction and infrastructure works continued intensely until the end of 1970s and OSTIM gradually took part in Turkish economy.

In 1980s, on one side of the economy, Turkey has been trying to recover its economic downfalls and on the other hand, it has been trying to understand the free market approaches and develop proper strategies. OSTIM which have been completed the most of the structuralization, was ready for the new “producing Turkey” concept and in this era, during the OSTIM is known to be an important industry region, development created new problems like not only infrastructure problems but also related with the management of the district. But, OSTIM was the correct route for industrialization. Successfully managed in 90s, OSTIM has rapidly and strongly started marketing, training, consulting, culture, etc. The institutional infrastructure needed for realization for all of those activities, has been established one after another and like new starts and OSTIM took its place in international platform. The most important development in ODTIM in 90s was to get Organized Industry Region status in 1997. Gaining significant advantages achieving the competitive environment it had already deserved.

Today, OSTIM with 5000 business enterprises, 40.000 workers and production in 100 different sectors in 5 million m² open area is a SMSE city which gathers small giants in one house.

Furthermore, OSTIM, the biggest of Turkey and one of the biggest small and medium size industrial production regions in the world, production in machine manufacture, metal treatment, electric-electronics, earth moving machines, production equipments, automotive, plastic-rubber, medical tools, defense industry main areas are realized.

In OSTIM, in which flexibility of production that is one of the advantages of small and medium size enterprises, with the advantages of wide machine park are combined, ten thousands of goods are produced in 100 different sector. These constitute a broad range of products from CNC tool benches to stationeries. Moreover, OSTIM supports many neighboring industrial institution through wide production capacity.

OSTIM having all support units relating to quality production and institutionalism is a giant factory that gained modern production technology. This one big industrial factory has achieved to be one of the employment region that is effective and of high added value while having characteristics of universal laboratory of small and medium size enterprises.

In addition to the services relating to Organized Industrial Region (OIR), OSTIM is an industrial region in which an ideal investment and trade environment has been established and a joint force with regional industrialists and businessmen in R&D, investment, promotion, foreign trade, radio and television broadcasting has been constituted.

While Ostim Organized Industrial Region is exemplified as a model for Turkey and the world for its flexible production power and cooperative characteristics, the organizational structure of the region is set the pace for production world of 2000's.

The main characteristic of OSTIM is the formation by means of direct and indirect relations of supportive and complementary expertise. Briefly, the fundamentals of OSTIM organization are as follows:

- ADMINISTRATION : Ostim OIR Directorate
- INVESTMENT FINANCE: Ostim Investment Inc.
- MARKETING: OSP Inc.
- ENERGY: Ayen Ostim Energy Inc.
- TECHNOLOGY & INFORMATION: Ostim Technocity, Ostim Telecommunication, Web site (www.ostim.org.tr)
- TRAINING-QUALITY-EMPLOYMENT: Ostim Foundation, Ostim Apprenticeship Training Foundation, ÜSAM, Occupational College, METEM, MEKSA, Batýkent Industrial Occupational School, Ostim Quality Society, KOSGEB
- PRESENTATION & MEDIA: OMEDYA Bakent TV, Ostim Radio, Export Catalogue, Ostim Newspaper
- SPORT: Ostim Football Club, Ostim Football Tournament, Table Tennis Team, Taekwondo Team

Moreover, as related, other important sectors found in OSTIM can be classified as ; Paper and Paper Products, Stationeries for school and office, Plastic cardboard packing, Publication and printing facilities, Household appliances, Restaurants, Stores and boutiques, Market-tea shop-buffet, Illumination equipments, Electric transmission and distribution equipment, Electric works, Electrical machine and equipment, Electronic control systems, Industrial kitchens, Food materials, Food Machines, Meal factories, Certification, Consultancy, Banks

5.3 Analysis and Results

Eraydın et al. (2005) argues that out of Turkey's industrial regions, Ankara (so as OSTIM) is defined as one of the peripheral industrial regions since Ankara is the capital of Turkey and important in terms of its administrative functions. It must also be underlined that although OSTIM is still far different from the formation of main industrial core (namely the Istanbul metropolitan region), there have been recently some attempts to specialize in some high technology sectors, in order to change the earlier industrial basis shaped mainly by local

demand. In this manner, to understand the possible business dynamics of OSTIM, we must define some of its specific conditions showing the relevance and necessity of our study:

- OSTIM is in such a position that it supports the development of the manufacturing industry sector as value added of traditional trade and agriculture sector is decreasing time by time. Moreover, the need of the generation of more employment-creating facilities and the labor shift from the agriculture sector is another factor contributing to that necessity. The mobility of qualified workers must also be planned prevented by industry policy measures. In addition to that, the presence of active entrepreneurs and the opportunities that the geographic position like being in the capital city etc. and its viable transportation facilities, indicates the rapid industrial development potential of the area, which is not utilized fully, but planned to be utilized by different industrial policies.
- The other indicators showing industrial potential of OSTIM are its capacity of production (also for settlement and investment) and the existing geographical location.
- As mentioned above, the existing policies based on the privatization of KITs in 1980s, and the strategies followed intensely by KOSGEB, hardly succeed in utilizing this potential by addressing the specific needs and problems of OSTIM's SMEs hence OSTIM still has such an industrial development potential, which should be utilized by correct public policy measures.

In the previous section on industrial districts, we identified various factors related to the local economy and community which might explain the development and performance of certain local economies. We underlined the characteristics of the institutional and social environment, the tradition of cooperation and collaboration, existing simultaneously with competition, the availability of skilled labour and the proximity of public institutions. Moreover, we depicted that the increasing importance of product quality and reliability in deliveries tend to reinforce the importance of close-knit and permanent long term inter-organizational relations between suppliers and producers, as well as between users and producers. At the first stage of our

research, we did not investigate the latter in detail, but did ask questions on the inter-organizational relations between suppliers and producers.

The first fact that we want to determine in our thesis was whether or not OSTIM firms are forming a web of business relations. Our analysis resulted such striking results that the relationships between firms are largely dense. In our survey, in questions 29 and 30 as can be seen in Appendix A, we asked interviewers to fill in the tables writing 3 leading suppliers and customers that they are closely related within business relations, respectively. Our variables in the question were the place of the supplier firm (in OSTIM district, in Ankara and nearby cities, in Turkey or from outside Turkey, its sector, years of relationship with the firm itself and the inter-organizational relationship type.) So the questioned firms were also asked for inter-organizational relation types so as to map a firm's business relationships.

Moreover, relation types of firms are categorized as; order-based relationship, informing the supplier about the production plans, and corporate production planning. As we have already discussed, inter-organizational relationships between the members of a network can be formal, i.e. formalized by way of agreements or contracts, or in the form of formal member unions, trade unions, or network groups; or informal, i.e. informal agreements based on mutual trust. We further interviewed the focal firms their methods of developing relationships and the years of their relationship with other firms affecting their position in the network. The data collected do not indicate a fully formal, techno-organizational strategy of formation but do indicate some evolution along these lines.

As mentioned before, one of the points we were interested in analyzing the data was the relation between formal or informal networks and cooperation between firms. Preliminary analysis of our data does indicate a very strong support for our hypotheses, in general, for the OSTIM region which we studied in detail. We need to work on more detailed analysis, but will present general results in this section. As we asked in the 2nd section of our survey (see Appendix A), our questions concern specifically product and process innovations,

Tables 4, 5 and 6 summarize the results of questions 15 and 17 respectively, as we asked to determine if firms make significant product and process innovations in the period between 2000 and 2003. Out of 77 firms, 63 of the firms (%81 of surveyed firms) did declare innovation activities for fiscal purposes in the period between 2000 and 2003. 52 firms (%67) reported that they make product innovations and 53 firms (%68) declared that they make process innovations on an ad hoc basis, when it was needed. Finally, 53 % of total firms (41 firms) indicated that they make both product and process innovations. Continuously, as we can see from table out of 52 firms performing product innovations, 29 of them reported that they innovate new products and respectively, 41 of them declared that they improve their products at all. In table Similarly, out of 53 firms making process innovations in the period between 2000 and 2003, 19 of them reported that they acquire new processes and respectively, 48 of firms reported that they make significant process innovations over current production phases. Here, we observe a high rate (around 90%) of firms reported any process improvements in their businesses out of process innovators as reported in our survey. Significantly, in the same period, a very high rate of firms (51 firms, %66 of total firms) reported that they transfer new sorts of technology in the period between 2000 and 2003.

Table 4: Results of innovation activities of surveyed firms

Total Number of surveyed Firms: 77		
	Number of Responses	Percentage of Surveyed Firms (%)
Firms that innovate	63	81
Firms reported product innovation	52	67
Firms reported process innovation	53	68
Firms reported both product and process innovation	41	53

Table 5: Results of analysis of firms reported product innovation

Total Number of surveyed Firms: 77			
	Number of Responses	Percentage of Surveyed Firms (%)	Percentage of Firms reported product innovation (%)
Firms reported new product innovation	29	37	55
Firms reported product improvements	41	53	78

Table 6: Results of analysis of firms reported process innovation

Total Number of surveyed Firms: 77			
	Number of responses	Percentage of surveyed firms (%)	Percentage of firms reported process innovation (%)
Firms reported the implementation of new process (or processes)	19	25	47
Firms reported process improvements	48	62	90

Moreover, we already know that, in order to get a good skill standard in an industrial district, there is often a need for cooperation amongst firms. Many firm owners, like the ones in OSTIM, ask themselves whether they should invest in the skills of their employees if they risk losing them, and therefore losing their investment. Thus, in the situation of where labour markets have traditionally been tight, there seems to present an original solution as in the Italian model of industrial districts; in order to avoid this risk and resolve this problem, firms have to join and work together, and effectively share the costs and the risks. Achieving this goal, they also have to have a good understanding of their joint interest, in the face of focal firms or other collaborators. Firms then tend to form long-term cooperative networks in order

to do joint development and sometimes even to do joint production. This apparently confirms the increasing importance of cooperation and inter-organizational relations for small as well as for large firms in an industrial district. In our case, firms in OSTIM have not been known to develop training much, and certainly not to cooperate much in this field. Rather, we wanted to know whether this was evolving with the development of inter-organizational relations. The results showed us that In our questionnaire, we asked firms whether they had had attended joint inter-organizational training programmes (inside or outside OSTIM district) in training their workers, and the results seem to indicate some progression of cooperation in this field. (questions 25 and 26 respectively). Surprisingly, results presented in Table 7, showed us that 42 of firms reported to face difficulties on finding skilled labor. Furthermore, 19 of product and process innovating firms reported that they attend to join inter-organizational training programmes, but in contrast, 33 attended none of the training programmes. 22 of firms also reported mobility of skilled labor force (19 of them reported this mobility to appear in OSTIM), and 30 of firms reported no mobility in their sector specific area.

Continuously, before projecting the raw data of the list of supplier-buyer relations to see if there is relatively a web of relations with Pajek, the networking software, we wanted to analyze the characteristics of shared resources analysed by questions 29 and 30 to find any significance guided from where the key functions of a firm may include development of new relations and alliances, coordination of knowledge, financial resources and technology, and also, management of core competence and strategies, developing relationships with suppliers and customers, and also managing knowledge resources that creates an efficient know-how and bind the network, and whether these creates embeddedness to others through direct and indirect linkages. Regarding this point, for our analysis, we chose the significant variables as; types of relations, years of relationship and sharing of sources.

For questions 29 and 30, we took the variable of “Sharing of Resources” (shared sources of the firm and its supplier); it is categorized and asked in the various possible answers on a scale of 1-4;

- Marked (1) for sharing of financial sources
- Marked (2) for sharing of machinery and other equipment

- Marked (3) for sharing of workforce
- Marked (4) for sharing of know-how

Similarly, for questions 29 and 30, we took the variable of “Relationship Type” ; it is categorized and asked in the various possible answers on a scale of 1-3;

- Marked (1) for order-based relationship
- Marked (2) for if the firm informs and shares its knowledge with the supplier about its production plans
- Marked (3) for if there exist a corporate production planning process between two firms

Table 7: Results of analysis of firms reported attendance to inter-organizational training programmes

Total Number of surveyed Firms: 77			
	Number of responses	Percentage of surveyed firms (%)	Percentage of firms reported product and process innovation (%)
Firms reported difficulties in achieving skilled labor force	42	54	80
Firms reported no difficulties in achieving skilled labor force	10	12	20
Firms reported attendance to training programmes	19	25	37
Firms do not report attendance to any training programmes	33	42	63
Firms reported mobility of skilled labor force	22	28	42
Firms reported no mobility of skilled labor force	30	38	58

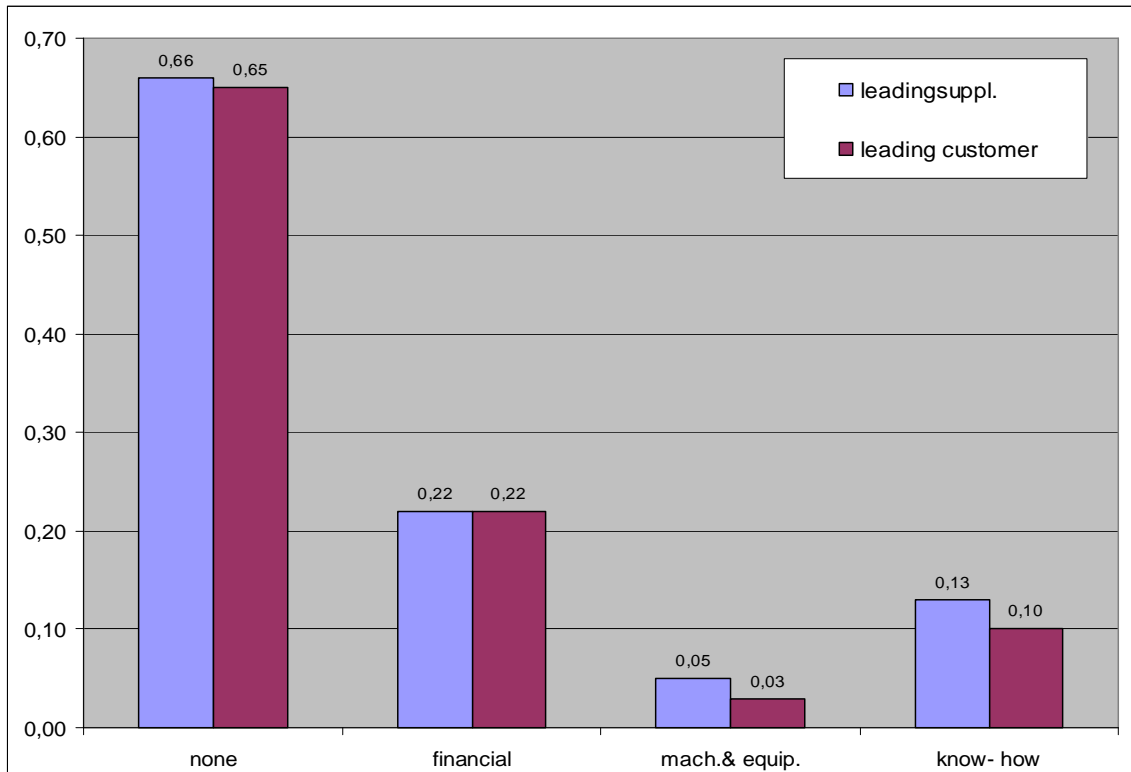


Figure 5 : Distribution of shared resource types over links with the leading supplier and customer.

The results, as graphed in Figure 5, may represent either the cooperative or the non-cooperative environment. Moreover, the results are surprisingly low. Only % 13 of firms share its know how with its supplier, and moreover, only % 10 of firms share its knowledge with its customer. Partly, this proves the status that strongly, there may be an informal cooperation between firms that are ‘embedded’ in their local area in terms of inter-organizational relationships and knowledge flows and when compared to informal structure formal cooperations may exist only with some cooperation over financial matters. Moreover, this shows us that only a small pressure is exerted on the supplier – buyer firm to behave cooperatively. The probability of receiving advantage due to participating in the network and of finding a partner with complementary knowledge (sharing know-how) in the likewise small informal network is low. But, in a more and more cooperative environment, this probability may increase.

There may be counted for two reasons: first, with a growing number of participants in the informal network, the absolute size of know-how available in the cooperative environment increases; second, the variety and therefore the quality of this know-how also increases. Thus, in theory, with growing quantity and quality, the probability of combining seemingly inconsistent ideas increases. Moreover, the missing know-how linkages to detect the beneficial dynamic relationships are captured by the firm developing new relations. Another aspect in our analysis was that the years of relations play a crucial role in the forming of a network. The results are presented in the Figure 6 and 7, below.

From our results, we also predict the average time for supplier relations ships are around 8.4 years and on the contrary, the average time for customer relations is higher, 9,4 years. 62% of customer relations are also longer than 5 years and 49% of supplier relations are longer than 5 years. With the previous findings, again, we can conclude that there has been little reliance on formal contracts with suppliers, such with final firms and subcontractors instead relying on informal agreements and commitments to underpin cooperation. As noted in the previous section, interviewees in smaller final firms typically talked of their relationships with their subcontractors in the language of personal relationships, reciprocity and trust.

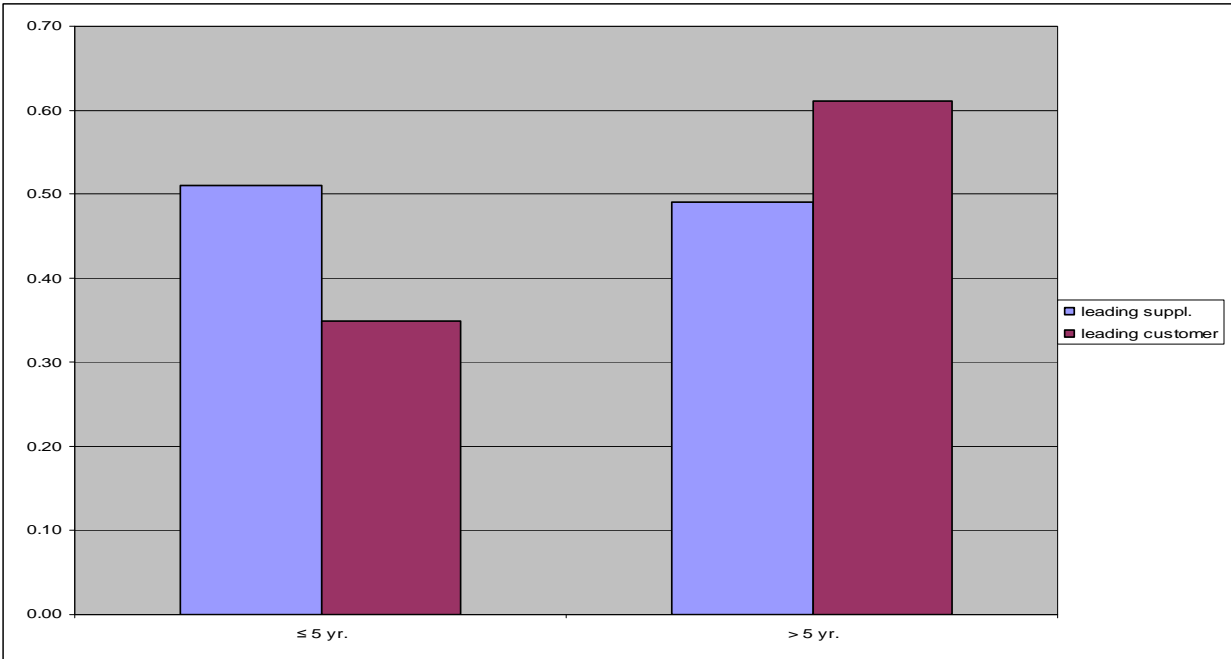


Figure 6: Time span of Supplier and Customer links

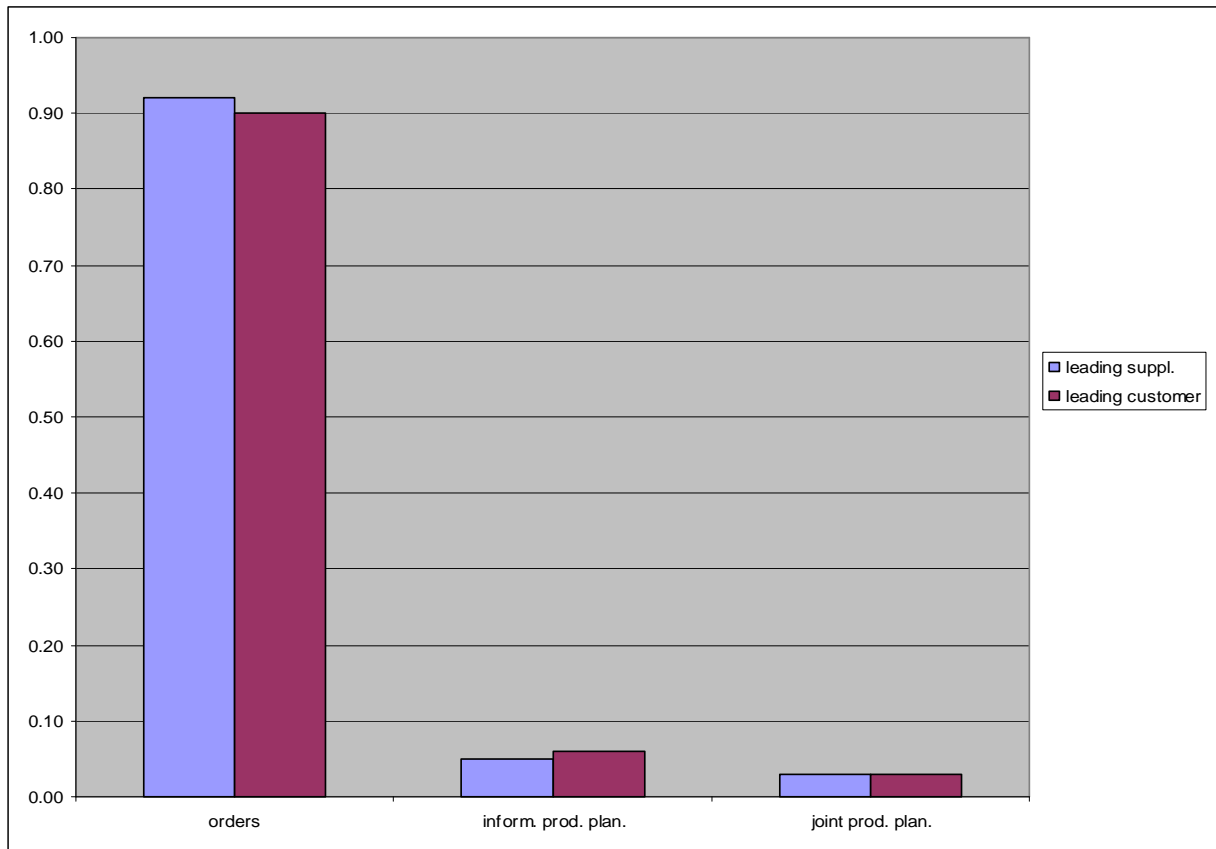


Figure 7: Distribution of relationship types over links with the leading supplier/customer

As described by one manager of a small final firm;

"What is applied is not a specific contract, it is a personal relationship between an office which puts out work and a small artisanal organization which produces it."

This statement found ample confirmation in other interviews with smaller final firms in the district. In our analysis, the results show that 90% of supplier and buyer relation links are essentially order-based, with little formal cooperation for production planning and almost 77 managers of the interviewed firms repeatedly spoke of how they did not use contracts with their subcontractors but instead relied on personal relationships involving guarantees of work over the long term relations and occasionally other forms of knowledge exchange such as knowledge about their production plans etc. (see Figure 7) It is more unlikely that these relationships were "personal" in the sense that they involved strong affective commitments such that one firm might have relationships with many subcontractors. Instead, these personal relationships in our analysis relied on informal norms. Moreover, here,

nearly all the results may be predicted as all of the firms studied in the data had long term relations with their subcontractors. This can also show that there exists trust and openness between the firms. Also, only the right to make profit through orders was recognized by the supplier or buyer firms as in general, purchasing and the costs of production and plans are not discussed. On the other hand, the subcontracting practices differ from the lean network concept in such an assertion that mere information is shared and joint development processes are established. We can also conclude that the subcontracting was strongly related to the fluctuation in the demand and moreover, transparency of the information was not always clear between rivals; for example the subcontractors did not know exact position in the relationship network.

Our further analysis is made by Pajek, and as mentioned in our methodology, we tried to discover focal firms in the sense of business relations. In question 13, we asked the participants to define at most 3 leader firms in the sector of their firm.

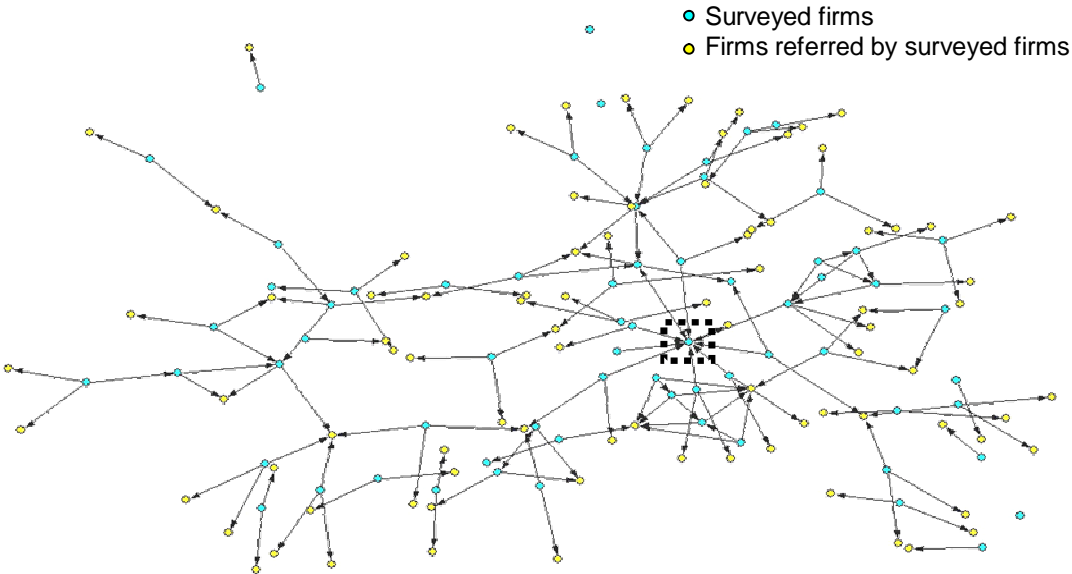


Figure 8: Firm – Leader firms relation map

Using the answers for question 13, as graphed in the figure , our analysis with Pajek clearly revealed the traces of a leader firm (marked with a thick dotted square) in the geographic area of OSTIM. Moreover, the further analysis over supplier-customer relations among firms as depicted in questions 29 and 30 respectively, we obtain the following structure showing us the whole network of inter-organizational relations.

The findings surprisingly pointed out that, in both figures of years of buyer and supplier relations (see Figures 8, 9 and 10), respectively, when the network is condensed to at least 5 years of relations, and regarding core firm group (as a cluster of inter-related firms) analysis with first and second tier relationships, seemingly, only one firm from the region is in the center of relations. The firm, marked in a thick dotted square, in figures respectively, is considered to be a focal firm.

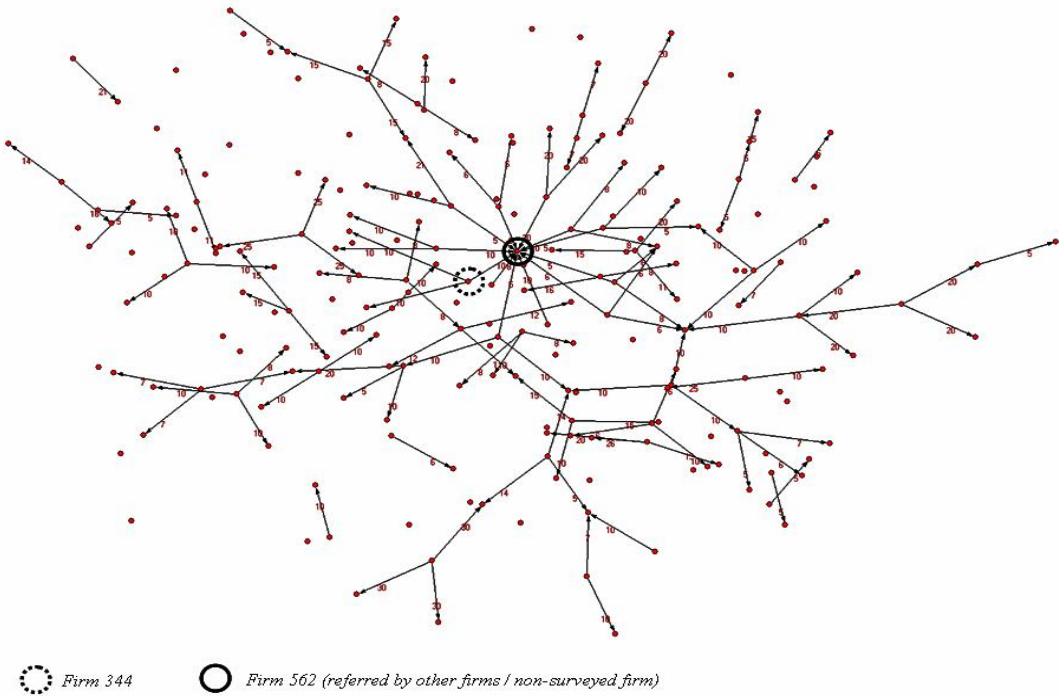


Figure 9: Years of Relations with Suppliers (relations more than 5 years)

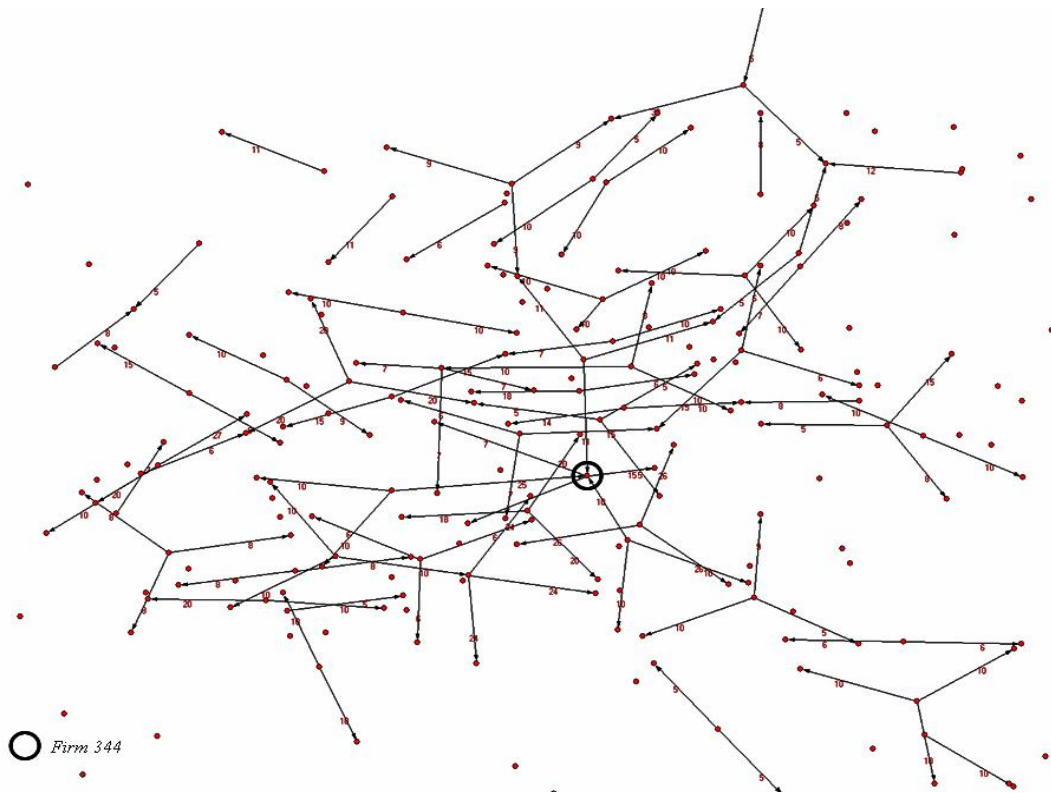


Figure 10: Years of Relations with Buyers (relations more than 5 years)

Interviews with the head of firm 344, proved us that as a technological gatekeeper, firm 344 always play a crucial role in scientific and technological information dissemination by ordering new CNC, new techniques, or imitative behavior, etc. Moreover, their network of external and internal contacts and their advanced knowledge base, and also their long-term relations play an effective boundary-spanning role by bringing a considerable volume of relevant scientific and technical information into the network so that they are effective internal communicators

As previously mentioned, focal firms also play a role in the diffusion of external knowledge into the cluster so that they can therefore be conceived as 'central actors' in the local knowledge system as their position is that of early adopters of technologies to whom all other firms turn to for technical advice and problem solving. In this sense, in the OSTIM district, firm 344 diffuses knowledge by training workers, sharing knowledge, etc. and shape the local knowledge system, accordingly. Among all other firms in OSTIM, firm 344 might also be distinguishable for their degree of technological advancement (using new machinery,

techniques, etc.) and our interviews states that this probably constitutes a formal or an informal effort for other local firms to go and ask for advice. In this sense, stated it our analysis with Pajek, firm 344 bears higher degree of cognitive centrality in the district. Degree of centrality of firm 344 in the district is another full discussion. In the end, the results and implications also proves our first hypothesis that focal firms with higher absorptive capacities are more likely to take a “central part” in the network and strongly show a higher degree of local interconnection, so that they can transfer knowledge to other local firms. ⁽¹⁷⁾

It is also evident from the network diagrams in figures respectively, that firms are not isolated with each other. With the previous result, we can conclude that connections between firms are maintained at a higher frequency of collaboration depending on long-term relationships and trust. Also the figures show us that the collaborative relations among firms mean that knowledge in one firm (or a group of firms) may be shared along the paths of plotted relations in a network. We previously argued that technological gatekeepers play a role in the diffusion of external knowledge into the cluster so that they can therefore be conceived as 'central actors' in the local knowledge system as their position is that of early adopters of technologies to whom all other laggard firms turn to for technical advice and problem solving. In this sense, technological gatekeepers would diffuse knowledge in the district and shape the local knowledge system accordingly

5.4. Focal Firm: Firm 344

Our analysis predicted that the focal firm 344 is embedded in the entangled web of business relations linked to the OSTIM industrial district. From our structural approach, the first analysis showed us the notion of centrality of a firm. Moreover, centrality of an actor in a network has been a key analytical concept in the tradition of both network and social network analysis. While there were several different measures of centrality in literature, we used the web of relations in defining years-of-relations based on centrality during our research on

¹⁷ See also Figure 11 and 12. The further analysis of firm 344 will be conducted in section 5.4

supplier-buyer relation network, leader firm relations. This section will search for other evidence by analyzing firm 344 as a leader and a focal firm to support our hypothesis.

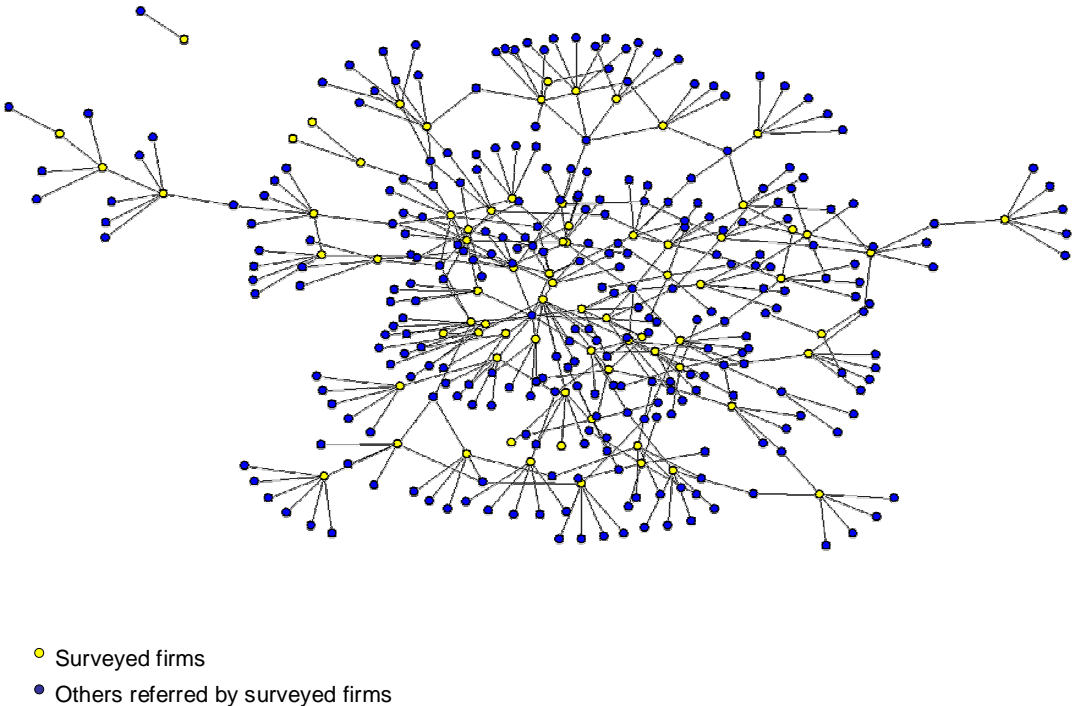


Figure 11 : Supplier – Buyer Relationships

Briefly, firm 344. has been in the gear manufacturing business since 1975. Well trained technical staff and modern state of the art machine tools ensure its high quality with reasonable prices. This has been the main reason for its growing customer profile both in domestic and international markets for long years. Their manufacturing program includes spur, worm, helical, straight and spiral bevel gears, splines, sprockets, pulleys, shafts, hydraulic couplings, planetary gear boxes and spare parts for earth moving machines. Moreover, they produce complete parts to customer's specification including heat treatment, internal, external, and profile grinding, plating and assembly. They can meet both mass production needs of customers and urgent demands even for single parts. Producing high

quality products on customer's specifications and on time delivery, firm 344 is located in OSTIM industrial Estate in Ankara. Facility is 2000 m² with over 70 machine tools and all

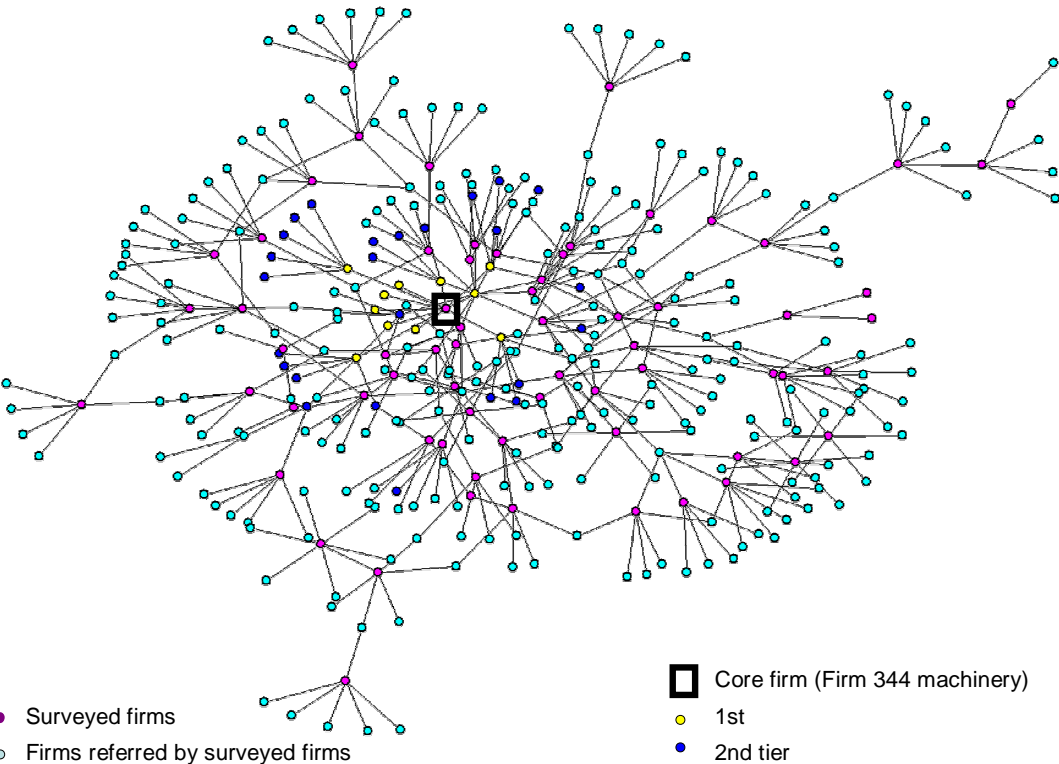


Figure 12 : A core-firm group with its fist and second-tier supplier buyer relationships (¹⁸)

kinds of hob and shaper cutter in stock. Modernization of machine tools is a continuous activity in firm 344. Throughout domestic and international markets, firm 344 also renders service to various sectors such as mining, chemical industry, handling and conveying, iron and steel works, ship building industry and machine production industry. Also, firm 344 licensed Original Equipment Manufacturer (OEM) of a hydraulic pump maker in Germany.

Our further interviews are conducted with the owner of firm 344. He complained that their firm is a family business and he is the third generation in the lead. The intensity of ties

¹⁸ First tier relationships refer to firms having supplier-buyer relations with whom they have a “direct” commercial relationship. On the other hand, second tier relationships are assigned directly to first tier relationships, not to the core firm, itself.

between other firms and firm 344 are as important as the spatial concentration of machinery producers in OSTIM. Most of them were part of territorially-grounded machinery manufacturing networks linking firms producing the final products to small subcontractors specialized in narrow ranges of processing jobs, such as drilling, lathing, metal surface finishing, etc.. Likewise, these subcontractors played an important role in firm 344's operations. According to firm 344's strategy, these subcontractors Not only did handle critical phases in the product processing, but they also participated in the product design and development which was firm 344's strength. Moreover, firm 344 involved in the operation of these specialized workshops by providing financial, managerial, and technical assistance. But it did not control smaller firms in this respect. Firm 344 also offered its service to other producers, even firm 344's competitors. There were about a little more than fifteen subcontractors that the manager points out at firm 344 called them, "the core partners".

Furthermore, firm 344 turned out to have a high level of trust in its interactions (business relations) with their subcontractors. The head of firm 344 expressed his view on this question by saying,

"You have to trust them. The owners of my subcontractors are all hard-working honest folks"

As mentioned earlier, trust as a form of social capital is essential in developing the relationship network in the industrial districts. Once established, inter-organizational trust conserved the cognitive resources in an uncertain environment and enables firms to exchange proprietary know-hows. This helps firms to achieve economies of time and promote organizational fit with environment. It is arguable that repeated transactions between firms in the subcontracting business network made it possible for them to build trust in an incremental fashion. With the prospect of long-term relations and co-operations, firms would be less likely to act selfishly as this might jeopardize future gains. Besides this mechanism internal to dyadic transacting relationships, inter-firm networks of the central OSTIM industrial districts put further check on dishonest behaviors of actors because one's reputation traveled freely and swiftly similar to knowledge spillover effect in this setting.

The ability to achieve inter-organizational trust between firms located within the short distance partially explains why subcontracting with neighbors was successful. For example, according to firm 344's structure, around 40 percent of its subcontractors were located in the same district where it resided, 30 percent of the subcontractors were in the same city or nearby (in fact, most of them were in the neighboring towns), 20 percent were in Turkey's other cities, with a little over 10 percent locating outside of Turkey. Although convenience might be the reason why firms chose nearby subcontractors, there were social dynamic that went beyond simple convenience: As more firms farm out to the nearby subcontractors, there are more chances for specialized relations to spring up and sustain an embedded environment with specialized subcontractors, firms can rely on them to provide high-quality service and over time become even more willing to further externalize their production.

Thus, the possibility to build trust through iterative economic exchanges, termed as process-based trust production by Zucker (1986), allowed economic actors to expand their relations with the changing environment such that it was difficult to achieve solely by an exclusive static network as all relation networks are dynamic.

It is also notable here that social relations could be built through economic transactions. In his analysis of OSTIM's business network, the manager also underlined that businessmen in OSTIM intentionally constructed familiar ties out of repeated economic transactions which in turn stabilized the economic exchange. With this aspect, manager's interpretations as well as our complements regarding the economic and sociological view, emphasizes the embeddedness of economic exchange on pre-existing social and economic relations.

In our study, according to related interviews, we also predicted that firms did not stop monitoring their transacting partners even if trust was obtained. But its function was transformed from a device against opportunistic behaviors to one that promoted mutual adjustments. Firms learned the peculiarities of their trading partners through constant monitoring and came up a way to meet their special needs. Frequent contacts established reliable channels for cooperating firms to deal with their differences and build consensus

more efficiently. For example, quality control in OSTIM was not only performed at the interface of economic transactions. It also involved measures such as frequent plant visits and technical assistance to prevent quality problems from happening in advance. Though all manufacturers in OSTIM district adopted nearly the same method of quality control (ISO and TSE standards), frequent plant visits and technical assistance could be performed interactively in the OSTIM district where firms located closely with each other.

The analysis of inter-organizational trust as presented here depicts that the longer term relationships of embedded ties and the possibility of recruiting new partners in the process-based trust production combined the stability and flexibility to enhance the survival chance of firms in OSTIM industrial district to meet the challenge of economies of time and innovation. Moreover, as the inter-organizational trust is easier to sustain with frequent contacts, district firms may be claimed to have advantages over non-district firms. As a result we may conclude that our hypotheses that the probability of being a focal firm in a web of relations between two organizations increases with the level of prior trust is truly satisfied.

In our further analysis of firm 344, as a focal firm, we predicted its ego networks. As a different analytical approach employed in our analysis, we can define an ego network as a network of a particular node (in general, the focal firm), consisted of firms connected to the ego either directly or indirectly. Graphically speaking, while the ego is located at the center of the network, other nodes (firms) are connected to the ego either directly or indirectly through steps of shortest paths, supplier-buyer relations, years of relationship or with geodesic distance. Considering directionality of the ties among nodes (usually bi-directional), it included only nodes connected by arcs (or bi-directed lines) from the firms to the focal firm at the center.

The ego network of our selected focal firm replicated a local group supplier-buyer network of the firm linked to OSTIM. Using Pajek (Batagelj & Mrvar 2002). The Figure showing a local subcontracting group network of firm 344 established in OSTIM, exemplifies an ego network of a focal firm. The identified group network consisted of three kinds of nodes: The parent OEM (ego), local SME buyers and local SME suppliers (alters). The local SMEs supplied

various components and parts and/or many different processing activities for firm 344 through either direct or indirect ties. Moreover, the graphic elaborated on the hierarchical structure of a particular focal firm’s local supplier-buyer network. Specifically, the geodesic distance, or the years of interaction with firm 344 to a particular supplier and buyers, represented the level of supplier and buyer's tier in the local production system. Those directly connected to the ego were the first-tier suppliers (Tier 1). ⁽¹⁹⁾ Then, those connected to the ego indirectly through the Tier 1 suppliers were the second-tier suppliers (Tier 2). These hierarchical steps continued to identify the lower tier suppliers for the ego.

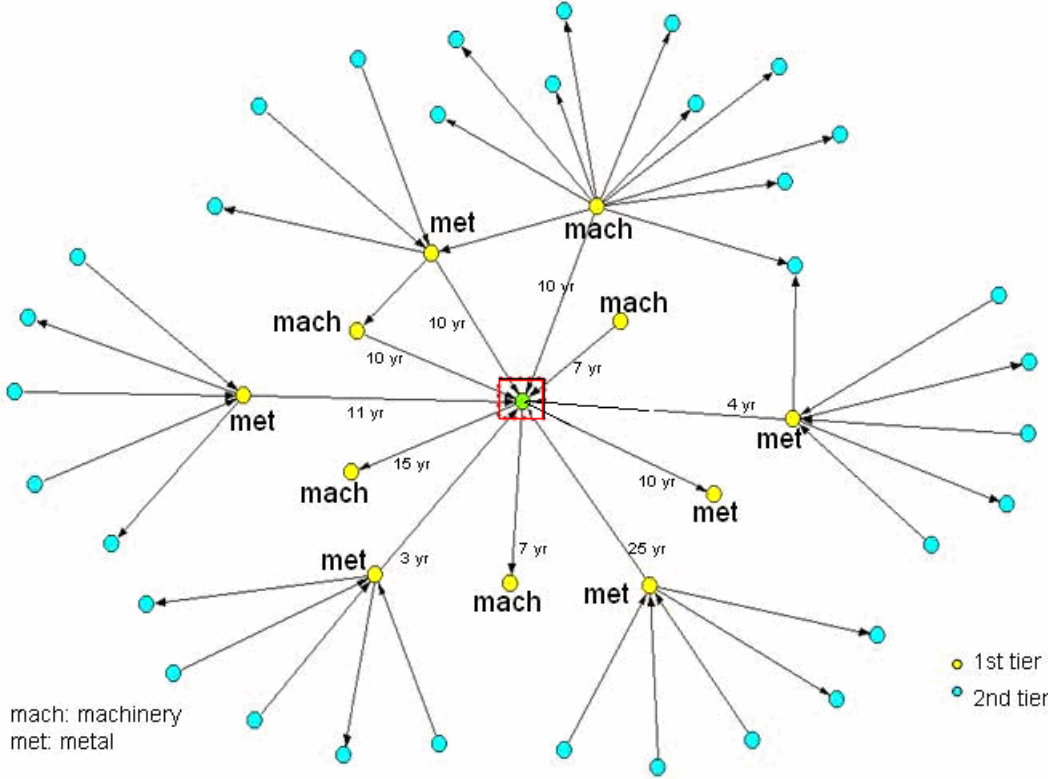


Figure 13 : Ego network of firm 344

From the structural viewpoint, Tier 1 firms played two different roles across the supplier networks, depending on their patterns of connection to other firms in the ego networks, according to the years of interaction. On the one hand, Tier 1 firms often appeared to fulfill

¹⁹ See also Figure 12

the role of local interdependencies for the focal firm, or the ego, also coordinating a web of relations among suppliers in the lower tiers, as a local hub, or typically a components assembler. On the other, Tier 1 firms, which we also predicted their supplier-buyer relations, or a Tier 2 firm, by definition, tended to be simply an intermediary between the focal firm at the center and the Tier 2, or the immediate subordinate supplier for the Tier 1. While the hub/intermediary distinction was seen typically at the level of the Tier 1 firms, in part due to the sectoral structure, we can conclude that the focal firm's relations mostly depends on the trustworthiness of same sectoral firms.

It is difficult to judge to what extent the distant firms outside OSTIM district should be regarded as core relations of the focal firm as those firms at distant positions from the firm 344 at the center also had up to three other prime buyers at various intermediate stages (Tier 2) in the chains of manufacturing processes in the subcontracting ego networks, respectively, according to our data structure. However, from the Figure 13 the Tier 1 relations show us that those firms encompassed in an ego network were connected either directly or indirectly to the firm 344 at the center as suppliers or buyers, although in reality, they should have numerous inter-firm relationships of less importance with other firms (other tier relations can be predicted), which were not shown in the graphic due to the stringent criterion of the name-generating questionnaire to ask each firm for only three names of its prime buyers and sellers, respectively.

Complementarily, at the theoretical level, when a Tier 1 firm supplies products for manufacturing services as three prime buyers in rivalry exists in the same industry, as it has been seen partly in our survey, the advantage of the position of the supplier is obvious, based on the concept of structural holes (Burt 1992). This is also graphed for our focal firm 344 (see Figure 14)

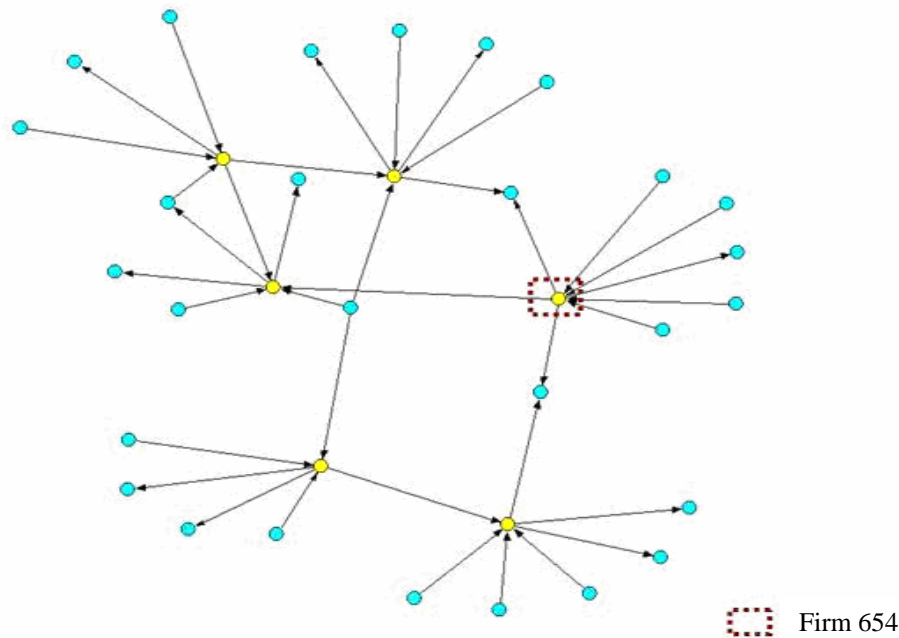


Figure 14: A structural hole from OSTIM supplier buyer network

According to Burt (1992), when two nodes in a triad do not have direct relationships with each other, the third party can exploit the two, by taking the so-called "robust action," or multi-vocality in its social action. Specifically, the Tier 1 supplier for the two competing firms can control the crucial information by taking the advantage of the structural hole in between the two, if it gets advanced technological knowledge from one of the two prime buyers. In the case of OSTIM, through the bridging supplier for the two, technological information can be shared among three members of the triad, even though the two firms were disconnected from each other. Our sample data predicted firm 654⁽²⁰⁾ (marked with a thick dotted square) as a bridging firm. It can be argued that the bridging firms, such as some Tier 1 suppliers were in strategically strong positions, in order to exert control over the flows of knowledge. From the structural viewpoint, as those triad relationships were embedded in the extremely complex, large-scale web of business networks, the roles of the bridging suppliers as brokers appeared to be important for fusion and diffusion of technologies for the entire large-scale regional economy (Fernandez & Gould 1994). Moreover, the analysis identified firms embedded in the complex regional networks. The ego network of a leading (focal) firm replicated a

²⁰ The firm 654 is a big tractor manufacturer outside of OSTIM district and is a non-surveyed firm.

subcontracting group network of the prime buyer. Then, based on the structural approach, an industry embedded in the regional subcontracting business network was conceptualized and captured as a sum of the subcontracting ego networks of leading firms in the industry. By putting together the ego networks of those leading firms in the same industry, it was possible to depict some key structural characteristics of the industry deeply embedded in the complex web of relationship networks in the regional economy.

There are also some other important implications from the analysis of our ego network. First, the analysis also articulated size of each industry. There were basically two different notions about the size of firms' supplier network. On the one hand, the size was measured in terms of the number of firms in each ego network of the focal firm. In other words, the size indicated the impact of each focal firm, or a sphere of influence across the web of complex supplier networks in OSTIM. On the other hand, size was also measured according to the years of interactions with other firms or longest/shortest paths from the ego to suppliers/buyers at the lowest tier in each of ego networks. Generally speaking, as the distance from the focal firm at the center to an identified supplier got stronger, the degree of embeddedness and interdependence of supplier-buyer relationships rises. This complements our hypothesis that the years of a relationship between focal firms other independent firms in a district increases with the level of interdependence between those organizations and is crucial for being at the center of an ego network and developing other longer-terms of relationships.

Second, the graphic presentation of ego networks also depicted some industry specific, hierarchical structural patterns in the supplier networks. On the one hand, the pattern was either relatively vertical or hierarchical. If the years of relations from the ego to the suppliers-buyers in lower tiers (preferably, tier 1 and 2) were relatively long, the pattern may indicate that the supplier group network of the focal firm has relatively vertical collaborative structure. In contrast, if the years of relation were relatively short, it suggested that the focal firm had relatively flat local supplier network as its own supplier group network (horizontally cooperated). Moreover, we must also predict that our variables (years of relations etc.) clarified linkages among different supplier-buyer networks under the leading firms in the same industry as an industry-specific subcontracting pattern. In theory, each of the ego

networks encompasses various manufacturing activities of SME suppliers in the flows of goods and services at intermediate processing stages. By combining these ego networks of leading OEMs in an industry, the industry structure embedded in the OSTIM seems to have rather complex web of inter-organizational relations which was identified from the point of view regarding linkages among the SMEs that are bridging across different supplier groups under the leading firm in the industrial district.

Third, the analysis of ego networks also showed the nature of a network under the focal firm at the center, in terms of centralization of the vertical integration. If a focal firm had many local hubs, which organized its own suppliers included in its ego network, this may indicate that the business network structure was relatively decentralized. In contrast, if a focal firm had a small number of hubs encompassed in the ego network, the network was relatively centralized under the leadership of the leader firm. In the former case, it may be inferred that the focal firm tended to be a final assembler, while the local hubs probably functioned as either a coordinator of components production or an organizer of a variety of processing activities to form a social division of business relations among the focal firm. In the latter case, the roles of the subordinate SMEs, which were engaging in various processing activities or parts production for the firms located at the center, appeared to be relatively limited in general, although the issue is beyond the scope of this thesis.

From another point of view, the firm 344 in our particular case study has an explicit policy of external and internal networking and is thus able to focus upon the critical issue of inter-firm relationship and trust building. Environmental and sectoral changes also have an ongoing impact on the firm 344's relationships. Alliances with other specialized firms are an attempt to reduce the risks and uncertainties that have entered the market, as well as providing a means of facilitating the firm's innovation strategy for new product development. In addition, the informal networking behaviour allows the firm 344 to draw on new as well as known contacts to develop closer links through strategic partnerships. In this approach to innovation, both the constraints of the particular industrial sector can be identified as well as the response of the individual firm to such limitations. The particular market conditions that dictate the need to tender for informal contracts forces long term co-operation between firms even before

a contract for a project is obtained. Moreover, the difficulty of managing relationships with other inside and outside OSTIM firms who are also direct competitors of firm 344, has forced it to court partners from European Union (EU). In this situation, where both communication over distance and a certain amount of trust are required, the policy of investing time and energy into cultivating relationships over the long term can be understood in terms of a continuing return on the intangible factors involved in inter-organizational relationship building. Benefits have been in the exhibity of the network approach (and associated cost savings), against an investment in internal technological development, but the large number of collaborations currently ongoing is now raising its strategic management issues.

In sum, we can depict that growing complexity of the knowledge base and the more rapid rate of (technological) change seems to make it attractive for most of the product and process innovating firms in an industrial district to establish selective relationships which are medium- to long-term. For instance, the results of the our survey reveal that of the firms having collaborated with one or several partners in relation to product or process innovation, only a minority were collaborating with these domestic partners for the first time. Also, our interviews reveal some interesting findings on related aspects. More than 50% of the OSTIM collaborating firms fully agree that trust and confidentiality is a very important basis for co-operation. However, this kind of basis has to be built immediately before substantial knowledge resources are allocated to a common product or process development project and as a rather logical consequence most of the product and/or process innovating firms indicate that past experience on collaboration and reputation of the partner is important or very important. The evidence of certain inertia in terms of centrality in the network and cluster formation seems to suggest that it takes “time” and “resources” to build efficient communication channels which seemingly rest on more “soft aspects” such as culture, personal experience and mutual trust.

CHAPTER 6

CONCLUSION

The study of inter-organizational relations and business networks, as especially relates to industry policy and the development of small firm competencies, represents a great field of research in the management literature. However, the network paradigm, while recognizing that global competition occurs increasingly between networks of firms is complex and incomplete in its conceptualization. While a significant typology of network and cluster structures can be identified from the literature, our understanding of the dynamics of networks is limited. Moreover, mechanisms and assessment of informal network interventions and their impacts over business networks has attracted considerable criticism on the grounds of measurement inadequacy.

To sum up, the purpose of this thesis was to articulate structural properties of complex business networks in the industrial district, OSTIM by comparatively studying linkages among firms in terms of trust and informal relations. We predicted that different industries embedded in the extremely entangled, regional supplier-buyer networks, based on relational data from our survey. From the structural viewpoint, one way to depict the linked industries embedded in the industrial districts was to put the focus on ego networks of highly central, focal firms as prime buyers of SME suppliers. Theory states that each ego network replicated a local subcontracting group network of an industry leader. A map of business relations in the industrial district was captured as a total of these small business networks, which consisted of different group networks of highly central to leading firms in the same industry and also, in the same district.

Then, by taking the graph-theoretic approach with Pajek, business relations of firms in the industrial district were unveiled, not only at the level of trust, or interdependence and embeddedness, but also at the levels of intermediate suppliers-buyers (tier 1 and 2 levels are taken into consideration in our analysis) located at various positions in the subcontracting tiers across the linked business networks. The methods made it possible to study our hypotheses as structural characteristics of the key firms strongly tied to the industrial district

within the framework of their inter-organizational dynamics in the district, or an intra-industry social cooperation and collaboration among the firms.

As a result, the findings from the graph-theoretic analysis clearly showed that the network structures were substantively embedded depending on the years of relations, or levels of trust at the top of subcontracting business units. We can conclude basically three points to be underlined regarding the inter-firm business network structure. First, the duration of relationship between subcontracting firms, measured in terms of years, effects the level of interdependence between organizations and is crucial for being at the center of an ego network and developing other longer-terms of relationships, connected with both social and the network theory.

Second, the business networks had industry-specific structural patterns. While those of leading firms in the district, relations tended to have rather hierarchically vertical structures with relatively long periods of relations with their suppliers/buyers as focal firm established at the center of the network showing more centralized forms with the extensive use of local hubs, as organizers of their own business relations.

However, if we try to identify workers' skills development, organizational and technological learning, managerial and entrepreneurial competence, public infrastructures, close cooperation and trust between the municipalities and the firms (as well as between the firms themselves) as vital ingredients for innovation and competitiveness, these vital ingredients do appear to be dominant in the present industrial structure of OSTIM industrial district. It seemingly does fit the firms' culture or business environment which is possible to conclude on the basis of this thesis. On the basis of the existing material over industrial districts in Turkey, we must also mention that it is rather difficult to find clear indications which might confirm the existence of trust and long-term business relationships in other industrial districts with identical or similar characteristics to those of what we have proposed for OSTIM industrial district.

Finally, it is important to point out that both formal and informal cooperative arrangements between innovation producers, innovation users and suppliers are important. On a more

general level, a scenario where inter-firm cooperation and alliances have become key elements in promoting innovation, forces us to re-assert the relationship between (and constitutive elements of) innovation and competition policy. Recent initiatives on innovation policies in US, Japan and Europe, more explicitly allowing for inter-firm co-operation and networking in developing new technologies, might represent a tentative step in this direction. As a well known fact, innovation does require informal or formal coordination between agents operating at different stages of the innovative chain. The question now is; what can be the policy implications of these empirical findings?

The answer to this question has to be differentiated. An immediate implication of our observation is that innovation policy should not focus on the single firm in isolation but rather on its capability to interact with other organizations and on the formation of innovative networks. Another point is that previous demarcations between competition and co-operation are becoming increasingly blurred. For the firms this constitutes an integration/specialization dilemma. For the public policy (or innovation policy), it points out to the need for designing framework conditions, including competition policy, which do not inhibit the formation of networks. Besides, in the area of informal modes of inter-organizational cooperation, public policy has no role to play: It is up to the innovating firms themselves to set up the kind of trust and informal relations with their buyers and suppliers. In the area of formal cooperative agreements, public policy can affect microeconomic decisions concerning two major issues: first, can vertical relations between innovation producers, users and suppliers be formed at all, and second, are the right kinds of vertical relations formed. Moreover, we must underline that the trust and informal relations were crucial in determining business linkages among subcontracting groups of cooperating or collaborating firms as well as buyer-supplier relationships. In other words, while the former business relations (important for entrepreneurs) were organized in the basis of trust under the network relations, here, the latter were structured in a more relaxed manner, with more inter-group transactions or group-spanning activities, especially at the level of Tier 1 suppliers.

In conclusion, through the graph-theoretic approach with Pajek, the present analysis unveiled the underlying structural patterns in the regional business networks, at the level of the linked,

but different, embedded sectoral firms in the aspect of industrial districts and regional economies. In fact, this thesis found out that there were clear underlying trust-based structural and informal patterns behind the extremely complex, large-scale entangled web of business relations linked to the OSTIM industrial district. In other words, the graph-theoretic analysis suggested that complex, regional supplier-buyer networks in flexible specialization can be heavily influenced by subcontracting practices of linked and deeply embedded relations in a large-scale industrial district. As a conclusive departure from the existing literature, the present research suggested that the distinctive business relations regarding trust and informal relations could generate distinctive social structures in the forms of local supplier-buyer networks in an industrial district.

Conclusively, as it is mentioned earlier, the investments in network building are seen in terms of the level of resources committed to the inter-organizational relationship through negotiation, communication and in identification of possible future areas of conflict within the partnership. The outcome, however, is an enduring long-term relationship through which other shared projects could emerge. The development of trust between the firms is also partly approached as a managerial problem. Moreover, the first encounter with a new partner is made through mutual and respected network contacts. Further development of trust between potential collaborators is enshrined in formal contract, and developed through behaviours that generate a high level of inter-firm trust and goodwill in terms of sharing out foreseen gains from the proposed collaboration equitably. Behaviour is always being mediated through the commitment to a long-term inter-organizational relationship, because in the internal accounting process of the firm, the return on investment in building a co-operative work situation with a partner is not regained through one project, but through maintaining healthy network relationships over time.

Thus, the explicit nature of the inter-organizational relationship building process can be seen through the attitude to formal agreement, where there are initial negotiations over responsibilities, and an initial understanding formed of the respective contributions and obligations that have been agreed. There is also a willingness to be flexible enough to accommodate inevitable change due to the long lead times involved in the projects, both in

terms of the work requirement and prospective changes in personnel. This attitude to flexibility and negotiation around the basic contract demonstrates areas of expertise in the management of inter-firm partnerships, particularly in terms of foreseeing the extra risks and stresses that will be faced once the informal contract has been placed and development is underway. In-house development of inter-organizational relationship building skills can therefore be seen as a component of networking expertise. The development of trust rests both on the formal agreement and sanctions, as well as on more informal inter-personal relationships.

Therefore, a network perspective can, nevertheless, provide valuable insights for business relations development and has important implications for policy formulation and management practice, many of which have yet to be explored. For example, an understanding of the dynamics that influence the formation of new networks can provide insights for policy makers regarding the role of trust and the duration and composition of formalized relations between actors of a firm. Researchers may want to analyze how to manage individual linkages of informal networking, for which recognition of dynamics that influence the evolution and contingent performance of networks at both the dyadic and network levels of trust which can be highly beneficial. An advanced understanding of inter-organizational relation dynamics may also provide insights that enable firms to proactively initiate selective network contacts that enhance their informational capabilities, or to position themselves in the central of networks to gain control these benefits. By examining ways in which networks might constrain or facilitate firms' future actions and market opportunities, firms themselves can begin to adopt a more proactive stance in developing trust and long-term relations and managing their own business networks and the future relations.

Still, there is much to learn about the efficacy of networks and the effects of programmes designed to initiate network formation. Despite the mixed empirical support for such initiatives, however, small firms in industrial district can gain greatly from dense relations and knowledge spillovers that deliver insights concerning the benefits of collaborating to compete in regional and global markets.

We may also emphasize that (1) the evidence in this thesis partially provides support for a model of business relations in industrial districts that sees business relations as a key causal variable, (2) there is evidence of a significant relationship between particular informal relations and levels of trust & trustworthiness in an industrial area, and (3) trust relations will thus materially be affected by changes in the relative positions of actors (centrality).

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APPENDIX A

TECHNOLOGICAL INNOVATION AND INTER-ORGANIZATIONAL RELATIONS SURVEY

Survey Number: _____
Survey Date : _____
Surveyer : _____

Surveyed Name Surname : _____
Position : _____
Phone Number : _____

I. ABOUT THE FIRM

In this section, we ask for general information about the firm

0. Name of Firm : _____

1. Year of Establishment : _____

2. First Place of Establishment : _____ (city)

3. How would you clasfy your firm (Please, mark only one)

- 1. Family Business
- 2. Foreign partners
- 3. Other (Please, explain) _____

4. What are the educational information and tasks of administrative personnels (managers) in your firm?

Manager	Education	Tasks
1		
2		
3		

5. Does your firm belong to an another firm group (holding etc.)?

- 1. Yes
- 2. No

6. Please, define your firms's capital stock distribution (as %).

Regional _____
(Ankara and its neighbor cities)
National _____
Foreign _____
Other _____

7. Did you export in years 2000-2003?

1. Yes
2. No → Please, go to question 9

8. How did the export incomes affect the net sales revenue of your firm?

1. Increased % _____
2. Decreased % _____
3. Not Changed

9. Approximately, how many people are working in your company?

10. Do you have any qualification of global or national quality assurance? (ISO 9000, AQAP etc.)

1. Yes
2. No → Please, go to question 12

11. Which quality assurance?

National _____
Global _____

12. Please, define your firm's main product/product groups?

P1. _____
P2. _____
P3. _____

13. Please define “leader” firms in OSTIM as in the same sector of your firm (first three firms).

F1. _____
 F2. _____
 F3. _____

13a. In the table below, please, mark your relative position to these “leader” firms.

	Seller	Buyer	Important Competitor	Important Cooperation	Same Firm Group
F1					
F2					
F3					

14. Please define “leader” firms outside OSTIM as in the same sector of your firm (one for each).

Regional(Ankara and its neighbor cities) _____
 National _____
 International _____

II. TECHNOLOGICAL INNOVATION

In this section, we ask for your firm’s product and process innovation activities

15. Did your firm make any considerable improvements over the its existing products during the period 2000 – 2003? (product innovation)

1. Yes
 2. No → Please, go to question 12 (pass question 19)

15a. Which products?

iÜ1. _____
 iÜ2. _____
 iÜ3. _____

16. Did your firm develop any “new” products in the name of its technological character and/or its usage during the period 2000 – 2003? (product innovation)

1. Yes

2. No → Please, go to question 17 (pass question 20)

16a. Which products? (according to their importance rankings)

YÜ1. _____
YÜ2. _____
YÜ3. _____

17. Did your firm make any considerable improvements over the its existing production processes during the period 2000 – 2003? (process innovation)

1. Yes

2. No → Please, go to question 18

17a. Which processes? (according to their importance rankings)

P1. _____
P2. _____
P3. _____

18. Did your firm adopted any “new” production process methods during the period 2000 – 2003? (process innovation)

1. Yes

2. No → Please, go to question 19

18a. Which processes? (according to their importance rankings)

YP1. _____
YP2. _____
YP3. _____

19. Did your firm adopted such process innovations to make any considerable improvements over the its existing products?

1. Yes
 2. No → Please, go to question 20

19a. Please, mark any contribution of your process innovation activities over the improvements of your existing products in the table below? (0 = none, 1 = few, 2 = very)

	IÜ1	IÜ2	IÜ3
P1			
P2			
P3			
YP1			
YP2			
YP3			

20. Did your firm adopted such process innovations to develop any “new” products?

1. Yes
 2. No → Please, go to question 21

20a. Please, mark any contribution of your process innovation activities over the development of new products? (0 = none, 1 = few, 2 = very)

	YÜ1	YÜ2	YÜ3
P1			
P2			
P3			
YP1			
YP2			
YP3			

21. Have you ever used any financial credit or support for the innovations as inclined above?

- 1. Yes
- 2. No

22. Have you applied for any patent request?

- 1. Yes
- 2. No → Please, go to question 22

22a. If so, in which countries?

National _____

International _____

23. Have you ever transferred technology/technologies during the period between 2000 – 2003?

- 1. Yes
- 2. No → Please, go to question 24

23a. Which methods did you use to transfer technology? (please mark according to their importance rankings, starting with 1 to 5 as the most important)

- Obtaining the licence
- Purchasing machinery and equipment
- Cooperations/collaborations for R&D
- Cooperations for production
- Firm mergers
- Employment of new expertise
- Counselling service
- Reverse engineering
- Açık bilgi kaynakları (fairs, exhibitions, print-outs, etc.)
- Other

24. Do you compell to find/obtain qualified labor?

- 1. Yes
- 2. No

25. Do you attend to join any inter-firm training programmes?

1. Yes
 2. No → Please, go to question 26

25a. Attended training courses are;

1. inside OSTİM
 2. outside OSTİM

26. Do you suspect frequent movement of qualified labor in your sector? (Do you frequently observe any job alterations between firms?)

1. Yes
 2. No → Please, go to question 27

26a. What kind of a movement is that?

1. inside OSTİM
 2. outside OSTİM

III. INTER-ORGANIZATIONAL RELATIONS REGARDING PRODUCT AND PROCESS INNOVATION

In this section, we ask for your firms product and process innovation activities regarding the inter-organizational relations.

27. Please, mark your degrees of firms inter-organizational relations contributing to product innovation. (0= none, 1 = few, 2 = very).

	Tracking other firms	External knowledge	Supply Chain Process	R & D cooperations	Other
inside OSTİM					
Inside the region					
Inside Turkey					
Outside Turkey					

Tracking: the innovation process beginning with tracking other firms' activities (acquiring the idea - imitation)

External Knowledge: : the innovation process beginning with accessing external knowledge outside the

Supply Chain Process: the innovation process beginning with inter-organizational relations between suppliers and buyers

R&D Cooperation: R&D with other cooperations

Please explain "other"

28. Please, mark your degrees of firms inter-organizational relations contributing to process innovation. (0= none, 1 = few, 2 = very)

	Tracking other firms	External knowledge	Supply Chain Process	R & D cooperations	Other
inside OSTİM					
inside the region					
inside Turkey					
outside Turkey					

IV. INTER_ORGANIZATIONAL RELATIONS

In this part, we ask for your firms' inter-organizational relations

29. Please, define 3 main suppliers of your firm.

T1. _____

T2. _____

T3. _____

29a. Please, write some basic information about these suppliers.

	Place	Sector	Years of Relations	Resource Type	Type of Relation
T1					
T2					
T3					

Place: O = OSTİM, B = Region (Ankara ve neighbors), T = Turkey, Y = Foreign country

Sector: ISIC code of the supplier

Resource Type: resource usage relations between the firm and supplier 1= financial, 2 = machinery, 3 = human resource, 4 = knowledge (know-how)

Type of Relation; 1=Order based 2=knowledge sharing about the production plans 3=cooperate production planning

30. Please, define 3 main buyers of your firm.

M1. _____
M2. _____
M3. _____

30a. Please, write some basic information about these suppliers.

	Place	Sector	Years of Relations (yıl)	Resource Type	Type of Relation
T1					
T2					
T3					

31. Please, mark your degrees of firms inter-organizational relations contributing to internal and external knowledge resources (0= none, 1 = few, 2 = very)

	Other firms	Support Institutions	Knowledge producers	Information Suppliers	Other
inside OSTİM					
inside the region					
inside Turkey					
outside Turkey					

Other Firms: Suppliers, buyers, competitors, cooperations, collaborators, etc.

Support Institutions: Counseling institutions, profession institutions, laboratories, training institutions, etc.

Knowledge Producers: universities, freelance R&D departments, etc.

Information suppliers: technical and tradable knowledge suppliers; fairs, exhibitions, publications, etc.

Please explain if “other”

32. Please, mark the ones from the list regarding your firm’s strategy

- Long term (3 years or more) production planning
- Firm’s strategical position against competitors
- Planning for skilled labor
- New production methods, concepts, etc.
- Cooperation and collaborations
- Global marketing
- University-industry cooperation