

# Innovating industrial districts:

## Ankara Sincan industrial district

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Organized Industrial Districts are important regional development tools that have been extensively utilized by the Turkish authorities with varying degrees of success. The study investigates the intra- and inter-firm relationships, and their possible implications for firm level innovation activity. The empirical part of the study is carried out in Ankara, Sincan Industrial district. In the first stage of this study, the purpose is to explore vertical interfirm links and social relations. For this end, a survey is employed to 86 firms engaging in machinery and equipment sector. 79 firms reported innovation activity. Next, the target is to reveal the determinants of innovative activities. Two general findings are noteworthy. First, the existing interfirm relations and other social relations are not well-established for achieving successful innovations but rather they hinder the possibilities for success. Second, the determinants of product and process innovations are different as envisaged at the beginning of the study.

**Keywords:** innovation; firm relations; Turkey

### Introduction

In recent years, a growing body of literature on industrial clusters is one of the realities a researcher observes. However, existing literature suffers from at least two difficulties, one is methodological and the other is empirical. The methodological problem is that some of the studies concentrate on existing clusters by employing standard technical tools without rigorous attempt to analyze social aspects of the inter-firm relations. The empirical problem is related with the geography of applications. Most of the studies use data from the developed countries yet the studies on developing countries is actually limited in number. The present study contributes to this inadequate literature on developing countries with an example of a Turkish industrial district.

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The ultimate aim of this study is to present evidence on inter-firm relations in a Turkish industrial district towards a second step of detailed clustering analysis. In other words, this study is the first step to explore possible opportunities to analyze Turkish clusters with their own peculiarities. Interorganizational relationships involve long-term interactions and exchanges between actors, which are maintained for economic purposes and change in time. As noted by Lundvall (1985), repeated interactions can eventually give rise to significant learning and innovation. In this context, relationships are considered as coordinating devices for resource creation and knowledge diffusion which facilitates innovation. Throughout this process, new combinations of sources of knowledge and skill are developed; an environment for the exploitation of complementarities is created; potential innovations are explored and realized.

The study is organized as follows: the second section focuses on the available evidence for developing both a theoretical and methodological structure; the third section presents the methodology and the data; the fourth section analyses the results; followed by concluding remarks.

## **Firm Innovation and Relationships**

It is possible to observe two different prototypes of managing inter-firm relations; namely trust and power. Although these two patterns seem to be distinct, they are interconnected. First of all, they are generally produced at the inter-personal level, and then transmitted to organizational level. Secondly, power is also contributing to build up trust between firms. In either way, these mechanisms may be transmitted to cooperative and collaborative activity. Such activities positively contribute the competitiveness of firms. The research on inter-organizational relationships dates back to Coase's study of the nature of firm in 1937. However, the most significant contribution is made by the progress of transaction cost economics of Williamson (1975, 1985). The stability and longevity of interdependent relationships between organizations result in a focus on network

structures that exist between markets and hierarchies (Thorelli, 1986; Easton and Araujo, 1994; Ford and McDowell, 1999; Hillebrand and Biemans, 2003). The study of cooperative relations needs a complicated analysis of involvement of parties, communication patterns, organizational learning, organizational norms, and cooperation as a coordination mechanism (Hillebrand and Biemans, 2003). In this context the relationships are part of a social capital.

As put forward by Anderson et al. (1994) relations are linked to other relations resulting in a system of interdependent relations. Therefore, by time, relationship portfolios are created. It comprises of exchange relations as well as other types of relations with actual and potential suppliers, other firms and organizations such as governmental instrumentalities, competitors, and complementors (Wilkinson and Young, 2002). Ritter and Gemünden (2003) hypothesize that a firm's degree of network competence has a positive impact on its degree of technological interweavement; a firm's degree of network competence has a positive impact on its innovation success; a firm's degree of technological interweavement has a positive impact on its product and process innovation success; and a company's degree of network competence is positively influenced by the degree of access to resources, the extent of network orientation taken by a company's human resource management, the integration of a company's communication structure, and the openness of its corporate culture. The antecedents and impacts of network competence are presented by Figure 1.

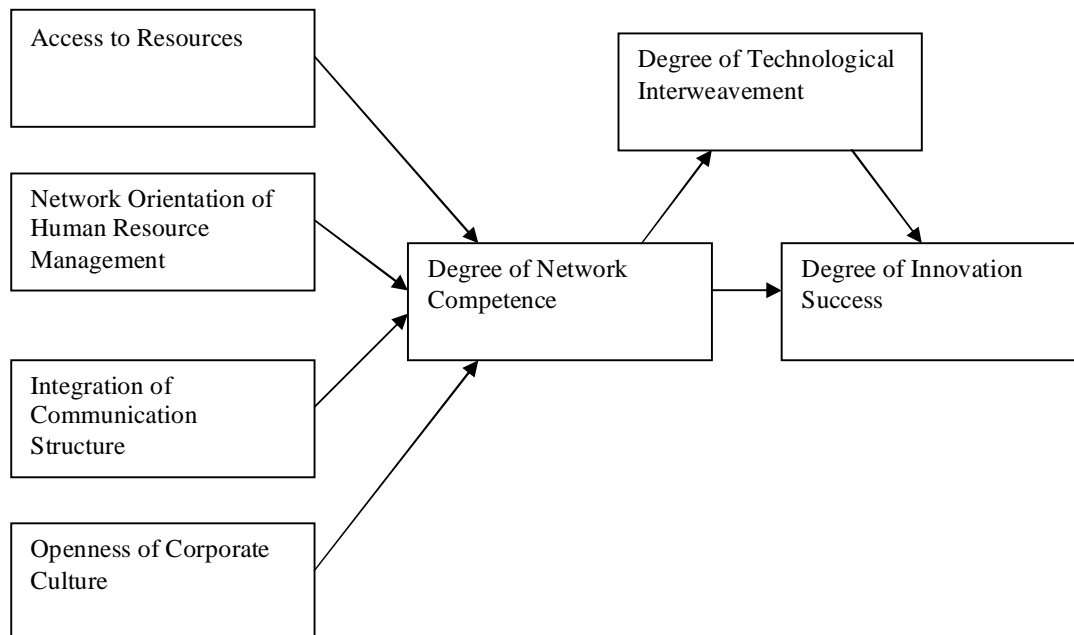


Figure 1: Antecedents and Impacts of Network Competence

Source: Ritter, T. and Gemünden, H.G. "Network Competence: Its impact on innovation success and its antecedents", *Journal of Business Research*, 56, 2003, page 749.

Johnson and Sohi (2003) examined the impacts of inter-firm relationships on learning. By using the claim of Day (1994), Johnson and Sohi (2003) advocates that the high quality and productive inter-firm relationships arise when the firms engage in building knowledge bases that pertain to inter-firm relationships partnering. Through organizational learning, the firm is able to gain competence for effective and successful partnering (Johnson and Sohi, 2003). In this framework, they model out the learning activities in buyer-seller relationships as presented by Figure 2. In this figure what is labeled as platform variables represent antecedents and relationship outcomes as consequences. Learning intent is the firm's desire to learn. Strong learning intent is an indicator showing that the firm prefers to distribute processing resources. Transparency is concerned with the opportunity to learn. It shows the openness of firm to learn. Higher levels of transparency in the form of dissemination of information can enhance learning. Receptivity demonstrates the firms' capacity to learn. Johnson and Sohi (2003) further hypothesized that the joint effects of these three variables produce dissemination of information and shared

interpretation of information related to inter-firm relationships, their making and their management. The higher levels of dissemination of information and shared interpretation of information, in turn, results with more effective and efficient relationships and higher commitment to inter-firm relationships. As a result, the stability and permanency of inter-firm relationships are ensured.

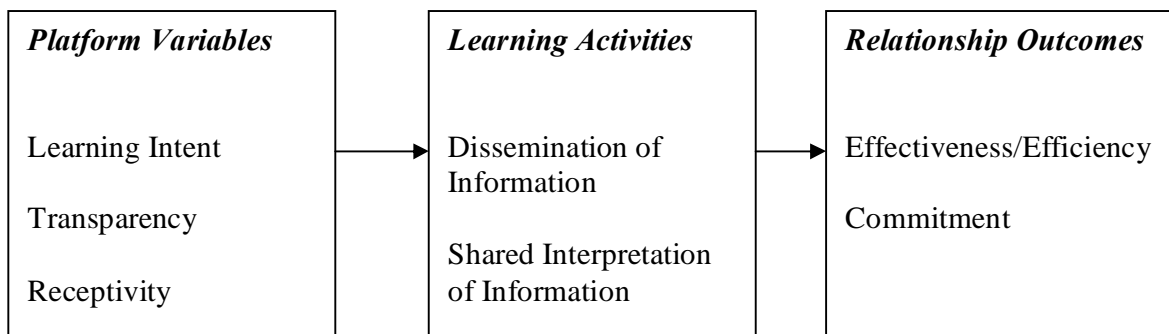


Figure 2: Learning Activities in Buyer-Seller Relationships  
 Source: Johnson, J. L. and Sohi, R. S., "The development of interfirm partnering competence: Platforms for learning, learning activities, and consequences of learning", *Journal of Business Research*, 56, 2003, page 759.

In a local production system, exchange and creation of knowledge takes place at both vertical dimension (Hakansson, 1987 and Gadde and Hakansson, 2001) and horizontal dimension (Maskell, 2001). Vertical dimension is the main carrier of inter-firm relationships. The presence of specialized suppliers, critical customers, and firm specialization with distinct capabilities generates a differentiated knowledge base, task portioning and deepens the division of labor. On the other hand, as the firms establish horizontal links, they are able to monitor, compare, select and imitate competitors' activities; engage in learning and continuous improvement by observing, discussing and comparing dissimilar solutions; share opportunities and threats; effectively share a communal social structure (Lorenzoni and Lipparini, 1999; Maskell and Lorenzen, 2004). The vertical and horizontal relations may sometimes overlap and agglomerated in a network of relationships. Schoenmakers and Duysters (2006) studied on the empirics of the relation between strategic

technology partnering and knowledge bases of firms in a cross-country setting. This study found that such types of partnering works as a significant tool for external knowledge acquisition for Fortune 500 firms in 1997. Johansson (2007) investigated the importance of founders' informal relations for corporate spin-offs for three spin-offs in Swedish telecommunications industry. One of the main findings of this study is that founders used their informal relations while they were acquiring resources. However, use of these relations tends to decrease the spin-off becomes mature.

In sum, the literature on theory of inter-firm relationships is considerably large and multi-dimensional. What we have done in this section is to underline the main theoretical underpinnings in conformity with the scope of the study. In sum, trust and power are the main driving forces of developing inter-firm relations in the context of cooperative and collaborative activities. These types of activities through learning and creating a knowledge base have significant repercussions on innovativeness and consequent competitive power.

The dynamics of technological change in industry is generally ignored for developing countries. However, in recent years, the developments in the course of global capitalism necessitate a framework to identify the dynamics of technological change in periphery. In this context, researchers discover the vital importance of differences in inter-firm relations in those countries. It can be hypothesized that the inter-firm relations, especially the informal ones, play a more important role for the development of local industry and, in turn, enhancement of innovative activities for the developing countries as compared to developed countries. The density and types of inter-firm relations accelerates the pace of technological change other than formal support to local industry. In other words, the policies for the support of local industry towards innovativeness and competitiveness should be incorporated with a rigorous attempt of identifying inter-firm relations.

Humphrey and Schmitz (1998) analyzed the trust and inter-firm relations in developing and transition economies. By assuming that an extended type of trust is necessary for sustaining the interdependence cooperation between firms seeking to compete in the world markets, they

examined India, Brazil, Pakistan, and former Soviet Union. The case of an Indian supply chain demonstrated the difficulty in constructing extended trust relationships where price-based competition is prevalent and relationship between customer and supplier is asymmetric. The cases of Brazil and Pakistan emphasize the significance of customary social networks for trust yet also exhibit that extended relies on economic and technical performance irrespective of social identity. In the former Soviet Union, it seems to be impossible to observe even minimal trust since reputation is slow to bite because of transition to market economy.

Meyer-Stamer (1998) analyzes industrial clusters in Santa Catarina state of Brazil where an enormously non-cooperative culture exists. However, firms try to alter their behavior toward cooperation and collective efficiency to the new conditions. These conditions comprise an existential crisis, the presence of change agents, and the existence of organizations they cause, and the presence of a role model that shows a possible alternative path for the adjustment process. The attempts to motivate cooperation between firms are observed.

In an attempt to study global competition and local cooperation, Schmitz (1999) inspects export-oriented firms in the south of Brazil. He finds out an intensified vertical cooperation in the footwear industry towards increasing product quality and speed of response. However, a significant improvement in export performance is not observed since some leading firms put their alliance with a major global buyer above cooperation with local firms and local policy problems. In a further study of local cooperation in industrial clusters of South Asia and Latin America, Schmitz (2000) ends up with three significant conclusions. First, cooperating firms seem to perform better. Second, the vertical cooperation is prevailing as a result of competitive pressures. Third, vertical cooperation arouses when major enhancements in quality and speed are entailed yet weakens subsequently. Visser (1999) investigates clusters of local garment industry in Peru. He finds that clustering brings advantages especially for small firms during the trade liberalization phase. The cost reductions and information spillovers through inter-firm linkages are the key advantages.

However, Visser (1999) claims that these advantages are not sufficient for competitiveness in the markets. The study calls for the urgent action for the inter-firm cooperation above local borders.

The study on Colombian fashion sector by Pietrobelli and Barrera (2002) verifies that the cluster is based on a low degree of firm specialization and poorly developed enterprise networks. This situation put barriers on attaining collective efficiency. They further analyze the backward and forward linkages. The analysis confirms that backward linkages are inadequately constructed whereas forward linkages are more robust. The retail chains are decisive in two analyzed clusters and through these chains networks are established in international markets. This study substantiates the previous analyses on Latin American clusters. Altenburg and Meyer-Stamer (1999) examined Latin American clusters in the context of ideal typologies of clusters, namely survival clusters of micro and small-scale firms, clusters of differentiated mass producers, and clusters of transnational corporations. According to this survey, many Latin American clusters consist almost exclusively of micro and small firms in activities with low barriers to entry, such as production of garments, shoes, furniture, and auto repair (Altenburg and Meyer-Stamer, 1999). However, they conclude that Latin American clusters are more complex and interactive clusters. Although resource-based clusters are very important, there is a highly heterogeneous structure. Rabelotti (1999) studies the effects on trade liberalization on the cooperative behavior of shoe firms in a local cluster of Mexico. He finds evidence on positive relation between cooperation and firms' performance. Moreover, the heterogeneous structure of Latin American clusters once again verified by this study. In a comparative study of internal heterogeneity of industrial districts in Italy, Brazil and Mexico, Rabelotti and Schmitz (1999) conclude that differentiation in size and performance in these industrial districts may limit the success of the district. They further support the view that deepening of division of labor between firms and heterogeneity of firms by process and product may be quite a contributing factor for the success yet the situation is different in the examined cases.

Sandee and Weijland (1989) study on changes in rural cottage industry clusters in Central Java, Indonesia. They examine the relations and dynamics of transition from household-based production to production by more specialized and productive units. The study concludes that the transition occurs in areas with access to wider markets and improved technology. Tewari (1999) analyzes Indian woolen knitwear cluster to grasp the facts for the adjustment in a labor-intensive export industry to external crises. The study outlines four significant factors for recovery. In the context of our study, Tewari (1999) observes that as direct ties with final buyers are important, feedback-intensive small-scale contracts directed through either small buyers or intermediaries may assist small or medium-size newcomers in the export sector to learn more effectively about new markets. They, in turn, absorb that learning more fully than the expansion of direct links between small producers and large foreign retail chains. The study provides further evidence that whereas the horizontal ties between firms are weak, the vertical cooperation among firms in the cluster is strong. Another factor for rapid recovery is the embedded character of production networks. The firms are successful to establish a dynamic middle-tier of locally-rooted exporters. These firms are able to lead the transformation of cluster. Knorringa (1999) also studies on Indian footwear cluster in Agra in order to explore how producers in a traditional cluster respond to changes in the global markets. Most of the firms in the cluster increased cooperation through vertical inter-firm relationships. However, relationships with other local producers seem to be unaffected. Surprisingly, Knorringa (1999) found a negative relationship between increased cooperation with other local producers and increased cooperation with buyers. In his study on Pakistan's surgical instrument cluster, Nadvi (1999) claims that to meet global quality standards necessitates greater local cooperation between producers and suppliers. The empirical evidence demonstrates that the pressure for these standards caused an upgrading in the sector involving more intensified joint action through vertical and horizontal ties. However, there are some fields of

collective failure because of the inability of cluster to deal with some collective problems such as inadequate infrastructure, low safety and health standards, use of child labor.

Although limited in number, we can see cluster studies in Africa. McCromick (1999) works on six case studies in Africa. The findings are not in line with the collective efficiency approach. The six case studies produce significant differences and illustrates that each group plays its own part in the industrialization process. Mc Cormick (1999) classifies these six cases under three headings, namely groundwork, industrializing, and complex industrial clusters. Among them, industrializing clusters provide more obvious evidence for collective efficiency. The higher specialization and segregation cause bilateral production linkages and higher efficiency and technology spillovers. Only in one cluster, as an example of complex industrial clusters, it is found that institutions facilitate collective action. Oyeyinka (2004) studies clusters in Nigeria in the context of networking, technical change and industrialization. Economic relations among group of firms have components of social embeddedness. The study provides support that investment decision of firms and cluster formation in rural clusters is based on ethnic, family, and geographic factors. On the other hand, social and professional networks based on educational attainment of owners replace ethnic and family ties in metropolitan clusters. It is interesting to note that the linkage with foreign firms is more critical for the rural cluster while the inter-firm links are more decisive in the metropolitan cluster. In the rural cluster, collaboration is with the input suppliers and trades within and outside the country yet it is in the form of maintenance, purchase of spares and sharing information on technical and market matters.

UNCTAD (1998) proposes a typology for clusters in a study of clusters in developing countries. It differentiates five types of clusters, namely informal clusters, organized clusters, innovative clusters, technology parks and incubators, export-processing zones. Five cases on Ghana, Pakistan, India, China, and Mexico are examined with reference to specific features. Among these specific features trust, cooperation, competition, and learning are noteworthy for our study. It is

found that trust is high especially in organized and innovative clusters. Moreover, there is a one-to-one relationship between trust and cooperation. Moreover, learning is also high in these clusters. However, such a relationship does not exist for competition. Almost in all types of clusters competition is high. Informal clusters composed of micro and small firms are main forms of clustering in developing countries. As noted by UNCTAD (1998), networking among firms in informal clusters tends to be low. Low level of trust and low level of information associated with a wild competition are main features in these clusters. As an attempt to offer policy recommendations, UNCTAD (1998) further notes that clustering and networking help SMEs to overcome the problems of isolation and powerlessness, thus, in turn, enhance their competitive capability through the emergence of linkages between firms providing economies of scale and scope.

One of the most comprehensive studies on Turkish clusters is carried out by Öz (2004). In this study, four different clusters of furniture, textile, carpet, and leather clothing are examined. The most striking finding in this study is that existence of strong cooperative mechanisms does not distinguish the relatively more competitive cases from the less competitive ones. Thus, Öz (2004) claims that spatial clustering is not a sole factor that ensures competitiveness. The common characteristics of competitive cases can be listed as along history in the general field of activity, a good resource base in the initial stages of development, an entrepreneurial outlook, the presence of related and supporting industries, competitive pressure, and accumulated know-how (Öz, 2004). Armatlı-Köroğlu (2004) and Eraydın and Armatlı-Köroğlu (2005) examine three clusters having different innovative capacities in Turkey. These studies find out differences in regional and external networks caused by the differences in production organization and historical differences. The extent of network relations changes from regional to international with an increase in innovative capacity. The customer and supplier networks are the prevailing type of network. In regional networks, trust seems to be an important variable. The studies further show the positive relation between the

density of regional networks and innovation capacity. Finally, they present evidence that firms in the global networks have higher number of innovations than firms with higher intensity of locally embedded linkages (Eraydın and Armatlı-Köroğlu, 2005). Oba and Semerciöz (2005) deal with the antecedents of trust in a Turkish industrial district. Three levels are determined in this study, namely institutional environment, institutional arrangements, and inter-firm exchanges. Almost all sample firms respond that in their relations with suppliers and customers transactions are not based on formal contracts. This is evaluated as a sign of trust-based inter-firm relations. The antecedents of trust in inter-firm relations are good reputation and repeated transactions. Firms in their transactions prefer more informal institutional arrangements. Finally, firms having trust-based relationships identify formal institutional arrangements as a barrier because of transaction costs. Oba and Semerciöz (2005) conclude that informal institutional arrangements are more significant than formal ones and reputation and expertise of other firms is more influential than family-friendship relations as antecedents of trust.

In sum, the rising number of studies on developing countries presents a somewhat differentiated structure as compared to the developed ones. The historical and geographical differences create different types of inter-firm relations. At one extreme, some studies claim that collectivity is not as important as some researchers thought. However, the available evidence still demonstrates that inter-firm relations and collaboration among firms is one of the major determinants of innovative capacity though not the only one.

### **The Data and Research Methodology**

Ankara 1 Industrial District was established in 1990. Ankara 1 Industrial district is one of the most important SME industry complexes in Turkey with an employment capacity of 25,000 and 189 places of manufacturing from several sectors. Machinery and equipment industry, iron industry, vehicle instrument industry, textile industry, petrochemical industry, electric-electronics

industry, construction industry, mining industry, plastic industry, aluminum industry are the main manufacturing sectors where 207 firms operate.

The study is a combination of theoretical and empirical work. The research methodology used for the study is questionnaire survey. The research sample is composed of 86 SMEs in Ankara 1 Industrial District in Sincan operating in the machinery and equipment sector. The empirical study is carried out in July-August 2006. The questionnaire is composed of five main parts, namely general establishment information, awareness about technological developments, innovativeness, relations with other establishments and institutions, and proximities. Most of the firms in the sample (79 firms) reported that they are engaged in innovative activities either in the form of product and process innovations and improvements. 71 firms out of 86 have made product innovations and/or improvements during the last five years, and 70 firms have realized process innovations and/or improvements.

In order to identify the factors determining innovativeness of the firms, various variables are created from the questionnaire. The qualitative dependent variable is the number of innovative activities in the form of product and process innovations and improvements (INN). This variable takes the value between 0 and 4. The independent variables are composite indices calculated from the responses of different questions. Four variables are defined to account for the impact of geographical proximities, GPID for industrial district, GPR for regional proximities, GPN for national proximities, and GPF for international proximities. AWARE measures the impact awareness of the firms about technological developments. LEARN stands for the influence of learning channels on innovative activities. TTRANS1 and TTRANS2 assess whether incoming and outgoing technology transfers have any effect on innovativeness. The organizational proximities are measured by OP through membership to professional organizations, supply chains, cooperative networks, support providers and other social organizations including associations and foundations. CRE questions the use of credits for financing innovative activities. COOP stands for the intensity of cooperative

relations with other firms while EXALL for all external relations with other institutions including other firms (suppliers, customers, competitors), universities, research centers, NGOs, etc. for main production activities. RDCOMP considers the effect R&D competitiveness of the establishment that measures the R&D intensity of the firm. Two different variables are generated for the absorptive capacity of the firms ABCAP and ABCAP25. The difference between these two variables is that ABCAP uses a broader definition of the absorptive capacity. ORGCAP denotes the organizational capacity of the firms. The problems experienced in hiring skilled labor is one of the main difficulties of firms in Turkish industrial district, thus LABORP measures this problem. The existence of business strategy is also an indispensable element for innovative activities. The elements of business strategy are measured by STRA. The lifetime of the firm is calculated by YEAR. Finally, the use of knowledge intensive business services is an important channel not only for consultation but for learning; KIBS represents this behavior of the firms. VALUE measures all types of social relations of the firm with the external environment including trust, culture, and other social relations. For all the variables described above, we expect positive and significant relations with the dependent variable. Furthermore, we also expect increasing magnitude of the coefficients as dependent variable takes values from 0 to 4, in other words, as innovative activities of the firm rise; the magnitude of the coefficients goes up.

The regression equation is estimated by multinomial logit using 82 valid observations. For the dependent variable (INN), the value 0 (no innovation) is treated as base. After various attempts, the independent variables in the equation are selected by using the correlations with the dependent variable and a stepwise estimation methodology is developed. We suppose that the determinants of the innovative activity for the product and process innovation may differ. Therefore, three different equations are estimated; one for all innovative activities and others for product and process innovations. This cause us to generate two more dependent variables PRTINN and PROINN taking values between 0 and 2.

## Discussion

The results for all innovative activities are presented at the first panel of Table 1. The methodology used has strikingly successful in which all the coefficients are statistically significant. Moreover, the estimated models have passed all the diagnostic tests. One of the most striking results is the unexpected negative and significant coefficient for GPID. The close geographical proximity in the industrial district has negative impact on innovativeness. The possible reason is the severe competition in the district. However, the geographical proximity in the region positively contributes to the innovative activities. Another unexpected outcome is observed for the organizational proximity. The membership to professional organizations, supply chains, cooperative networks, support providers and other social organizations do not bring about positive contribution for innovative capacity. Unfortunately, the intensity of such relations has negative impact. This means that necessary learning for innovation does not take place through these channels. Moreover, R&D intensity of the firms in our sample is far from providing a positive input for innovativeness of the firm. This situation, in fact verifies previous findings that Turkish firms do not attain a possible threshold level of R&D intensity for being innovative. Finally, external relations with other institutions such as other firms universities, research centers, NGOs, etc. for main production activities unexpectedly do not constitute a base for innovative activities inside the firm. In sum, it can be claimed that the firms in Sincan industrial district are unable to establish productive interfirm relations that positively contributes to their innovative activities. Furthermore, they are unable to do so with the external environment. However, the existing relations seem to impede their success for the innovative activities.

Table 1: Determinants of Innovative Activities in Sincan Industrial District

	(I)				(II)		(III)	
	(1)	(2)	(3)	(4)	(1)	(2)	(1)	(2)
GPID	-12.937 (17.11)**	-12.947 (18.27)**	-12.856 (20.30)**	-13.155 (15.84)**	-0.089 (1.11)	-0.227 (3.24)**	4.622 ( )	4.632 (67.29)**
GPR	12.031 (20.61)**	12.040 (21.81)**	12.029 (21.42)**	12.197 (20.77)**	0.097 (1.35)	0.186 (2.26)*	4.065 ( )	4.097 ( )
GPN	-4.852 (23.00)**	-4.802 (24.23)**	-4.689 (22.85)**	-4.831 (24.75)**	0.040 (0.58)	0.029 (0.39)	-3.538 (33.80)**	-3.538 ( )
GPF	3.661 (18.87)**	3.745 (19.07)**	3.724 (18.89)**	3.800 (20.20)**	0.125 (2.11)*	0.118 (1.84)	4.086 (13.95)**	4.062 (12.79)**
AWARE	8.679 (14.90)**	8.533 (16.07)**	8.472 (13.34)**	8.722 (19.17)**	0.035 (0.69)	0.083 (1.22)	-0.354 ( )	-0.296 (1.72)
LEARN	6.962 (18.15)**	6.896 (17.39)**	6.984 (16.98)**	7.014 (18.60)**	0.011 (0.35)	0.004 (0.12)	6.170 ( )	6.240 ( )
TTRANS2	150.972 (17.47)**	151.588 (19.09)**	149.868 (18.85)**	154.095 (18.17)**	0.068 (1.01)	0.170 (2.01)*	5.710 (30.87)**	5.719 (18.77)**
OP	-6.868 (10.24)**	-7.376 (12.01)**	-7.135 (11.04)**	-7.786 (11.04)**	-0.041 (0.50)	-0.080 (0.81)	83.590 (16.84)**	83.712 (14.93)**
CRE	77.455 (16.57)**	77.194 (17.59)**	77.830 (17.30)**	78.434 (16.36)**	0.087 (0.89)	-0.014 (0.12)	-25.291 ( )	-23.206 (21.13)**
COOP	147.980 (26.87)**	148.646 (27.04)**	148.398 (27.01)**	148.767 (27.62)**	0.090 (0.99)	-0.003 (0.03)	4.684 ( )	4.756 (59.43)**
RDCOMP	-4.536 (8.74)**	-4.532 (9.97)**	-4.472 (9.12)**	-4.241 (8.65)**	-3.456 (1.78)	-2.971 (1.72)	1.722 (21.68)**	1.583 ( )
ABCAP	2.304 (3.98)**	2.345 (4.24)**	2.615 (5.24)**	2.209 (3.97)**	86	86	YEAR 1.289 (6.27)**	1.311 ( )
ORGCAP	-3.360 (5.13)**	-3.261 (4.92)**	-3.625 (5.19)**	-3.393 (4.67)**			LABORP 141.772 ( )	141.015 ( )
EXALL	-8.004 (18.71)**	-7.932 (19.16)**	-7.980 (21.40)**	-7.947 (19.13)**			COOP 55.032 ( )	55.835 ( )
Constant	100.466 ( )	96.892 (25.20)**	87.919 (20.61)**	92.296 (19.78)**			EXALL -7.478 ( )	-7.471 ( )
Observations	82	82	82	82			RDCOMP -4.407 ( )	-4.304 (81.27)**
							VALUE -1.289 ( )	-1.127 (16.05)**
							Constant -271.679 (107.17)**	-273.782 ( )
							Observations	80

Robust z statistics in parentheses; \* significant at 5%; \*\* significant at 1%

The second panel of Table 1 shows the determinants of product innovations in Sincan industrial district. Although we do not obtain as many as significant coefficients in Panel (I), we do still have some significant coefficients. However, if the level of significance is raised to 10%, the number of significant coefficients will exactly increase which seems to be reasonable for such a study. The geographical proximity in the industrial district has again a negative impact on innovative activities denoted by the negative coefficient of GPID. The positive significant coefficient for GPR persists while RDCOMP changes its sign. In other words, R&D competitiveness has positive impact for product innovations.

As exhibited by the third panel of Table 1, the determinants of process innovations are quite different from the product innovations. Interestingly enough the closest geographical proximity (GPID) has a positive impact as with the most distant one (GPF). This means that the firms learn process innovations either from their neighbors in the industrial district or from relations with the foreign firms. The availability of knowledge intensive business services also provides a positive contribution which is logical considering the nature of process innovations since try and fail situation is more costly for process innovations as compared to product innovations. Thus, process innovations necessitate consultation to knowledge providers. Technology transfer from other firms has also positive impact which is natural because an incoming technology generally means restructuring in the context of process innovations. The existence of business strategy is also positive and significant. The positive and significant coefficient for the absorptive capacity variable notes that firms should have higher level of absorptive capacity for process innovations. However, the social relations with the external environment negatively add up for the innovativeness of the firms in our sample. This might be from the fact that those relations are not mature enough for successful innovative activities rather they hinder possibilities for fruitful cooperation. In conclusion, our presupposition about the different factors determining the product and process innovations has been verified by the results obtained from Panel (II) and Panel (III) of Table 1.

### **Concluding Remarks and Prospects for Future**

The existing study is an attempt to contribute to a growing literature on the relationships-innovation link in developing countries. The study provides evidence for this link for a group of firms in a Turkish industrial district. Two general conclusions are more important than the others: First, the existing interfirm relations and relations with the external environment have blocked the success of the firms for the innovative activities. Second, the determinants of product and process innovations are different. However, the present study is still continuing one especially in the context

of the second conclusion. The ultimate aim is to generalize a repeatable methodology and model on the determinants of innovation in terms of the interfirm relations. We still engage in research for Turkish industry with larger datasets for different sectors.

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### *Notes*

\* For a more recent detailed review of those concepts, see Basant, 2002.

<sup>2</sup> For a detailed discussion all available studies on knowledge flows and industrial clusters for developing countries, see Basant (2002)

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