

“Innovation and relationships in industrial districts: the case of Turkey”

AUTHORS	Özlem Özkanlı Erkan Erdil Erdal Akdeve
ARTICLE INFO	Özlem Özkanlı, Erkan Erdil and Erdal Akdeve (2008). Innovation and relationships in industrial districts: the case of Turkey. <i>Innovative Marketing</i> , 4(1)
RELEASED ON	Monday, 05 May 2008
JOURNAL	"Innovative Marketing "
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

© The author(s) 2025. This publication is an open access article.

Özlem Özkanlı (Turkey), Erkan Erdil (Turkey), Erdal Akdeve (Turkey)

Innovation and relationships in industrial districts: the case of Turkey

Abstract

Industrial districts (ID) and small scale industrial estates are important regional development tools that have been extensively utilized by the Turkish authorities as part of Turkish industrialization programs, with varying degrees of success. The empirical part of the study is carried out in one of the oldest industrial zones in Turkey, Ankara (Sincan) with 207 firms facilitating. Following the determination of innovative capacity of the firms, the study investigates the intra- and inter-ID firm relationships, and their possible implications for firm level innovation activity. At the first stage of this study, the purpose is to explore vertical I/O (input-output) inter-firm links. Following the relationship mapping, a background structure is obtained for supply chains and the relative focal firm positions are observed. The analysis of cross-tabulations provides valuable insights on the relationship between innovative capacity of firms and their interactions with the environment. According to a latest formal report, four firms from the district are placed among the 500 largest ones in Turkey. The results of the questionnaire which is applied to all firms in the district studied will further give evidence for developing Turkish ID innovation policies.

Keywords: inter-firm relations, innovation, industrial district, Turkey.

Introduction

The intra- and inter-ID firm relationships and their possible implications for firm level innovation activity have been widely examined in literature. However, existing literature has methodological and empirical difficulties. The methodological difficulty 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. Besides, the empirical difficulty consists in the geography of applications. Although the studies on developing countries are actually limited in number, most of the studies used data from the developed countries. The present study contributes to this inadequate literature on developing countries concentrating on Turkish industrial districts case.

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. This study is the first step to explore possible opportunities to analyze Turkish clusters with their own peculiarities. According to 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 are very important for innovation. 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 during this process.

In this study, the purpose is to explore vertical I/O (input-output) inter-firm links. Following the relationship mapping, a background structure is obtained for supply chains and the relative focal firm positions are observed. For this end, a survey is applied to all 207 firms facilitating at industrial zone in Ankara (Sincan).

The next section reviews the available evidence on inter-firm relations. Section 3 sums up research methodology and main characteristics of the firms in the sample. The analysis of cross-tabulations in Section 4 provides valuable insights on the relationship between innovative capacity of firms and their interactions with the environment. The results of the study will further give evidence for developing Turkish ID innovation policies.

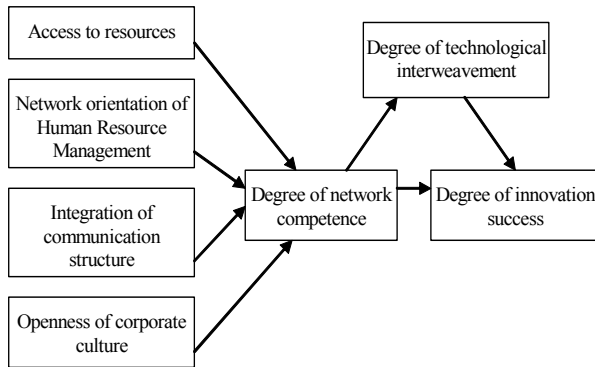
1. Inter-firm relations in retrospect

The literature review part of the study focuses on the firm innovation and relationships and the studies of inter-firm relationships in Turkey.

The network structures between markets and hierarchies are investigated in the literature (Thorelli, 1986; Easton and Araujo, 1994; Ford and McDowell, 1999; Hillebrand and Biemans, 2003). The relations linked to other relations resulting in a system of interdependent relations mechanism are explained in the study of Anderson et al. (1994). Wilkinson and Young (2002) mention exchange relations as well as other types of relations with actual and potential suppliers, other firms and organizations such as governmental instrumentalities and competitors. Firms that have a formal business plan or formal networks with other firms or R&D expenditure are also more likely to report an innovation (Harris, Rogers and Siouclis, 2003).

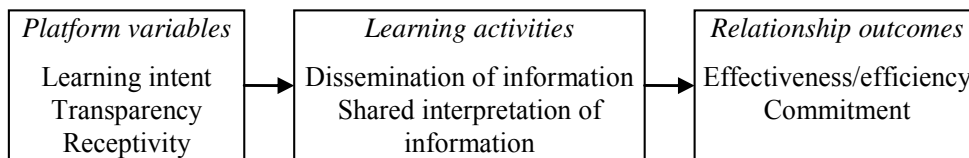
It is hypothesized by Ritter and Gemünden (2003) that a firm's degree of network competence has a positive impact on its degree of technological interweavement; a firm's degree of network competence has a positive impact on its innovation success; a firm's degree of technological interweavement has a 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. Figure 1 shows the antecedents and impacts of network competence.



Source: Ritter and Gemünden, (2003).

Fig. 1. Antecedents and impacts of network competence



Source: Johnson and Sohi, (2003).

Fig. 2. Learning activities in buyer-seller relationships

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. Armatlı-Köroğlu (2004) and Eraydın and Armatlı-Köroğlu (2005) investigated 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. Oba and Semerciöz (2005) noted the antecedents of trust in a Turkish industrial district and concluded that informal institutional arrangements are more significant than formal ones and reputation and expertise of other firms are more influential than family-friendship relations as antecedents of trust.

2. Research methodology and firm characteristics

The study is a combination of theoretical and empirical work. The research methodology used for the study is questionnaire survey. The research population is the firms in Ankara 1 Industrial District in Sincan.

Ankara 1 Industrial District which started for establishing at 1978 has been in operation since 1990. The district covers a total area of 400 hectares. 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 instru-

According to a study of Day (1994), Johnson and Sohi (2003) examined the impacts of inter-firm relationships on learning. Figure 2 shows their model of learning activities in buyer-seller relationships.

In a local production system, exchange and creation of knowledge take place at both vertical dimension (Hakansson, 1987; Hakansson and Johanson, 2001)¹. On the other hand, according to some researches (Lorenzoni and Lipparini, 1999; Maskell and Lorenzen, 2004) 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.

ment industry, textile industry, petrochemical industry, electric-electronics industry, construction industry, mining industry, plastic industry, aluminum industry are the main manufacturing sectors where 207 firms have facilitate.

The questionnaire is applied to all of the 207 firms operating in 18 different sectors in Ankara 1 Industrial District. For that reason, the response rate is 100%. The majority of the firms belong to metal industry (38.16%), machinery and equipment (13.53%). The average firm size is around 33 (Table 1). However, 47% of the firms can be treated as small-sized establishments employing 1-24 workers, and 47% of the firms are medium-sized establishments employing 25-150 workers². 6% of the firms do not respond to the size question. The number of employees is considered as determinant of the firms size in that case application.

The questionnaire is composed of eight parts, namely the information about the manager of the firm, the general information about the firm, systems and processes, the services obtained outside the firm, the performance of the firm, the future needs of the firm, clustering activities, the memberships to professional organizations. Thus, the questionnaire provides detailed information on the surveyed firms. In terms of

¹ For a more recent detailed review of those concepts, see Basant, (2002).

² The equality of the number of small and medium-sized firms occurs just by chance, it is not a result of a purposeful sample selection criteria.

the employee profile of the workers, it is found that 16.46% of the employees are university (12.63%) and higher vocational school (3.83%) graduates. On the other hand, 36.97% of the employees are graduated from the high school (22.72%) and vocational high school (14.25%). Overall, only 22.79% of the employees are endowed with some sort of a vocational education. Firms are also asked whether they engage in R&D activities. 53.14% of the firms in our sample claim that they engage in R&D activities. The ICT infrastructure of the firms is not as strong as expected. 78.74% of the firms have access to the internet while 58.94% have their own web pages. As a tool of increasing information flows inside the firm, 54.11% of the firms utilize an intra-firm network. The weakest point is observed for the B2B trade activities; only 17.39% of the firms in the sample are exploiting the advantages of B2B portals. Table 1 summarizes the main characteristics of the firms in the survey. As noted before, the average firm size is 33.29. Thus, the sample average indicates the dominance of the small-sized establishments. The average firm age is just above the age of the industrial district. The oldest firms are established in 1976 meaning that even for the oldest firms we are analyzing the development path for a thirty-year time span. Approximately one half of the firms in the district are exporters. The firms not exporting are reported that they have difficulties in access to global markets and in finding necessary resources (capital, technology, material, etc.).

Another important reason is the size of the domestic market. The domestic market is large enough for the sustainability of the firms. Considering that around 50% of the firms are exporters, some firms in our sample are not producing and exporting according to the global standards. 33.82% of the firms are producing in accordance with national standards. Almost 70% of the firms are planning new investments in the near future. The dominant investment motive is related with the production while about 15% of the firms are planning new R&D investments. More than one quarter of the establishments carry out test procedures by using their own laboratories whereas more than half of the firms apply to external laboratories. These figures show that around 20% of the firms do not use any test procedure during and after the production.

Table 1. Main characteristics of the firms in Ankara 1 Industrial District

Firm characteristics	
Average firm size (number of employees)	33.29
Average firm age	15.63
Exporter firms	50.24%
International standards certificates	38.65%
National standards certificates	33.82%
Trade mark ownership	43.96%

Planned investment	69.57%
Planned R&D investment	14.49%
Own laboratory	27.54%
Use of external laboratory	52.66%

In sum, the firms in a developing industrial district suffer from many structural problems. The significance of these problems is that they call for urgent mitigation measures. The structural character of the problems such as the improvements in financial and labor markets necessitates consistent long-term policies. An earlier study (Durgut and Erdil, 2005) verifies that these problems are not only relevant at the regional level but also at the national one.

3. Inter-firm relations in Ankara industrial district

In this section, what we aim is to unearth the inter-firm relations in Ankara industrial district. To this end, particular variables¹ are cross tabulated with clustering questions. We have basically six questions for clustering. We explore whether firms establish relations with other firms in the same industrial district, in the same province, in another province or abroad on certain grounds, namely machinery and equipment purchased, spare parts purchased, maintenance and repair service purchased, raw materials and intermediate goods purchased, products sold, and rival firms.

In fact, the firms are asked to list the geography of five different firms to which they have the listed relation. However, the review of the data demonstrates that only the responses for the first two firms produce noteworthy results². The table in the appendix part illustrates the results of cross tabulations. In terms of the export status of the firm, significant differences are observed for obtaining machinery and equipment for our sample. As expected, the export firms generally purchase machinery and equipment from abroad (35%) possibly because of attaining international standards in production.

On the other hand, non-exporters overwhelmingly obtain machinery and equipment from the firms in another province (41%). Because of the nature of the spare parts, maintenance and repair services and the need for on-time service, these services are acquired from the same province. This behavior is not differentiated in terms of the export status of the firm. Export firms relatively purchase raw materials and intermediate goods from abroad (13.9%) as compared to non-exporters

¹ These are the export status of the firm, trade mark ownership, use of own laboratory, use of external laboratory, attempts for product innovation and/or improvement, and need for product innovation and/or improvement.

² We summarized the results of the first firm in the manuscript. The detailed table in the appendix part illustrates the results of cross tabulations. The results of the answers for the second firm do not significantly diverge from the general conclusions.

(7.6%). Non-exporters generally acquire them from the same province (44.3%), while exporters – from the different province (36.6%). The export firms have also strong national and local market connections, 47% of the customers of those firms are in the same province as 29% of the customers are in the different province. The non-exporters also have weaker customer ties in the national market; they generally serve for the local market (45.8%). For non-exporters, most of the rival firms are established in the same industrial district (38.1%) and the same province (36.9%). The rival firms of the exporters are, in general, located in the same province (30%) and in the different province. The 16% of the exporters note that they have significant rival firms in the global markets. The main reason behind this low ratio is possibly due to insufficient information on international markets.

As the next point of the analysis, we concentrate on the registered trade mark. It is interesting to note that approximately one third of the firms having trade mark purchase machinery and equipment from abroad. The share of the same and different provinces is more or less same. The firms without trade mark generally obtain them from the same province (39.1%). For all categories of firms, the spare parts, maintenance and repair parts are commonly purchased from the same province. This fact is also valid for the raw material and intermediate goods purchases. The firms with trade mark are more inclined to obtain them from the world markets. Both the owners and non-owners of a trade mark sell their final goods mostly in the same province (44.3% and 53.5% respectively) even though trade mark-owners have more access to national markets (36.4%). Another interesting point is the fact that there are no significant differences between owners and non-owners in world markets. Thus, it is possible to conclude that trade mark-owners do not become globally known suppliers. The rivals of non-trade mark owners are located in the same district (43.7%), whereas the owner's rivals are generally in the different province (40.9%).

The firms having own laboratory purchase machinery and equipment more often from abroad (40%) due to the fact that R&D-based firms may transfer know-how from abroad as compared to others. Again the firms with own laboratory tend to obtain raw materials and intermediate goods from abroad as compared to non-owners of laboratory. The firms carrying out test and quality procedures inside the firm have more access to national markets (42.6%), while the local market is dominant for the others (53.4%). Such a differentiation is also observed for the case of the rival firms. The non-owners of a laboratory have more rivals inside the same indus-

trial district (36.6%) as the owners have more rivals in different provinces (40%). In percentage terms, the ratio of rivals in international markets for owners (14.5%) is double of the non-owners (7.6%).

External laboratory use for the case of machinery and equipment purchased is concentrated in the same province (36.2%) followed by other provinces (30.5%). The dominance of the same province is also observed for the case of spare parts purchased (50%), repair and maintenance services purchase (56.7%). Moreover, these firms more often obtain the raw materials and intermediate products again from the same province (37.1%). The consistency of the superiority of the same province is also observed for customers; the firms using external laboratories have more access to the local markets as compared to others (44.9%). The highest rate is reached for the same industrial district (36.6%). Finally, it is important to note that firms having own laboratory are more articulated to the national and international markets as compared to the firms using external laboratories.

The firms attempting product innovation and improvement develop more close relationships with the firms in the same province for all types of relationships we reviewed. However, more than one quarter of such firms purchase their machinery and equipment from abroad. The undeniable dominance of the same province alternative (34.8%) is also threatened for the case of rival firms by different provinces choice (33.3%). Thus, it is possible to claim that firms engaged with innovation activities have more access to national and international markets than the others. Finally, the same pattern is also observed for the answers on the needs for product innovation.

Concluding remarks and directions for future research

The results presented in this study are the early outcomes of a continuing study. However, even this early stage produces significant results on the attitudes of Turkish firms. It is argued that inter-firm relations and collaboration among firms is one of the determinants of innovative capacity. Our review of Ankara 1 Industrial District demonstrates the existence of some structural problems. Although more than half of the firms are somewhat integrated to the global markets through their exports, around one third of them do not have either a national or international standard's certificates. Moreover, the existence of financial problems and macro economic instability impede them to invest in R&D activities which in turn have critical repercussions on their innovative activities. The mismatch between the technology and the skilled labor seems to be another serious problem. The firms in the district have established close vertical I/O relationships with the local and national firms yet the links with the same industrial district seem to be the weakest meaning that

firms are not able to fully exploit the advantages of agglomeration, in other words, complementary relations such as providing repair and maintenance services do not exist. The relationships are generally established at the national level except for the cases of purchase of spare parts, repair and maintenance services as expected. Only for the case of machinery and equipment purchased, we perceived some international linkages.

In the next step of the research, for a sample of firms, the quality of the relations together with the impacts of these relations on the firm's performance will be examined. The existence of leading firms will also be investigated. The final stage will concentrate on those firms. In conclusion, this study is a contribution to the considerably poor literature on developing country experiences of inter-firms relations.

References

1. Anderson, J.C., Hakansson, H., and Johanson, J. Dyadic business relationships within a business network context // *Journal of Marketing*, 1994. – №58. – pp. 1-15.
2. Armatlı-Köroğlu, B. SME networks as new engines of economic development and innovativeness. Ph.D. dissertation. Ankara: Middle East Technical University, 2004.
3. Basant, R. Knowledge flows and industrial clusters. A background paper commissioned by the International Development Research Centre (IDRC), Canada, 2002.
4. Day, G.S. The capabilities of market-driven organizations // *Journal of Marketing*, 1994. – №58. – pp. 37-52.
5. Durgut, M. and Erdil, E. Firm Innovation and Relationships, The 13th International Forum on Technology Management, September 2005, Istanbul, Turkey, 2005.
6. Easton, G. and Araujo, L. Market exchange, social structures and time // *European Journal of Marketing*, 1994. – №28. – pp. 72-84.
7. Eraydın, A. and Armatlı-Köroğlu, B. Innovation, networking and the new industrial clusters: the characteristics of networks and local innovation capabilities in the Turkish industry clusters // *Entrepreneurship and Regional Development*, 2005. – №17. – pp. 237-266.
8. Ford D. and McDowell, R. Managing business relationships by analyzing the effects and value of different actions // *Industrial Marketing Management*, 1999. – №28. – pp. 429-442.
9. Hakansson, H. *Industrial Technological Development*. – London: Routledge, 1987.
10. Hakansson, H. and Johanson, J. *Business Network Learning*. – New York: Pergamon Press, 2001.
11. Harris, M.N., Rogers, M. and Siouclis, A. Modelling firm innovation using panel probit estimators // *Applied Economic Letters*, 2003. – №10. – pp. 683-686.
12. Hillebrand, B. and Biemans, W.G. The relationship between internal and external cooperation: literature review and propositions // *Journal of Business Research*, 2003. – №56. – pp. 735-743.
13. Johnson, J.L. and Sohi, R.S. The development of inter-firm partnering competence: Platforms for learning, learning activities, and consequences of learning // *Journal of Business Research*, 2003. – №56. – pp. 757-766.
14. Lundvall, B.-A. *Product Innovation and User-Producer Interaction*. – Aalborg: Aalborg Universitetsforlag, 1985.
15. Lorenzoni G. and Lipparini, A. The leveraging of inter-firm relationships as a distinctive organizational capability: A longitudinal study // *Strategic Management Journal*, 1999. – №20. – pp. 317-338.
16. Maskell, P. Towards a knowledge-based theory of the geographical cluster // *Industrial and Corporate Change*, 2001. – №10. – pp. 921-943.
17. Maskell, P. and Lorenzen M. The cluster as market organization // *Urban Studies*, 2004. – №41. – pp. 991-1009.
18. Oba, B. and Semerciöz, F. Antecedents of trust in industrial districts: an empirical analysis of inter-firm relations in a Turkish industrial district // *Entrepreneurship and Regional Development*, 2005. – №17. – pp. 163-182.
19. Öz, Ö. *Clusters and Competitive Advantage*. – New York: Palgrave MacMillan, 2004.
20. Ritter, T. and Gemünden, H.G. Network Competence: Its impact on innovation success and its antecedents // *Journal of Business Research*, 2003. – №56. – pp. 745-755.
21. Thorelli, H. B. Networks: between markets and hierarchies // *Strategic Management Journal*, 1986. – №7. – pp. 37-51.
22. Wilkinson, I. and Young, L. On cooperating firms, relations and networks // *Journal of Business Research*, 2002. – №55. – pp. 123-132.

