

**ANALYSIS OF THE IMPACT OF THE INTER-FIRM  
COLLABORATION ON INNOVATION: ANKARA  
IVEDIK ORGANIZED INDUSTRIAL ZONE  
MEDICAL SECTOR**

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**FEBRUARY 2015**

## Approval of the Institute of Social Sciences

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## **PLAGIARISM PAGE**

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## **ABSTRACT**

### **ANALYSIS OF THE IMPACT OF THE INTER-FIRM COLLABORATION ON INNOVATION: ANKARA IVEDİK ORGANIZED INDUSTRIAL ZONE MEDICAL SECTOR**

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Despite the general idea of collaboration within clusters leads more innovative activities, there is not enough empirical work for justifying. This thesis examines the relation between inter-firm collaboration and innovation within Medical Sector Cluster firms of Ivedik Organized Industrial Zone in Ankara, Turkey. A questionnaire is applied to 44 firms of the cluster to collect data and measure the firms' collaboration existed for innovation, to find the innovation dynamics that characterize the cluster and to see how collaboration is carried out between firms. Results implied that firms tend not to collaborate within the cluster, therefore there is not a significant relation between collaboration and innovation within the cluster although innovative activities exists. Reluctance of the firms to collaborate was explained by trust problems and by the fact that most firms procure technologies from outside of Turkey. This thesis also provides some useful recommendations for further studies on the collaboration and innovation topics within clusters of Turkey.

**Keywords:** Clusters, Innovation, Collaboration, Medical Sector, Small and Medium Sized Enterprises (SMEs)

## ÖZET

### **FİRMALAR ARASI İŞBİRLİKLERİNİN İNOVASYONA ETKİSİNİN ANALİZİ: ANKARA İVEDİK ORGANİZE SANAYİ BÖLGESİ MEDİKAL SEKTÖRÜ**

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**Şubat, 2015**

Kümelerde firmalar arası işbirliklerinin inovasyon faaliyetlerini artırdığına yönelik genel kanıya rağmen, bunu doğrulayacak yeterli ampirik çalışma bulunmamaktadır. Bu tezde İvedik Organize Sanayi Bölgesi Medikal Sektör Kümelenmesi firmaları arasındaki işbirliğinin inovasyonla olan ilişkisi incelenmektedir. Kümelenmeyi karakterize eden inovasyon dinamiklerinin belirlenmesi, firmalar arası inovasyona dönük işbirliklerinin ölçülmesi ve firmalar arası işbirliği düzeyinin belirlenmesine yönelik veri elde etmek amacıyla kümedeki 44 firmaya anket uygulanmıştır. Sonuçlara göre küme içinde inovatif aktivitelerin olmasına rağmen, firmaların işbirliğine yanaşmadıkları ve bu nedenle inovasyon üzerinde firmalar arası işbirliğinin anlamlı bir etkisinin olmadığı görülmüştür. Firmaların işbirliğine isteksiz olmaları yaşanan güven problemleri ve yurtdışından teknoloji ithali yapılması ile açıklanmıştır. Bu tez aynı zamanda, gelecekte Türkiye'deki kümelerde işbirliği ve inovasyon konularında çalışma yapmak isteyenlere yönelik yararlı tavsiyelerde bulunmaktadır.

**Anahtar Kelimeler:** Kümeler, İnovasyon, İşbirlikleri, Medikal Sektörü, Küçük ve Orta Büyüklükteki İşletmeler (KOBİler)

## **DEDICATION**

To my family and beloved friends

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## **LIST OF ABBREVIATIONS**

Asymp. Sig.	Asymptotic Significance
df	Degrees of Freedom
GDP	Gross Domestic Product
GREMI	Groupement Europeen des Milieux Innovateurs
IT	Information Technologies
MEDICAPLAT	Ivedik OIZ Medical Sector Platform
OIZ	Organized Industrial Zone
R&D	Research & Development
SMEs	Small and Medium Enterprises
TRNC	Turkish Republic of Northern Cyprus
TTO	Technology Transfer Office
USA	United States of America

# 1 INTRODUCTION

## 1.1 Background

*“Great discoveries and improvements invariably involve the cooperation of many minds.” (Alexander Graham Bell, somewhere between 1847-1922)*

Bell did realize the importance of collaboration when there is a will for discovering something new. It's comparatively a new subject of interest in practice and science that collaboration and innovation relation (Grant and Baden Fuller, 2004; Linnarson, 2005; Hagedoorn, 2002). Leifer, McDermott, Colarelli-O'Connor, Peters, Rice & Veryzer. (2000) and Linnarson, (2005) claimed that inter-firm research & development (R&D) collaborations provide opportunities for companies to reduce R&D expenses, decrease marketing time and minimize the risk of missing new opportunities and make firms more flexible. It also solves the problem of accessing missing competences (Leifer et al, 2001), since innovations require knowledge from diverse areas of competence and sources (Schmickl and Kieser, 2007). For a company, identifying the value of external knowledge, adjusting and applying it to its internal processes are important to develop its innovative capability (Cohen and Levinthal, 1990).

Recently, Turkey has started to aggressively develop policies and establish institutes to create inter-firm collaboration between companies by supporting industrial clusters and innovation activities. When we investigate the government strategy on clusters and innovation policy in Turkey; it can be noticed that popularity of the concepts attracted attention of policy makers as much as scholars. However, there is a misunderstanding and misuse of the concepts themselves. Government tends to name any agglomeration as potential clusters without examining if there is a collaborative environment or not. Similarly, the effect of the geographical proximity on innovation activities of the firms is questionable.

Particularly in Organized Industrial Zones (OIZ), a suitable climate is tried to be built for clustering among firms within the same sectors. Major focus of government policies and cluster support programs through OIZs is to develop clusters and increase innovative activities in sectors that have high potential.

## **1.2 Problem Discussion**

The term of innovation is widely used in both business practice and academia with many definitions, however it should not be restricted just to novelty of the product or service (Christensen & Raynor, 2003). Scholars have been trying to find a comprehensive definition that includes all aspects of the innovation, such as change, advantage and novelty (Berthon, Hulbert, & Pitt, 2004). Scholars agree on the idea that there should be a distinction between invention and innovation; in contrast to the fact that innovation is simply commercialized as inventions (Solow, 1957). Innovations are important as central economic drivers (Schumpeter, 1934; Schmookler, 1962) and this importance increases when there is a technological aspect, sometimes influencing the industry as a whole and leading change (e.g. Apple's iPod, or the Internet) (Solow, 1957; Chilver, 1991; Syrett & Lammiman, 2002). To be able to introduce technological innovation is the dream of most firms, since it provides immense competitive edge (Lawless, 1996).

In order to successfully adopt and commercialize innovation a firm should combine complex human and capital resources in addition to the proper diffusion and distribution techniques (Jorde & Teece, 1990). This complexity created two different strategy; first claiming that innovation processes should be protected against rivals to ensure competitive advantage (Barney, 1991); while other side emphasizing the importance of collaborative strategy based on knowledge transfer, networks and ecosystems (Adner, 2006). Barney (1991) suggested that firms should gain competitive advantage by having valuable, rare, inimitable, non-substitutable resources (VRIN) that they should turn these resources into core competencies and capabilities. In the case of technological innovations, maintaining the core competencies and resources related to technological innovation and isolating mechanisms become critical (Rumelt, 1984; Bharadwaj, Varadarajan, & Fahy, 1993). Moreover, Conner & Pralahad (1996) went one step further and claimed that knowledge is the most important resource within the resource based perspective.

While the resource based views have some true extents (Gomes, Hoche-Mong, Hoche-Mong, Ivanek, & Wakelin, 1991), recent theories concentrate on the collaboration and innovation relationship, and indicate that technological innovations cannot be realized in isolated environments (Teece, 1990; Jorde & Teece, 1990; Khanna, Gulati, & Nohria, 1998; Adner, 2006). Therefore, technological innovations require complex supportive services and processes which are very hard for a firm to handle on its own (Teece, 1990).

The concept also attracts attention of the innovative companies as much as of academia, in order to deal with continuously changing and challenging environment. These companies need to analyze the consequences of selection between these two alternatives, competition and collaboration, and decide their positions between these two extremes (Conner & Pralahad, 1996). Teece sums up this dilemma quite well:

*“Competition is essential to the innovation process and to capitalist economic development more generally. But so is cooperation. The challenge to policy analysts and to managers is to find the right balance of competition and cooperation, and the appropriate institutional structures within which competition and cooperation ought to take place.” (Teece, 1990, p. 1).*

Taking into consideration of this debate and current situation in Turkey, this thesis focuses on the relation between collaboration and innovative performance of firms in Medical Cluster of Ivedik Organized Industrial Zone (OIZ), which is one of the biggest OIZs in Ankara, providing a good illustration of the classical firm collaboration effort of policy makers. It is the common idea that collaboration in high-tech industries, like medical sector, is not just a contractual exchange but reflects a critical role for conforming rapidly changing developments (Powell, Koput, & Smith-doerr, 1996). Thus, it is important to test the validity of this argument in a cluster.

#### ***Medical Sector Platform (MEDICAPLAT):***

MEDICAPLAT was established in 2012, under the project of “Establishment of Ankara Ivedik Organized Industrial Zone Medical Technology Transfer, Industrial Design and Commercialization Center” which was supported by Ankara Development Agency.



MEDICAPLAT aims to increase the competition, innovation and production capacity of the firms in Medical Sector Cluster of Ivedik OIZ. They are providing free consultancy on project development, product design, business development, technology development, patent application and exports. There are 49 medical firms operating in MEDICAPLAT.

### **1.3 Purpose**

This thesis aims to test the impact of the inter-firm collaboration on innovation activities of the firms in Medical Sector Cluster of Ivedik OIZ (Medical Sector Platform – MEDICAPLAT), Ankara. In undertaking this, it is hoped to strengthen the theoretical framework of inter-firm collaboration on innovation process occurring related to the problems of cooperation and coordination in industrial clusters.

### **1.4 Research Questions**

To fulfill this purpose thesis will try to answer the following three research questions:

- RQ1: What are the innovation dynamics that characterize Medical Sector Cluster of Ivedik OIZ (Medical Sector Platform – MEDICAPLAT)
- RQ2: Is collaboration for innovation existent in this sector and to what extent?
- RQ3: How is collaboration then carried out on innovation in such a complex environment between companies in cluster?

### **1.5 Limitations**

This study is focusing only on the aspect of innovation in inter-firm collaborations in clusters. The aspect of innovation, regarding the internal works of the company, is not included in this thesis. The study is also limited to the companies in Medical Cluster of Ivedik Organized Industrial Zone (OIZ).

## **2 MEDICAL SECTOR**

### **2.1 Medical Sector in the World**

Medical industry had become a worldwide strategic sector recently, specifically in the last 50 years there had been important technological changes and developments. After 1960s there were critical amounts of investment into the sector and by the 1970s sector gained a huge capacity. Today, with approximately 300.000 products range, medical sector is highly innovative and day by day new product innovations emerge (Ivedik OSB, 2013).

With recent economic developments competition in the global medical market increased. Countries being more innovative and having more technological capacity are the leaders of the sector, United States of America (USA) has been dominating the market for years. There are approximately 1 million firms operating in the sector worldwide and 1.000 of them are the leader companies by having 90% market share. Sector conditions require huge amounts of investments and only big-sized firms could provide these amounts. Especially in high technology required products, developed countries' firms have been controlling the sector and those firms face some difficulties to catch up with developed countries' technologies and investments.

Innovative aspect of the sector is related with multi-disciplinary characteristic of medical industry. When we examine the development of medical sector before 1950s, we see that the sector benefited from basic science disciplines such as chemistry, physics and biology. Recently new inventions and technology development in the sector have created new areas such as biomedical, nanotechnology, biotechnology etc. Another important area related to the development of medical sector is information technologies (IT) which are widely used in the diagnostic and monitoring equipment.

According to the Medical Sector Analysis report of Ivedik sector had 600 billion dollars of trade capacity in 2012. USA, China, Germany and Japan are the leader countries in terms of both import and export (Ivedik OSB, 2013).

**Table 1 Top 5 Export / Import Countries in Medical Sector in 2012 (1000 dollars)**

<b>Country</b>	<b>Import</b>	<b>Export</b>
USA	48.570.832	52.657.971
China	24.464.674	22.966.803
Germany	21.846.801	38.203.317
Japan	17.879.460	17.539.918
Netherlands	15.198.309	19.506.924

Resource: Ivedik OSB (2013)

USA, China, Germany, Japan and Netherlands are leading countries in medical sector products' import & export. These five countries control half of the total international trade. China has been increasing its share in recent years, USA and Germany are traditionally big players in the sector by taking advantage of their old investments.

### **2.1.1 Healthcare Consumption**

Health care consumption in the world have been increasing recently and have made medical industry prior sector for most of the countries. According to OECD data overall health care consumption accounted for 9,3% of Gross Domestic Products (GDPs) on average across OECD countries in 2012. USA consumption on health care accounted for 16.9%, while this proportion was only 5,4% in Turkey. Table below summarizes the healthcare consumption proportions of OECD countries in their GDPs.

**Table 2 Healthcare Consumption of OECD Countries by % of GDP between 2009-2012**

Country / Year	2009	2010	2011	2012
Austria	11,17	11,13	10,87	11,10
Belgium	<b>10,65</b>	<b>10,56</b>	<b>10,61</b>	<b>10,89</b>
Canada	11,12	11,11	10,94	10,93
Denmark	<b>11,47</b>	<b>11,08</b>	<b>10,87</b>	<b>10,98</b>
Finland	9,17	8,99	8,95	9,09
France	<b>11,60</b>	<b>11,55</b>	<b>11,52</b>	<b>11,61</b>
Germany	11,75	11,56	11,25	11,27
Greece	<b>10,19</b>	<b>9,48</b>	<b>9,79</b>	<b>9,27</b>
Hungary	7,74	8,06	8,03	7,97
Israel	<b>7,30</b>	<b>7,27</b>	<b>7,30</b>	<b>7,35</b>
Italy	9,40	9,41	9,25	9,19
Japan	<b>9,53</b>	<b>9,59</b>	<b>10,08</b>	<b>10,28</b>
Korea	7,19	7,33	7,42	7,63
Netherlands	<b>11,88</b>	<b>12,15</b>	<b>12,10</b>	..
Norway	9,67	9,42	9,28	9,28
Poland	<b>7,21</b>	<b>7,02</b>	<b>6,87</b>	<b>6,76</b>
Slovak Republic	9,15	8,51	7,96	8,15
Slovenia	<b>9,38</b>	<b>9,07</b>	<b>9,08</b>	<b>9,37</b>
Spain	9,60	9,65	9,44	9,29
Sweden	<b>9,94</b>	<b>9,47</b>	<b>9,49</b>	<b>9,58</b>
Switzerland	11,00	10,91	11,05	11,43
Turkey	<b>6,08</b>	<b>5,61</b>	<b>5,29</b>	<b>5,39</b>
United Kingdom	9,73	9,37	9,23	9,27
United States	<b>17,05</b>	<b>17,05</b>	<b>17,02</b>	<b>16,90</b>

Resource: OECD.StatExtracts (n.d.)

When the sources of consumption in Turkey are investigated, studies show that most of them were made by government. Only 1,3% of the consumption was made by private sector, 4,1% was made by government. In USA, private sector consumption on health accounted for 8,9% of the GDP which was more than the government consumption of 8,0%. Consumption on health care in Turkey falls behind the average in OECD countries. As a developing country, Turkey provides investment opportunities in medical sector, considering that eventually the country will reach the OECD countries' health care consumption level.

## 2.2 Medical Sector in Turkey

Medical sector in Turkey has been growing in recent years. Fundamental health care delivery system reform initiatives had been undertaken by the government after 2005. (Tatar, Ozgen, Sahin, Belli, & Berman, 2007) Health care system was very fragmented and ineffective before 2005 (Tatar & Kanavos, 2006). These reforms and regulations positively affected and accelerated the medical sector (Türkiye Odalar ve Borsalar Birliği, 2009). Additionally, in recent years demand for quality health care services have been increasing and many new public and private hospitals have been established to satisfy the demand increase. More than 6.000 firms in the medical sector work for satisfying the customer demand and try to adapt themselves to new technologies and innovations in health care industry (Batı Akdeniz Kalkınma Ajansı, 2012).

In medical sector report of TOBB (Turkey Union of Chambers and Commodity Exchanges), it is stated that according to the ISIC (International Standard Industrial Classification) medical sector products provide 13<sup>th</sup> most value addition to the Turkish economy. Sector has a large product range, main products which are produced in Turkey listed below (Türkiye Odalar ve Borsalar Birliği, 2009):

**Table 3 Main Medical Products Produced in Turkey**

- operating tables and lamps,
- anesthesia devices,
- gynecological tables,
- surgical aspirators,
- oxygen delivery devices,
- x-ray devices,
- syringes,
- needles,
- steam and dry air sterilizers,
- medical gas systems,
- elastic bandages,
- patient beds,
- dental units,
- surgical instruments,
- drainage stents,
- catheters and probes,
- litter,
- blood and blood products,
- blood bags,
- surgical and examination gloves,
- bedside monitors,
- orthopedic prostheses,
- orthopedic repair materials,
- surgical drapes and catgut,
- centrifuges,
- gauze and cotton,

**Table 3 (continued) Main Medical Products Produced in Turkey**

- electro cautery,
- x-ray bathroom solutions,
- sutures,
- dental restoration materials,
- medical masks,
- blood storage cabinets,
- bio-carriers,
- defibrillator,
- serum sets
- stainless steel

When the regional concentration of the medical sector production is examined, it is seen that İstanbul is the center of production. Ankara and then İzmir follow İstanbul with their production level. Other industry cities such as Bursa, Eskişehir, Gaziantep, Kayseri, Denizli, Kocaeli and Samsun also have production potential. (Türkiye Odalar ve Borsalar Birliği, 2009)

According to the data from Technology Development Foundation of Turkey (TTGV) report, there were 1.548 registered medical firms as producers and 2.100 registered medical firms as importers in 2012. Additionally there were 9.316 registered retailers in the sector. Medical sector production in Turkey is fully controlled by private sector firms. Government does not intervene in the production, but is the main purchaser of these medical products (Türkiye Teknoloji Geliştirme Vakfı, August 2013).

### **2.2.1 Export & Import of Turkey**

Turkey had increased its export amounts in medical sector recently. In 2012, Turkey had realized 500 million dollars of export mainly to the countries Germany, Iraq, France, Azerbaijan and Iran. Following table summarizes the export amounts to top 5 countries

**Table 4 2009-2012 Top 5 Countries Turkey Exported Medical Sector Products (1000 USD)**

Country	2009	2010	2011	2012
Germany	30.578	37.246	47.122	45.578
Iraq	11.137	20.981	23.037	42.148
France	27.775	27.744	34.898	31.687
Azerbaijan	20.198	18.515	21.161	25.387
Iran	8.587	13.781	23.386	22.904

**Resource:** Ivedik OSB (2013)

When import amounts are examined, it can be derived that Turkey is an importer of medical sector products. In 2012, Turkey realized 3 billion dollars of import. USA is the number one importer of Turkey with over 500 million dollars of sales.

**Table 5 2009-2012 Top 5 Countries Turkey Imported Medical Sector Products (1000 USD)**

Country	2009	2010	2011	2012
USA	423.828	450.227	492.351	521.527
Germany	396.360	401.303	478.239	455.218
China	254.384	313.665	425.582	452.218
Italy	159.759	185.881	306.110	242.865
Japan	89.421	96.466	111.715	105.005

Resource: Ivedik OSB (2013)

As it can be derived from the tables, Turkey had a trade deficit in 2,5 billion dollars in 2012, indicating that medical sector has a dependency on foreign sources.

### **2.3 R&D and Innovation in medical sector**

Recent development in medical sector illustrated that R&D and innovation are very critical factors for development and sustainability of the industry. Both in diagnosis and treatment level of diseases, each day new technologies occur and new inventions are made.

Big firms which dominate 80% of the medical sector market allocate 9% of their budget to R&D activities. This situation shows that being leader in the market is highly related to the R&D investment and innovation capability of the firms (Ivedik OSB, 2013).

When the condition in Turkey is examined, we see that medical sector firms generally make productions which require lower technologies. The R&D investments of the firms are not sufficient and government supports on innovation are not enough. There are some firms that newly invest in R&D and try to obtain product innovation. However, Turkey still falls behind leader countries in terms of developing new product innovations in medical sector (Ivedik OSB, 2013).

In process of EU harmonization, most of the medical sector firms try to adapt and develop their quality standards. Medical sector's large product range caused variations of new product technologies. In order to keep up with the new electronic and digital changes in the sector medical firms began to make investments on R&D and new product development. Additionally, EU harmonization process requires high quality standards (such as Conformité Européenne (CE) mark). These standards must also be applied within the domestic sales which have been already mandatory for exporters to sell certain products in European Economic Area. These factors contribute the capacity and quality development of the medical sector firms in Turkey. (Türkiye Odalar ve Borsalar Birliği, 2009)

#### **2.4 Human Resources in medical sector**

Medical sector requires specialization in terms of human resources and making serious investments in developing human capital. Qualified employees are required from the beginning of the production processes before the sales and after sale services. Moreover, expert human resources are required in usage and maintenance of delicate medical products. Under considering these circumstances, medical sector provides opportunity for high quality and skilled employment creation.

According to the report of BAKA (Batı Akdeniz Kalkınma Ajansı, 2012), in EU approximately 22.500 medical sector firms employ half million people. Countries like Germany and UK have high proportions of employment in medical sector, 25,3% and 13,8% respectively. In Turkey, medical sector provides only 0,9% of the total employment. (Türkiye Odalar ve Borsalar Birliği, 2009)

#### **2.5 Medical Sector in Ankara**

Based on the information from the Medical Device Sector Report of Development Bank of Turkey, Ankara medical firms have a foreign trade volume of 477 million dollars in 2011. 90% of this amount consist of imports. Although the export proportion is very low, it has been increasing in recent years. In 2002, the exports constituted only 5% of total foreign trade, this percentage had increased to 10,6% in 2011. In this year, Ankara provided 24% of the total exports of Turkey. 7,1 million dollars of export volume in 2002 had increased to 50,4 million dollars in 2011. On the other hand 135,1 million dollars of import volume had



increased to 426,2 million dollars from 2002 to 2011. (Türkiye Kalkınma Bankası A.Ş.Ekonomik ve Sosyal Araştırmalar Müdürlüğü, January 2013).

**Table 6 Ankara Medical Sector Devices Foreign Trade (in million USD)**

<b>Years</b>	<b>Export</b>	<b>Import</b>	<b>Foreign Trade Volume</b>	<b>Foreign Trade Deficit</b>	<b>Coverage Ratio</b>
<b>2002</b>	7,1	135,1	142,2	-128,0	5,3%
<b>2003</b>	9,3	161,3	170,6	-152,0	5,8%
<b>2004</b>	11,0	222,2	233,2	-211,2	5,0%
<b>2005</b>	21,5	296,3	317,8	-274,8	7,3%
<b>2006</b>	27,6	342,2	369,8	-314,6	8,1%
<b>2007</b>	36,5	418,0	454,5	-381,5	8,7%
<b>2008</b>	36,9	386,1	423,0	-349,2	9,6%
<b>2009</b>	38,4	342,8	381,2	-304,4	11,2%
<b>2010</b>	39,6	392,7	432,3	-353,1	10,1%
<b>2011</b>	50,4	426,2	476,6	-375,8	11,8%
<b>Increase from 2002 to 2011</b>	21,8%	12,8%	13,4%	12,0%	

Resource: (Türkiye Kalkınma Bankası A.Ş.Ekonomik ve Sosyal Araştırmalar Müdürlüğü, January 2013).

As illustrated in Table 6, between 2002 and 2011 foreign trade volume of Ankara in medical sector had increased 13,4% on yearly basis, while import and export volumes had increased 12,8% and 21,8% each year respectively. When general situation in Turkey is examined, it is seen that between 2003 and 2011 foreign trade volume had increased 13,8% each year. This volume increase had been realized as 17,2% in export and 13,5% in import.

Following İstanbul, Ankara is the second largest importer and exporter of the sector. By 2011 İstanbul constituted 44,4% of total exports and Ankara had 23,5% of the exports. When import volumes is examined, it is seen that İstanbul imported 64,7% of total medical products and Ankara followed it by importing 24%.

### **2.5.1 Distribution of the Foreign Trade by Countries**

According to the report of Ankara Development Bank (January 2013) the biggest exporter countries of medical sector devices of Ankara are Azerbaijan, Iraq, Germany, Turkish Republic of Northern Cyprus (TRNC) and USA. Between 2009 and 2011 export volume of Ankara had increased by 31,4%. In 2011, the number of countries where Ankara sell medical devices had increased to 125 from 113 in 2009.

The biggest importer countries of Ankara medical sector devices are USA, Germany, China, Japan and Switzerland. In 2011, total import amount was realized as 263 million dollars which constituted 62% of total imports of Ankara. Between 2009 and 2011 import volume of Ankara had increased by 24,3% however, the number of countries did not change.

### **2.5.2 Activities Related to Medical Sector in Ankara**

There are three main centers which focus on medical sector activities in Ankara: (1) Hacettepe Technocity – Technology Transfer Office, (2) OSTIM Medical Sector Cluster and (3) Ivedik OIZ Medical Sector Platform (MEDICAPLAT).

### **2.5.3 Hacettepe Technocity – Technology Transfer Office**

Under Hacettepe Technocity, Technology Transfer Office (TTO) was established in 2008 and its main focus areas are development of new technologies and industrial products. This TTO provide scientific and technological supports to entrepreneurs from different sectors. Specifically, this center supports entrepreneurs who have a production potential of medical products which are imported and used in the health sector. R&D departments in this center provide technical and social solutions to the potential problems of the sector.

TTO not only provides financial supports to firms in their R&D and software development activities, but also helps them in registration process of their patents and trademarks for ensuring intellectual property rights. Hacettepe Technocity TTO also

manages projects to support the development of the medical sector in Ankara. (Türkiye Kalkınma Bankası A.Ş. Ekonomik ve Sosyal Araştırmalar Müdürlüğü, January 2013)

#### **2.5.4 OSTIM Medical Sector Cluster**

Most of medical sector firms in Ankara operate in OSTIM medical sector cluster. This cluster is an important center which has the production capacity, product range and professions necessary for medical sector. Existence of other big sectors in OSTIM like defense supports the development of medical sector by their innovation capacities and experiences. OSTIM is a center in which there are export opportunities to Middle East and African countries. By April 2012, there were 59 firms operating in OSTIM medical sector cluster by employing 1.150 workers.

According to Development Bank of Turkey report (January 2013), in spite of the high technological infrastructure, OSTIM medical sector producers have weaknesses in terms of capital. Thus, their investment budgets for R&D and innovation are relatively low. Firms also face problems on product quality management which influence the preferability of their products both in domestic and foreign trade. This is due to the deficiency of product certification and calibration. Other important weaknesses exist on marketing, human resources, production management of the firms and they don't put emphasis on industrial designs in production processes.

Based on these results, Development Bank of Turkey (January 2013) suggested that in order to increase the export capacity of Ankara medical sector, these problems and weaknesses are needed to be handled and overcome.

##### **2.5.4.1 Ivedik OIZ Medical Sector Platform (MEDICAPLAT)**

MEDICAPLAT was established in order to increase the collaboration between industry, university, non-governmental organizations and other stakeholders related to medical sector in Ankara. Yildirim Beyazit University, Hacettepe University, Ankara Local Health Authority are the shareholders of this platform and by establishing a medical cluster in Ivedik

OIZ, MEDICAPLAT aims to (Türkiye Kalkınma Bankası A.Ş.Ekonomik ve Sosyal Araştırmalar Müdürlüğü, January 2013):

- Revealing the current situation of collaboration level between medical sector firms in Ivedik OIZ and developing the potential collaborations,
- Establishing “Medical Specialization Technology Transfer Center”, “Industrial Design Center” in order to increase the collaboration and knowledge sharing between industry and universities,
- Preparing “Medical Sector Action Plan”,
- Increasing the capacity of the firms on entrepreneurship and innovation,
- Contributing the regional development by making the firms more competitive in local and global terms,
- Organizing common activities (educations, seminars etc.) to increase the collaborative activities,
- Making medical sector firms utilize economies of scale advantage by increasing the cooperative marketing, advertising, design and sales.

By these kinds of projects MEDICAPLAT aims to develop sector support mechanisms and contribute the development of medical sector in Ankara.

## **2.6 Future of the medical sector**

Above mentioned data and indicators illustrate that medical industry in the world is a dynamic sector and leading technological developments and innovations providing a huge growth potential with the help of the aging population of the world and correspondingly rising importance on healthcare industry. Developed countries take advantage of their R&D and innovation capacities in the sector and gain important amounts of revenues.

Turkey on the other hand understood the importance of the industry in recent years and began new investments and supports to the sector. In line with the 2023 vision of Turkey sector has following targets (Türkiye Teknoloji Geliştirme Vakfı, August 2013):

- It is aimed to reach the export amounts of 2 billions of dollars in 2018 and 5 billions of dollars in 2023.
- The import dependence level of 85% is targeted to be deducted to 20% by the end of 2018.

- It is intended to be able to supply 30% of the need by domestic production by the end of 2023.

Importance of the sector both in the world and Turkey, and its potential to support Turkey reaching 2023 economic vision make it an interesting topic for doing research. Sector is highly innovative and affected by technological developments. Thus, policy makers make investments on the sector to create value-added production and services for Turkish economy. Clustering strategies are one of these policies and aim to trigger the potential of the sector. Ankara, as the second largest medical devices producer, provides a good research potential to understand general situation of medical sector in Turkey. By investigating one of these medical sector clusters in Ankara, this thesis focuses on the inter-firm collaboration and its effects on innovation level of the firms, which is a very critical factor for success.

### 3 THEORETICAL FRAMEWORK

*Theoretical Framework* section is organized under three topics: (1) the literature of clusters under perspective of collaboration, (2) the literature of clusters under perspective of innovation and (3) the literature illustrating a link between collaboration and innovation within the clusters. The reason for this categorization is that there is a belief in the cluster literature that clustering positively affects both collaboration and innovation. Before analyzing the relationship between inter-firm collaboration and innovation within a cluster, it is important to see the academic background of these concepts in cluster literature. It is also important to note that cluster, innovation and collaboration literatures are referenced only within this thesis' scope, in order not to be distracted from the topic.

#### 3.1 Cluster and Collaboration Relation

Until the end of 20th century, the focus of the economy has been on macroeconomic conditions as the source of growth and prosperity. However, there has been a change on the focus; the importance of the microeconomic conditions has been appreciated. More than macroeconomic stability, terms like “knowledge-based economy”, “information” society and “economic geography” have come into use while explaining the economic success.

In this context, concept of *cluster*<sup>1</sup> has received widespread attention in the last two decades in explaining the importance of internal connections, knowledge and resource sharing, joint decisions, collaboration with public institutions and universities, shared R&D activities between the firms in order to create competitive advantage. The potential positive economic effects and good examples of the clusters took the attention of policy makers in terms of building up strategies for creating and developing sustainable clusters.

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<sup>1</sup> It is important to note that concepts of industrial district, geographical proximity, firm agglomeration, regional agglomeration and cluster are used interchangeably.

The historical roots of clusters date back to 19th century, since *industrial districts* concept was developed by Marshall (Marshall, 1890). He stressed the idea that location of the firms affects the efficiency. When firms get geographically closer, they have some positive externalities, which are so called *Marshall Externalities*. He explained these externalities by three factors; specialized labor, industry specific inputs and knowledge spillovers. Marshall stressed the importance of knowledge spillovers by describing it to people (craftsmen) getting inspired by each other and sharing the tacit knowledge. The main idea of standard agglomeration theory (Scitovsky, 1954; Krugman, 1995) is that cluster firms share a *common* of labor supply, knowledge, infrastructure, resources etc. by forming extensive local linkages with other firms.

After this first reference of collaboration of industrial districts, researchers of the Californian school put emphasis on the cost advantage of the firm agglomerations. Change in technology and market conditions leads to higher uncertainty and increase the transaction costs of the firms. Californian school thinks of clusters as a result of a collaborative effort to minimize these transaction costs and uncertainties (Scott, 1988; Storper, 1989).

While Californian school centers its argument on traded interdependencies, flexible specialization theorists emphasize trust and flexible firm boundaries as untraded interdependence of firms (Newlands, 2003). Success of regional agglomerations in northern Italy in 1980's has taken attention of these scholars. One of the most famous representatives of this Italian school, Becattini (1990), reapplied Marshall's concept of industrial districts to Italian districts. He was able to convincingly propose the Marshallian model against the Fordist traditional perspective (Giuliani, 2005). The *Third Italy* has been one of the first such industrial district phenomena to be investigated in depth by many scholars (Lyon, Baruffi, & Electric, 2011; Carbonara, 2002; Belussi, Gottardi, & Rullani, 2003). Traditional industries of shoes, furniture, tiles, and musical instruments in northeast and center of Italy<sup>2</sup> had been very successful and gained a competitive advantage globally, despite the fact that other regions of Italy were in stagnation and recession. Lyon et al. (2011) argued that many of the studies on the *Third Italy* stressed the importance of social capital within the region.

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<sup>2</sup> Northwest of Italy, so called *First Italy*; poor South region so called *Second Italy*

Main idea of clusters is proximity and general thinking in the literature is that proximity naturally brings along inter-firm collaboration. Close firms in similar sectors interact a lot and eventually there would be cooperation.

### **3.2 Cluster and Innovation Relation**

During the 1980's a new approach, *Economic Geography: The GREMI (Groupement Europeen des Milieux Innovateurs) Approach*, intended to move away from the static point of view and focused on the dynamic nature of industrial agglomerations (Bahlmann & Huysman, 2008). This approach stressed the potential of these dynamic agglomerations to generate change. They used the term *Innovative Milieu* which means “*groups together in a coherent whole, a production system, a culture and actors.*” (Giuliani, 2005, p.271). Following elements are considered as the elements of milieu: know-how, standards and rules, values, relational capital, human and material resources and interaction patterns with the external environment. With the concept of network of innovation, GREMI was able to perceive innovation as a socio-territorial phenomenon. Accordingly, it stressed the importance of learning, inter-firm networks, regional socioeconomic embeddedness (Bahlmann & Huysman, 2008).

Porter, the creator of the cluster concept, put emphasis on the competitive environment of clusters in his famous five-diamond model (Porter, 1990), which could be considered as a progress of the Marshall's industrial district (Newlands, 2003). Porter (1990) claimed that competitiveness depends on the capacity of innovation and upgrade, and once companies gain competitive advantage through innovation then they need to sustain it with relentless improvement. He also claimed that clusters contribute to enhancement of the firms' productivities by providing them the opportunity to access to the means needed for their activities such as technology, knowledge, channels, customers, input etc. and this easy access makes them more innovative.

Institutional and evolutionary economists also view competition as an important part of the change. Boschma & Lambooy (1999) proposed that evolutionary thinking may be useful for describing the process of localized collective learning and its' effects on technological changes. If the nature of the competition is innovative in a cluster, proximity leads firms to



create new products, new technologies (Nelson & Winter, 2009; Amin, 1999). Alüftekin, Yüksel, Taş, Çakar, & Bayraktar (2012) argued that clusters are strategically important to obtain and sustain competitive advantage and according to Newlands (2003) new technologies are the drivers of competitive processes in clusters.

The above stated literature illustrates that there is an understanding that clusters increase the innovation capacity of the firms mainly because of creating competitive environments which force firms to be more innovative.

### **3.3 Collaboration and Innovation**

Innovative and technological changes in the world in recent decades changed the environmental conditions dramatically. In order to keep up with this relentless change in the environment, organizations began searching for new solutions. According to Kotter (1996) the forces which drive the need for major changes, are global changes, competition and markets. The dramatic development of the technology and increased international economic integration put organizations in a position where they face both more threats and more opportunities. While organizations face more domestic and international competition, they also can find easier ways to reach bigger and more markets with fewer barriers (Kotter, 1996). Achieving these changes (innovations) is easier when there is inter-firm collaboration. Shan & Hamilton (1991) argued that partnering firms realize economies of synergy as a result of pooling resources, risk reduction, production rationalization and utilization of assets. It is also claimed that clusters were able to establish strong positions in world markets with their innovative production and network styles (Andersson, Hansson, Serger, & Sörvick, 2004).

The literature has already provided empirical evidence (Proprius, 2002) claiming that despite being small and investing very little in R&D, SMEs tend to be more innovative than large firms. Hypothesis involved the thought that firms do not innovate in isolation but rather innovation is affected by the network of actors (Håkansson, 1987). According to Powell, Koput & Smith-doerr (1996) when there is a radical technological development, since the research breakthroughs are so broadly distributed, no single firm has the necessary internal capabilities to adapt these innovation. Thus a variety of collaborative efforts occur between

firms that seek to reduce the inherent uncertainties and acquire the skills and knowledge that cannot be produced internally. This fact has encouraged researchers to investigate the link between innovation performance and geographical concentrations of industrial activities.

There is not a common definition of innovation, however for the purpose of this research adopting the definition of Dosi's definition (as cited in Propris, 2002, p.338) is appropriate:

*“Innovation concerns the search for, and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organizational set-ups.”*

Drawing upon the definition, three categories of innovation are concentrated: *product*, *process* and *organizational*. The main reason for this categorization is to address the questions of how inter-firm collaboration affects these types of innovation, and more importantly to shed light on whether small firm clusters' environment help promoting innovation or not. Akdeve (2008) also put emphasis on this categorization by claiming that recent highly competitive environmental conditions forces local economies to build strong product, process and organizational innovation capabilities.

### **3.3.1 Product and Process Innovation:**

Lorenzen (2001) described product and process innovation as subcategories of localized technological learning. *Product Innovation* is about bringing something new to the market place that improves the range and quality of the product or service. The concept of *locality* here is associated with the spatial borders in which learning takes place. Hence, although there is an absence of R&D investment, small firms can be innovative according to the context in which they operate. If the context is about sharing an uncodified, informal knowledge and information; firms must be located geographically close. Thus, there needs to be an effect of inter-firm collaboration on product innovation in firm clusters (Propris, 2002).

In terms of business processes, innovation occurs by consolidating some process-level variables (initiation, portfolio management, development and implementation, project management, commercialization etc.) and these variables define how organizational

processes convert inputs into outputs (Crossan & Apaydin, 2010). In our research, in addition to the process innovation, we also put a special emphasize on commercialization (marketing) aspect of the innovation. When we consider marketing aspect of innovation, there is an underdevelopment in the innovation management area, by leaving the domain to the marketing specialist; however the innovation cycle remains incomplete without implementing the innovation to the market (Adams, Bessant, & Phelps, 2006).

### **3.3.2 Organizational Innovation:**

Crossan & Apaydin (2010) proposed a five-type based managerial levers for organizational innovation: (1) missions/goals/strategies; (2) structures and systems; (3) resource allocation; (4) organizational learning and knowledge management tools; and (5) culture. This categorization is made according to the *dynamic capabilities* concept of resource-based view (Prahalad & Hamel, 1990; Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). Bringing up the literature references together for each lever, Crossan & Apaydin (2010) claimed that these five organizational levers support firms to be able to innovate. Also, some scholars claim that there is a strong link between product and organizational innovation (Floyd & Lane, 2000; Danneels, 2002). According to this view, product innovation drives firms to organizational renewal by exploring and exploiting new competences and capabilities within the firm. Resource-based view scholars put emphasize on this *dynamic nature of firm capabilities* and Eisenhardt & Martin (2000) argued that these capabilities are also dependent on inter-firm alliances. Innovation in the organizational level is important since efficient organizations can be traced in continuous improvement of processes (higher speeds, greater flexibility, lower costs etc.) (Lorenzen, 2001). According to Lorenzen (2001) innovation is not only about achievement of a new knowledge, it also requires firm-level organizational habit changes. For example, relevant unlearning of some routines and qualification of employees may be necessary in formalization and concentration of R&D departments.

### **3.3.3 Some Counter-Arguments**

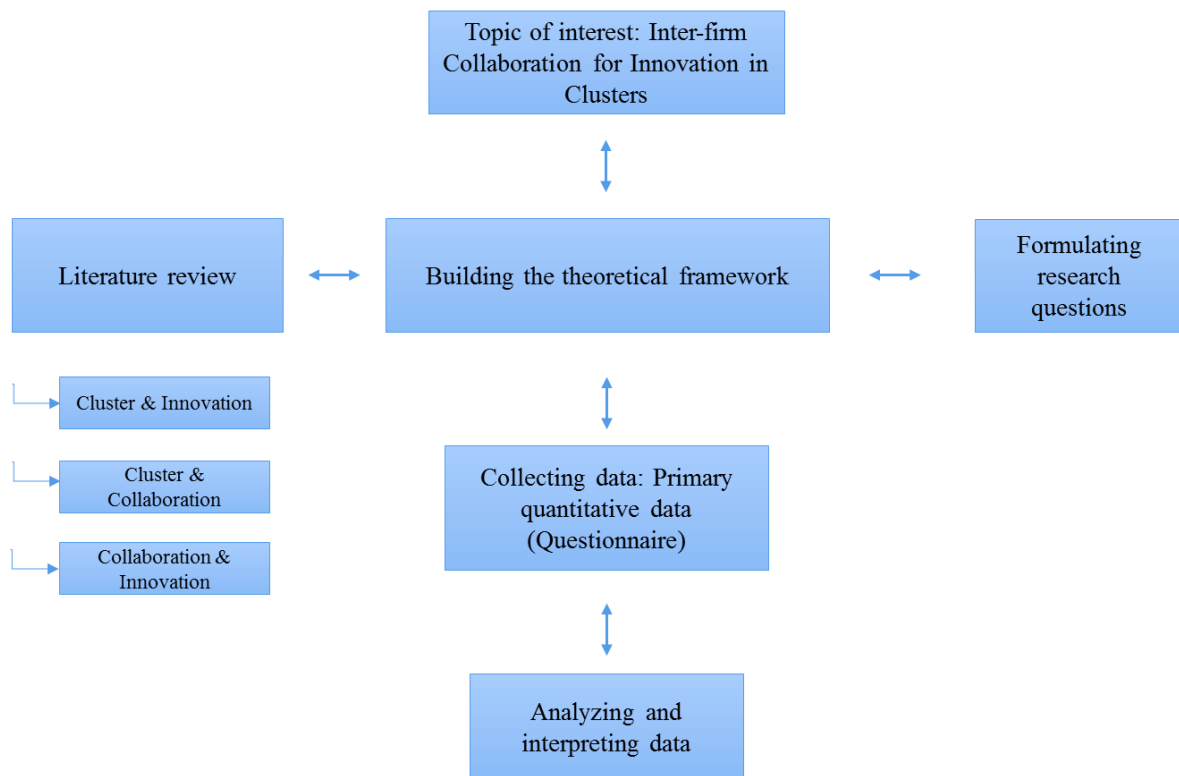
On the opposite of the mainstream literature that argues that clusters positively affect innovation and collaboration, some scholars questioned whether geographical proximity has

to increase innovation and collaboration or not (Boschma, 2005; Huber, 2012; Ben Letaifa & Rabeau, 2013). In their critical work, Ben Letaifa & Rabeau (2013) address the question of why some clusters fail to innovate and collaborate despite proximity. Second, they claimed that sometimes geographical proximity can negatively impact the collaboration. Huber (2012) examined the Cambridge IT Cluster and found out that there is no innovation benefit for the R&D workers of the firms. The reason is that R&D workers do not find it necessary to interact with other firms and they found alternative sources, like internal sources and internet, more useful for them.

The above literature shows that there have been many studies on clusters and their effect on innovation and collaboration. However, the relation between collaborative activities and innovation needed to be tested empirically within clusters. This thesis mainly focused on to construct a framework that portrays the relationship between inter-firm collaboration and three types (product, process and organizational) of innovation. After testing this relation within a cluster, this thesis would seek new answers for the debate of whether collaboration affects innovative activities in clusters or not.

## 4 METHODOLOGY

The figure below is a brief representation of the research design used in this paper. A qualitative research approach was followed in order to fulfill the purpose of exploring the innovation dynamics and determining the level of collaboration within MEDICAPLAT. The following is an account of the measures undertaken to decide on the methodological approach, collection and analysis of the data.



**Figure 1 Research Design**

\* Quantitative Research Design, adapted from Williamson, Burstein, & McKemish. (2002)

## **4.1 Research Approach**

### **4.1.1 Positivism vs. Interpretivism**

Social sciences have been dominated by two traditions: positivism and interpretivism (in other terms: hermeneutics) (Williamson et. al 2002). These two traditions have been discussed and compared to each other in terms of appropriateness and validity. By linking cause and effect in findings, positivist approach tries to apply similar methods of natural sciences (Dick, 1991) with a quantitative nature. On the contrary interpretivist approach focuses on qualitative methods while trying to find the meaning of the social phenomena. This approach creates its methods on data originated from human beings' actions which cannot be studied using the same methods of natural sciences (Williamson et al., 2002). Quantitative research tests a theory by examining data and filtering which ones are true or not, while qualitative research works on areas where variables are unknown (Creswell, 2009). Neither one nor other is purely used in researches, generally a mix of these two approaches under domination of one is applied (Williamson et al., 2002).

In this thesis, a positivist approach is preferred to an interpretivist approach due to the nature of the topic and quantitative data obtained by the questionnaire.

### **4.1.2 Deductive vs. Inductive**

There is a distinction made in the literature between reasoning styles: (1) Deductive reasoning, in which the argument moves from general principals / doctrines to specific cases / illustrations (Williamson et al., 2002). This approach is generally used to explain or confirm a phenomenon by using a theory. (2) Inductive reasoning on the contrary begins with specific cases / examples and ends with general principals / doctrines (Williamson et al., 2002).

This thesis uses deductive reasoning style, it begins with stating the phenomena to be studied and then lists the theories related to the study, to later lead to analysis and explanation of the phenomena.

## 4.2 Choosing Research Method

The purpose of the thesis is to investigate the effect of inter-firm collaboration on innovation and to measure to what extent they collaborate. In order to find empirical data on this topic, it is needed to obtain observable evidence. In quantitative methods, a proposition becomes meaningful when it can be empirically verified or if there exists an empirical method or evidence for deciding the truthiness and falseness of the proposition (Brown, 1977). Therefore, primary data were collected through questionnaires which could provide measurable and verifiable data that were analyzed statistically and results were represented with graphs, tables and explanations.

In addition to that, documentary secondary data like books, journal articles were also used in this thesis to explore the literature for defining the research question.

## 4.3 Data Collection

Questionnaire is a form of data collection in which all the respondents are asked the same set of questions in a pre-set order. In this study the questionnaire consists of 61 Questions and has been divided into 9 parts. The first part consists of information regarding demographics on organization location, age, employee numbers, shareholder structure etc. The second part consists of questions related to R&D activities of the firms, the third part includes questions on technology usage of the firms. The fourth section is about innovation activities, the fifth one consists of questions about patent and license information. The sixth part has questions on technology transfer while the seventh part is on inter-firm collaboration. In section eight, collaboration of firms in technological areas specifically examined and the last section has questions on design.

Appendix shows the questions that were asked to companies to find out effect of inter-firm collaboration on innovation. In the questionnaire mainly *likert* scale was used to score each question and score will be given from strongly disagree (1) to strongly agree (5) to.

Data were derived from a survey which was done as a part of the establishment project of MEDICAPLAT in 2012, on 44 of the total 49 firms. Main purpose of the questionnaire was

to identify technology transfer level, innovation capacity of firms and also to determine the collaboration level between firms. Thus, content of the questionnaire is a good fit for the purpose of the research. In this research, only related results of questionnaire are used, other topics (e.g. design, usage of technology) unrelated with the focus of the research in the questionnaire are not used in the analysis. It is also important to note that the questionnaire results are primary data and have not been used in any academic or non-academic research before.

Questionnaire was applied to 44 medical firms in MEDICAPLAT, the obtained data were transferred into SPSS and statistical analyses were conducted by running chi-square and frequency analysis.

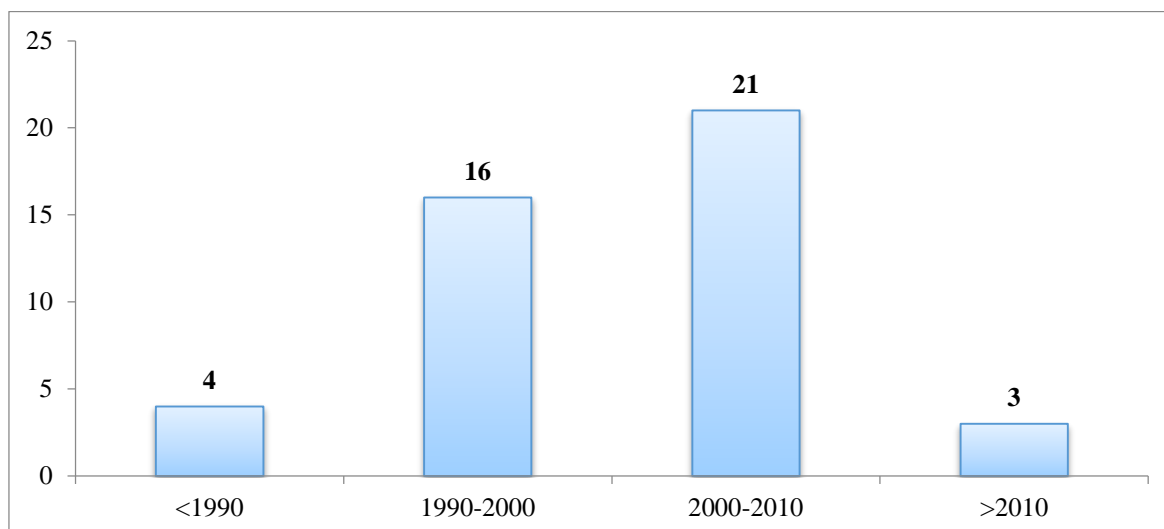


## 5 RESULTS

### 5.1 Description of the Sample

There are 44 firms from the cluster participated in the questionnaire. When we look at the age of the companies, we see that only 9% of them established before 1990. 36% of the firms were established between the years of 1990-2000; 48% of them were established between the years of 2000-2010 and 7% after 2010. Graph 1 summarizes the establishment year of the firms.

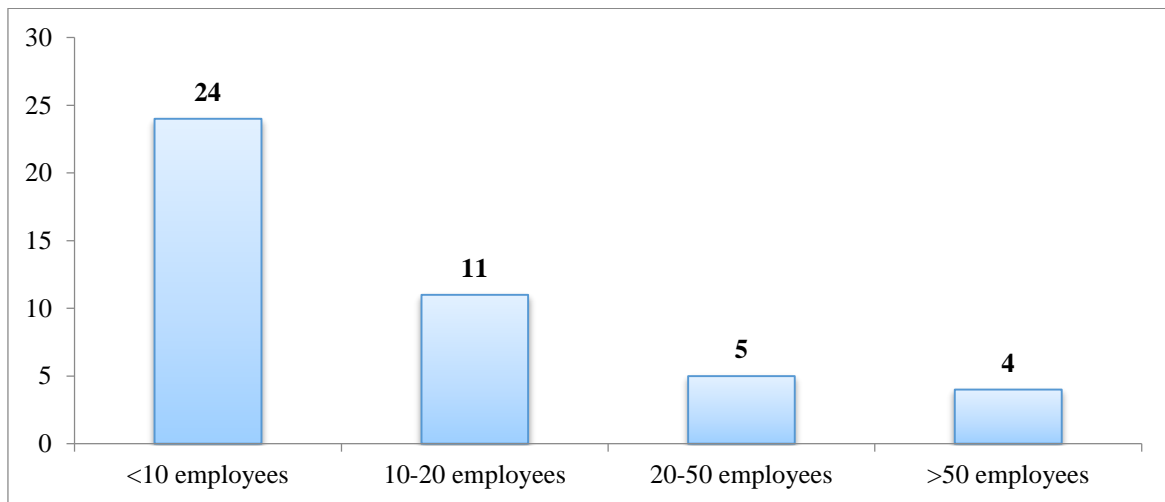
**Graph 1 Number of the Firms by Establishment Years**



It is important to note that all firms were established in Ankara. Legal status of the firms are mostly limited companies (%81.8); followed by corporations (%13.6) and proprietorships (%4.5).

55% of the firms employed less than 10 personnel. 25% of the firms employed between 10-20 employees. Proportion of the firms that employed between 20-50 workers is 11%, this proportion declines to 9% for the ones who employed more than 50 workers. Graph-2 summarizes the sizes of firms by number of employees.

**Graph 2 Size of the Firms According to the Employee Numbers**



## 5.2 Innovative Activities / Outputs of Firms

When the firms were asked whether they have R&D departments, which is very important for innovative activities only 36.4% answered yes (see Table 1). Since most of the firms are small sized (see Graph 2), they may not have realized departmentalization yet. Although it does not mean that firms cannot innovate without R&D departments, this low percentage still raise the question of whether the cluster firms have the capacity to innovate or not.

**Table 7 Does Your Company Have Research & Development Department?**

	F	%
No	28	63,6
Yes	16	36,4
<b>Total</b>	<b>44</b>	<b>100,0</b>

Innovative outputs of the firms like patent, utility model, industrial design and brand applications are good indicators of innovative activity of the firms (Acs & Audretsch, 1988; Acs, Anselin, & Varga, 2002). When we examined the application numbers we see that there were 21 patent applications from 15 firms (34% of total firms), 17 utility model applications from 9 (20%) firms, 28 industrial design applications from 7 (16%) firms and 73 brand applications from 30 (68%) firms. Among these applications 13 patents were registered for 8 firms (18% of total firms), 13 utility models were registered for 6 (14%) firms, 26 industrial

designs were registered for 6 (14%) firms, and 69 brands are registered for 28 (64%) firms. These few numbers of innovative outputs (patent, utility model and industrial designs) may be related to the lack of R&D departments of the firms. Most of them do not have an institutionalized innovation generation.

**Table 8 Did You Face Intellectual Property Theft?**

	<b>F</b>	<b>%</b>
No	23	52,3
Yes	21	47,7
<b>Total</b>	<b>44</b>	<b>100,0</b>

Almost 48% of the firms claimed that their intellectual property rights had been stolen by others and this opportunistic behavior of the firms decreased the trust level within the cluster. Trust in clusters is a critical factor which promotes inter-firm collaboration (Oba & Semerciöz, 2005) and innovative activities (Dayan, Di Benedetto, & Colak, 2009). Lack of trust decreases the chance of collaboration and consequently lowers the innovative activities.

Participants were also asked where they procure their production technologies. 66% of the firms claimed that they use unpatented technologies developed by their firms. 32% reported that they use their own patents, and 23% informed that they used expired and free patents. Purchasing licenses were very rare both from other firms (4.5%) and from universities and research centers (2,3%) in Turkey.

When it came to buying technologies from abroad (purchase equipment, software etc.) 55% of the firms used this method to obtain production technologies. 25% of the firms procured their production technologies in cooperation with firms in Turkey, while 16% of the firms gained these technologies in cooperation with firms outside Turkey. Table 3 summarized these results.

**Table 9 The Ways of Procuring Product Technologies**

<i>Do you use the following methods while procuring product technologies?</i>	<i>Yes</i>	<i>No</i>
Free or expired patents	22,7%	77,3%
Unpatented technologies developed by your own firm	65,9%	34,1%
Your firm's own patents	31,8%	68,2%
Licenses purchased from other firms in Turkey	4,5%	95,5%
Licenses purchased from universities and research centers in Turkey	2,3%	97,7%
Buying technology from abroad (equipment, software etc.)	54,5%	45,5%
Consequences of the cooperation with other organizations in Turkey	25,0%	75,0%
Consequences of the cooperation with other organizations outside Turkey	15,9%	84,1%

### 5.3 Collaboration & Innovation

#### 5.3.1 Situation

As summarized in Table 4 When 44 participants of the questionnaire were asked whether they had done any product innovation within the past 5 years, 41 (93%) of them answered yes. When it came to processes 70% of them achieved innovation in their processes. These proportions decreased to 66% for organizational innovation and 61% for marketing innovation.

**Table 10 Innovation Types and Number of Firms Realized the Innovation**

<b>Innovation Type</b>	<b># of firms realized the innovation</b>	<b>% of the firms</b>
Product innovation	41	93%
Process innovation	31	70%
Organizational innovation	29	66%
Marketing innovation	27	61%

When the types of the product innovation were examined in detail, 30% (13 firms) of the firms claimed that their product innovation is new in the world. 77% (34 firms) of the firms reported that they have achieved innovation which is not new in the world but new in Turkey.

64% (28 firms) of them claimed that they have new product innovation for their firms which had already existed in Turkey.

When same questions were asked for process innovation types, only 11% (5 firms) of the firms claimed that they have achieved worldwide new process innovation. 43% of them (19 firms) claimed having new process innovation in Turkey and 57% (25 firms) of them claimed that they had new process innovation in the firm-level. Table 5 summarizes the product and process innovation types.

These results are in accordance with the results in the way of procuring product technologies (see Table 9) which indicated that more than half of the new technologies are bought from other countries. Therefore innovations are mostly derived from existing technologies in the world which are transformed and adapted to Turkey.

**Table 11 Types of the Product & Process Innovations of the Firms**

<b>Innovation type</b>	<b>Firm number (product innovation)</b>	<b>% in the total firms</b>	<b>Firm number (process innovation)</b>	<b>% in the total firms</b>
Worldwide new	13	30%	5	11%
Exists in the world, new in Turkey	34	77%	19	43%
Exists in Turkey, new in the firm	28	64%	25	57%

When participants were asked about collaboration, only 43% (19 firms) of them reported that they collaborated with other firms. 25% (11 firms) of the participants confirmed that they have collaborated for product and process innovation.

When the low collaboration level is evaluated with the high innovation levels (see Table 10) it can be derived that innovation is independent from collaboration for MEDICAPLAT firms. Following section statistically tests this relation between inter-firm collaboration and innovation activities.

**Table 12 Did Your Company Collaborate with Other Firms within the Last 5 Years?**

	<b>F</b>	<b>%</b>
No	25	56,8
Yes	19	43,2
<b>Total</b>	<b>44</b>	<b>100,0</b>

**Table 13 Did Your Company Collaborate with Other Firms within the Last 5 Years for Product and Process Innovation?**

	<b>F</b>	<b>%</b>	<b>Valid %</b>
No	32	72,7	74,4
Yes	11	25,0	25,6
<b>Total</b>	<b>43</b>	<b>97,7</b>	<b>100,0</b>
No Answer	1	2,3	
<b>Total</b>	<b>44</b>	<b>100,0</b>	

### **5.3.2 Relation**

In order to explain the above results of the low collaboration level and high innovative activities, chi-square test was conducted to examine whether there is an interdependence between collaboration and innovation types (product, process and organization).

Table 14 provides results implying that collaboration activities are independent of product innovation with a p-value of 0,721.

**Table 14 Collaboration & Product Innovation Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,127 <sup>a</sup>	1	,721		
Continuity Correction <sup>b</sup>	,000	1	1,000		
Likelihood Ratio	,130	1	,718		
Fisher's Exact Test				1,000	,604
Linear-by-Linear Association	,124	1	,724		
N of Valid Cases	44				

a. 2 cells (50,0%) have expected count less than 5. The minimum expected count is 1,30.

b. Computed only for a 2x2 table

Table 15 provides results implying that collaboration activities are independent of process innovation with a p-value of 0,282.

**Table 15 Collaboration & Process Innovation Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,159 <sup>a</sup>	1	,282		
Continuity Correction <sup>b</sup>	,552	1	,458		
Likelihood Ratio	1,185	1	,276		
Fisher's Exact Test				,335	,230
Linear-by-Linear Association	1,132	1	,287		
N of Valid Cases	44				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,61.

b. Computed only for a 2x2 table

Table 16 provides results implying that collaboration activities are independent of marketing innovation with a p-value of 0,143.

**Table 16 Collaboration & Marketing Innovation Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,141 <sup>a</sup>	1	,143		
Continuity Correction <sup>b</sup>	1,324	1	,250		
Likelihood Ratio	2,186	1	,139		
Fisher's Exact Test				,213	,125
Linear-by-Linear Association	2,092	1	,148		
N of Valid Cases	44				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,34.

b. Computed only for a 2x2 table

On the contrary of product, process and marketing innovations, results in Table 17 implies that there is dependence between collaboration and organizational innovation with a p-value of 0,026. When the correlation between these two variables is tested it can be seen that there is a positive correlation of 0,337, which is statistically significant at the 0,05 level, between collaboration and organizational innovation (see Table 18).

**Table 17 Collaboration & Organizational Innovation Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,985 <sup>a</sup>	1	,026		
Continuity Correction <sup>b</sup>	3,654	1	,056		
Likelihood Ratio	5,273	1	,022		
Fisher's Exact Test				,052	,026
Linear-by-Linear Association	4,872	1	,027		
N of Valid Cases	44				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 6,48.

b. Computed only for a 2x2 table



**Table 18 Correlation between Collaboration & Organizational Innovation**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	,337	,133	2,317	,025 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	,337	,133	2,317	,025 <sup>c</sup>
N of Valid Cases		44			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

When these results are analyzed altogether it can be seen that although general literature streams argue that collaboration activities affect the innovation level within the clusters, there is not a statistically significant relation between inter-firm collaboration and product, process and marketing innovation in MEDICAPLAT.

### 5.3.3 Collaboration & Technology Transfer

Hassink as cited in Lorenzen (2001) mentioned technology transfer infrastructures as a major field in stimulating technological innovation. Technology transfer also plays a central role and not only provides new technologies to local firms, but also increases general awareness on the trends which are occurring outside the cluster (Lorenzen, 2001; Glasmeier, 1999). Thus we also want to determine the technology transfer rate of the cluster and the relation between technology transfer level and collaboration.

Results showed that 38% (17 out of 44) of the firms claimed that they had realized technology transfer from outside and 23% (10 out of 44) of the firms claimed they transfer their technology to other firms.

Table 19 provides another important result implying that there is not a statistically significant dependence between technology transfer (from other firms) and collaboration ( $p = 0,118$ ).

**Table 19 Collaboration & Technology Transfer (from other firms) Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,443 <sup>a</sup>	1	,118		
Continuity Correction <sup>b</sup>	1,560	1	,212		
Likelihood Ratio	2,451	1	,117		
Fisher's Exact Test				,209	,106
Linear-by-Linear Association	2,386	1	,122		
N of Valid Cases	43				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,51.

b. Computed only for a 2x2 table

As it can be derived from Table 20, there is not statistically significant dependence between technology transfer (to other firms) and collaboration ( $p = 0,051$ ) as well.

**Table 20 Collaboration & Technology Transfer (to other firms) Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,794 <sup>a</sup>	1	,051		
Continuity Correction <sup>b</sup>	2,511	1	,113		
Likelihood Ratio	3,810	1	,051		
Fisher's Exact Test				,074	,057
Linear-by-Linear Association	3,707	1	,054		
N of Valid Cases	44				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 4,32.

b. Computed only for a 2x2 table

### 5.3.4 Collaboration & Intellectual Property

When we examined the relation between collaboration and intellectual property innovation (new patent, utility model, industrial design and brand registrations), we found out that there

is no statistically significant interdependence between collaboration and intellectual property production.

Table 21 illustrated that there is not statistically significant dependence between collaboration & patent registration with a p-value of 0,340.

**Table 21 Collaboration & Patent Registration Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3,355 <sup>a</sup>	3	,340
Likelihood Ratio	3,745	3	,290
Linear-by-Linear Association	1,072	1	,300
N of Valid Cases	44		

a. 6 cells (75,0%) have expected count less than 5. The minimum expected count is ,43.

Table 22 illustrated that there is not statistically significant dependence between collaboration & utility model registration with a p-value of 0,393.

**Table 22 Collaboration & Utility Model Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2,992 <sup>a</sup>	3	,393
Likelihood Ratio	4,100	3	,251
Linear-by-Linear Association	1,479	1	,224
N of Valid Cases	44		

a. 6 cells (75,0%) have expected count less than 5. The minimum expected count is ,43.

Table 23 illustrated that there is not statistically significant dependence between collaboration & industrial design registration with a p-value of 0,379.

**Table 23 Collaboration & Industrial Design Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4,207 <sup>a</sup>	4	,379
Likelihood Ratio	5,676	4	,225
Linear-by-Linear Association	,553	1	,457
N of Valid Cases	44		

a. 8 cells (80,0%) have expected count less than 5. The minimum expected count is ,43.

Table 24 illustrated that there is not statistically significant dependence between collaboration & brand registration with a p-value of 0,571.

**Table 24 Collaboration & Brand Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5,735 <sup>a</sup>	7	,571
Likelihood Ratio	7,573	7	,372
Linear-by-Linear Association	,012	1	,913
N of Valid Cases	44		

a. 12 cells (75,0%) have expected count less than 5. The minimum expected count is ,43.

**Table 25 Collaboration & Intellectual Property Theft Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,740 <sup>a</sup>	1	,017		
Continuity Correction <sup>b</sup>	4,373	1	,037		
Likelihood Ratio	5,864	1	,015		
Fisher's Exact Test				,032	,018
Linear-by-Linear Association	5,609	1	,018		
N of Valid Cases	44				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 9,07.

b. Computed only for a 2x2 table

There is a statistically significant relation between collaboration and intellectual property theft with a p-value of 0,017. There is also a significant (0,016) positive correlation of 0,361 between collaboration and intellectual property theft (see Table 26). These results indicate that there are serious trust problems in the cluster. Low level of collaboration may be a consequence of the positive correlation between collaboration and intellectual property theft. Following section will be dealing with the trust issues within clusters.

**Table 26 Collaboration & Intellectual Property Correlation**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	,361	,141	2,510	,016 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	,361	,141	2,510	,016 <sup>c</sup>
N of Valid Cases		44			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

### 5.3.5 Trust within Clusters

In the literature, trust had been seen as an important factor for the success of the firm agglomerations. Social trust mechanisms play an important role for inter-firm collaboration (Oba & Semerciöz, 2005; Dayan & Di Benedetto, 2010) Trust is a critical factor which triggers innovative activities (Madhavan & Grover, 1998; Koskinen, Pihlanto, & Vanharanta, 2003; Akgün, Byrne, Keskin, Lynn, & Imamoglu, 2005; Dayan, Di Benedetto, & Colak, 2009). Adler (2001) stated that “the high-trust forms of intra organizational, interdivisional, and inter-firm relations encourage more effective knowledge generation and dissemination” (p.225). Liao (2010) illustrated that trusting issues are directly effecting the performance of the firms in clusters. Humphrey & Schmitz (1998) claimed that trust has been seen as a critical factor on economic performance of developed countries and it is named as the *missing factor* that describes why some districts develop rapidly and other lag behind. They distinguish two types of trust: (1) *minimal trust* which is required for market transactions, (2) *extended trust* which sustains the inter-firm collaboration seen in clusters.

In this thesis, extended trust is referred to examine the effect of the trusting issues on inter-firm collaboration.

MEDICAPLAT demonstrates a good example of general Turkish business system regarding the trust issues. In Turkish socio-cultural context, close interpersonal relationships are important where networks are established through family members, relatives and neighbors of geographical proximity (Kağıtçıbaşı, 1984; İmamoğlu, 1987). Empirical results on intellectual property theft and collaboration relation illustrated that firms in MEDICAPLAT have a difficulty to build extended trust since they have faced opportunistic behaviors. Additionally, the complexity and uncertainty about laws and legal procedures within Turkish business system result in feeling of powerlessness of businessmen which may also cause trust problems towards the system (Buğra, 1991). Lack of institutional arrangements against the violation of intellectual property rights might also be a reason for the general trust level of the cluster firms (Oba & Semerciöz, 2005). Consequently firms have trust problems and are reluctant to collaborate.

## 6 CONCLUSION AND DISCUSSION

### 6.1 Conclusion

The results illustrate that although there are innovative activities within the cluster, there is not statistically significant relation between collaboration and innovation. Collaborative activities of the firms are less than innovative activities, while 93% of the firms were claiming they have realized product innovation, only 43% of them reported that they have collaborated with other firms. Chi-square test results provide information about this, there is only a low level (0.337 correlation) statistically significant interdependence between collaboration and organizational innovation. Other types of innovations are not affected by collaboration.

One reason of low level collaboration could be related to trust problem among firms. Statistically significant correlation (0.361) between intellectual property theft and collaboration indicates that firms don't prefer to collaborate with each other since there is a risk of facing intellectual property theft. Additionally, proportion of firms who obtained their product technologies as a result of the cooperation with other organizations in Turkey, and cooperation with other organizations outside Turkey are very low; 25% and 16% respectively (see Table 3). The trustless environment could be considered as a reason for low level collaboration within the cluster.

Another result implied by the questionnaire is that most of the firms (77%) claim that their innovations are new in Turkey, while already existing in the world. This means that innovation dynamics of the environment push firms to procure their new technologies outside Turkey which may consequently decrease the need to collaborate with others for innovation within the cluster. Additionally, when firms are asked what kind of obstacles they face in development of innovation, 55% of them claimed the argument of not being able to find a capable partner to innovate with.

These results imply that Medical Cluster in Ivedik OIZ does not provide a collaborative environment to cluster firms regarding innovation and technology transfer. Innovative activities in terms of product, process, intellectual property; and technology transfer could be seen in the cluster; however, these are not a consequence of inter-firm collaboration. Claiming that cluster policies of Turkey should be insufficient in terms of sustaining a collaborative environment for the firms would not be wrong based on these results, however further studies are needed to be done.

## **6.2 Discussion**

This thesis tried to determine whether there is a relation between collaboration and innovation in clusters. General literature streams argued that clusters positively affect both collaboration and innovative activities of the firms. In addition, there is a general idea claiming that collaboration activities within the clusters affect the innovation level. However, there are also researches defending the opposite of these general arguments questioning the relation between innovation activities and inter-firm collaboration efforts within the clusters. In order to provide new empirical evidences to this debate, this thesis examined the effect of the inter-firm collaboration on innovation within a cluster.

Empirical findings of this study indicated that there is not a significant relation between collaboration and innovation within the cluster although innovative activities exist. Results implied that clusters do not necessarily increase the collaboration between firms, and the relation between collaboration and innovation does not exist. Innovation dynamics that characterize MEDICAPLAT are not much dependent on the collaborative efforts of the firms within the cluster. This could ground upon three main causes: (1) trust issues between firms, (2) procuring the technologies from outside Turkey; and (3) cluster specific characteristics.

Based on the results, it would not be wrong to argue that reluctance of the firms to collaborate can be explained by trust problems. When a firm has a fear of theft of its research & development activities, the probability of collaboration with other firms becomes very difficult. As claimed in De Noni, Ganzaroli & Pilotti (2013) local trustful relations effect the exploitative innovation development rather than explorative innovations. Therefore, firms do not prefer to share their innovations with others, most of the time they try to keep it as a



secret since the rival firms may easily imitate the product and claim the property of the innovation. Moreover, numbers of patents and utility models are low (only 13 patents are registered for 8 firms and 13 utility models are registered for 6 firms) which will be a cause of untrustworthy environment since trust-based relations are claimed to be highly dependent on the presence of stable legal protection (Lane & Bachmann, 1996). The results implied that the low-level collaboration in MEDICAPLAT is affected by this general trust problem of Turkish business system.

The second important result is the fact that most firms procure technologies from outside Turkey. This case affects the innovation dynamics of the cluster by making inter-firm collaboration for innovation unnecessary. The potential of the cluster firms' research & development is also low and most of the firms do not even have R&D departments. Complaints of MEDICAPLAT firms about lack of capable partners to innovate with are also good indicators for the level of innovation capabilities and competences of the cluster firms. Under such circumstances it would not be wrong to question innovation capacity of MEDICAPLAT cluster firms. When there is a low level of R&D and quality of this R&D is also a question, it will be pointless to hope that collaboration on innovation exists in a cluster. Empirical findings illustrate that in MEDICAPLAT there is no link between product or process innovation and collaboration. Only one link exists in organizational innovation which is not highly related to R&D activities. When this low innovation capacity of the cluster is combined with the trust problems, most of the firms prefer to obtain high quality, credible technologies from abroad which is more confident and risk free.

Other than these two results, it is also needed to be considered that the sample cluster is a new one which is established in 2012. MEDICAPLAT may need some time to build a collaborative environment and overcome the trust issues. Although there is a long history of medical sector in Ankara, the cluster development in Ivedik OIZ is comparatively new. It may take some time to see the effect of cluster.

Management of the cluster is also another aspect, but it is not included in the context this thesis. There are questions exist on how clusters should be designed in a way that they can promote collaboration and innovation.

The above results illustrated that there are some problems in MEDICAPLAT on establishing cluster characteristics. There is a low level of collaboration; there are trust problems and low level of innovation production (most of the firms obtain innovation from abroad). More importantly, the results raise the question of whether a medical sector cluster exists in Ivedik OIZ or not. If the innovation activities of the firms are independent of each other, and if there is not enough collaboration between them, how being a cluster contributes to these firms other than geographical proximity. This is also a general policy problem of Turkey on developing cluster strategies. As mentioned in Martin & Sunley (2003) the concept have become a world-wide policy fashion item and just because naming a firm agglomeration as a cluster does not necessarily make it a cluster. Ebbekink & Lagendijk (2013) debated the limited success of some clusters and criticized *cluster building* policy rationales as the reason of the inefficacy. Policy makers firstly need to determine different cluster governance structures and coordinating mechanisms for each cluster to use their scarce resources efficiently (Brown, 2000). Based on this structure they should establish the channels necessary for collaboration and innovative activities and then invest on the potential clusters. Moreover, on institutional level some precautions need to be taken to prevent opportunistic behavior. As claimed by Oba & Semerciöz (2005) institutional arrangements against opportunistic behavior eliminate the sources of insecurity and allow firms to trust each other. Therefore, trust problems are needed to be overcome by development of trust both in inter-firm and institutional levels and by the improvement and protection of intellectual property rights.

### **6.3 Limitations & Further Research**

This thesis has offered an evaluative perspective on an important concept, clusters and their effects on collaboration & innovation relation and it has been conducted in Ivedik medical sector cluster in Ankara, Turkey. However, the thesis encountered number of limitations, which are needed to be considered. First of all, although the data is firstly used in this research, the design of the questionnaire itself was prepared by Ivedik OIZ management, not by the researcher. Some parts of the questionnaire which is unrelated with the topic of the thesis are excluded and not used in this thesis. However, the main purpose of the questionnaire is a good fit for the purpose of the research.

It is important to note that even though MEDICAPLAT was established in 2012, medical sector has a long history in Ankara and the sector can be considered as old and mature. There is also another medical sector cluster in Ostim OIZ in Ankara which was established in 2009 and very close to Ivedik geographically. The relations between these two cluster firms are nested and hard to distinguish between each other. Even existence of two separate clusters may be a matter of debate. Further studies may enlighten the different / similar characteristics of these two clusters and relation between them.

Further researches should also point solutions to overcome trust issues between cluster firms and increase the collaboration level. Trust problem which is a critical obstacle for collaboration exists in general Turkish business system, however cluster-specific studies are needed in order to build up strong cluster policies and benefit from clusters expectedly.

Definition of cluster in Turkish business context should also be a matter of debate in further researches and studies. General definitions do not provide a comprehensive explanation which is applicable to clusters from all over the world. Results of this thesis indicated that there is a need for questioning the standard cluster definitions and answering how does the definition to be changed to cover such results in dissimilar regions which have different characteristics.

Lastly, the thesis was examined only in one cluster in a specific sector. Further studies need to be done in other clusters and other sectors in Ankara and Turkey to provide more empirical evidence. Similar researches could be done in other sector clusters, especially newer and high technology required ones like automotive, aerospace, biotechnology, nanotechnology, information technologies, telecommunications, computer engineering etc. Relation between innovative activities and collaboration in other high-tech sectors' clusters may be different from medical sector. Further comprehensive and comparative research among clusters from different sectors could be studied in PhD level.

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## APPENDICES

### APPENDIX A: QUESTIONNAIRE

#### İVEDİK OSB MEDİKALSEKTÖR PLATFORMU OLUŞUMU - AR-GE, TASARIM VE YENİLİK ARAŞTIRMASI

Değerli yetkili;

Bu anket İvedik Organize Sanayi Bölgesi Müdürlüğü tarafından Ankara Kalkınma Ajansı destekleri ile yürütülen “Ankara-İvedik Organize Sanayi Bölgesi Medikal Teknoloji Transferi, Endüstriyel Tasarım ve Ticarileştirme Merkezi Kurulması” projesi kapsamında uygulanmaktadır. Anket çalışmasının temel amacı firmaların teknoloji transferi, tasarım ve yenilik kapasitelerini tespit etmektir. Bu nedenle anket soruları firmaların genel yapısını, faaliyet konusunu, işgücü özelliklerini, üretim koşullarını, yenilik ve tasarım beklentileri ile firmalar arası ilişkileri açığa çıkarmaya yönelik hazırlanmıştır. Sizden anket sorularını yanıtlamanızı rica ediyoruz.

Görüşülen Kişinin Adı Soyadı :.....  
Görüşülen Kişinin Firma İçindeki Unvanı:.....  
Firma Adı :.....  
Firma Adresi :.....  
Telefon Numarası/ Faks :.....  
E-posta adresi :.....

## BÖLÜM 1 : FİRMA BİLGİLERİ HAKKINDA

S1. Firmanın kuruluş yılı : .....

S1.1 Firmanız aile şirketi midir? 1. [ ] Evet  
2. [ ] Hayır

S2. Firmanın ilk kurulduğu yer (İli) : .....

S3. Firmanın hukuki statüsü  
1 ( ) A.Ş  
2 ( ) LTD  
3 ( ) KOL  
4 ( ) KOMDT  
5 ( ) KOOP  
6 ( ) ŞAHIS  
7 ( ) Diğer (Belirtiniz) .....

S4. Firmanın ortaklık yapısını belirtiniz.

	% (yüzde)
Kamu	
Özel	
Yabancı	
Toplam	

(► Anketör: Toplamı %100 olmalı)

S5. Şirketinizde toplam kaç kişi çalışmaktadır?

	2009	2010	2011
Toplam Çalışan Sayısı			

**S6. Firmanın Faaliyet Alanı Nedir?**

(► Anketör: NACE Kodu listesinden firma faaliyet alanını doğrulayarak kodu da ekle)

Faaliyet Sektör Alanı Adı : .....  
NACE Kod Numarası

.....

**S7. Firmanın Teknoloji Alanı nedir?**

(► Anketör: FOS Kodu listesinden firma teknoloji alanını doğrulayarak kodu da ekle)

Teknoloji Alanı Adı  
:.....  
FOS Kod Numarası

.....

**S8. Üretilen medikal cihazlar nelerdir? AB normlarına göre (CE uyumluluğu) hangi sınıflandırmaya dâhildir? Bu konudan haberdar mısınız?**

(► Anketör: Eğer varsa 5 tane ürün grubu bilgisi alınacak; daha sonra EU Class I/II/III den uygun kodu üretilen ürünleri doğrulayarak kodu da ekle)

Üretilen Medikal Ürün Grupları (kısaca):

(1) .....

(2).....

(3) .....

(4) .....

(5) .....

FOS Kod Numarası

.....

**S9.**İhracat yapıyor musunuz?

1.  Evet (► Anketör: Cevap EVET ise, 1.1.  Dolaylı İhracat  
1.2.  Dolaysız İhracat  
2.  Hayır (► Anketör: Cevap HAYIR ise, S10'e geçiniz.)

**S9.2.** İhracat yaptığımız bölgeler / ülkeler nerelerdir?

(► Anketör: İhracat yapılan ülkelerin isimleri alınıp daha sonra işaretlenecektir.)

-----

- 1 ( ) Avrupa  
2 ( ) Doğu Avrupa  
3 ( ) Amerika  
4 ( ) Çin  
5 ( ) Asya (Hindistan vd.)  
6 ( ) Güney Amerika  
7 ( ) Afrika

**S10.** Ekonomik krizden dolayı (örneğin, 2009 krizi) eleman işten çıkardınız mı?

1.  Evet  
2.  Hayır (► Anketör: Cevap HAYIR ise, S11'e geçiniz.)

**S10.1.** Şu ana kadar kaç tane çalışanınızı işten çıkarmak zorunda kaldınız?

(► Anketör: sayı belirtiniz)

..... Kişi

**S11.** AR-GE ve yenilik faaliyetlerinizin, krizlerin neticesinde ekonomik kriz açısından size bir avantaj sağlama ya da krizden dolayı yaşanabilecek sıkıntılarınızı azaltıcı yönünde etki edebileceğini düşünüyor musunuz?

1.  Evet  
2.  Hayır (► Anketör: Cevap HAYIR ise, S12'e geçiniz.)
-

**S11.1.** Cevabınız EVET ise, bunun en önemli gördüğünüz birkaç nedenini belirtiniz.

- 1) .....
- 2).....
- 3).....

---

## **BÖLÜM 2: AR-GE FAALİYETLERİ**

**S12.** Firmanızda bir AR-GE birimi var mı?

1.  Var

2.  Yok (► Anketör: Cevap YOK ise, S14'e geçiniz.)

**S13.** Firmanızdaki AR-GE birimi kaç yıldır faaliyetlerini sürdürüyor?

\_\_\_\_\_ Yıl \_\_\_\_\_Ay

**S14.** Firmada çalışanların mesleki deneyimi (*yıl olarak belirtiniz*) kaç yıldır?

(► Anketör : “AR-GE Birimi” satırı için; Firmada AR-GE birimi olmasa bile AR-GE faaliyetine katılan çalışanlar göz önüne alınacaktır. Mesleki tecrübeler, ilgili birimdeki tüm personeller açısından ortalama olarak belirtilecektir.)

	Personellerinizin toplam mesleki tecrübeleri (yıl olarak)	Personellerinizin sadece sizin firmanızdaki mesleki tecrübeleri (yıl olarak)
AR-GE Birimi		
AR-GE birimi dışındaki tüm birimler		

**S15.** Aşağıdaki belgelerden hangileri sağlık alanında gösterdiğiniz faaliyetler ile ilgili olarak firmanızda bulunmaktadır?

(► Anketör: birden çok işaretlenebilir.)

	VAR	YOK
TSE belgesi	1( )	2( )
ISO 9001 belgesi	1( )	2( )
ISO 13485 belgesi	1( )	2( )
ISO 14971 belgesi	1( )	2( )
ISO 17020	1( )	2( )
CE (Avrupa uygunluk) belgesi	1( )	2( )
IEC 60601-1	1( )	2( )
Diğer		

NOT: ISO 14971, “Medical Devices—Application of Risk Management to Medical Devices.”

IEC 60601-1, “Medical Electrical Equipment—General Requirements for Basic Safety and Essential Performance.”

ISO 17020, “General Criteria for the Operation of Various Types of Bodies Performing Inspection.”



### **BÖLÜM 3: TEKNOLOJİ KULLANIMI HAKKINDA**

**S16.**Firmanız, aşağıdaki bilişim teknolojilerinden hangilerinden yararlanmaktadır?

(► Anketör: Birden çok yanıt işaretlenebilir )

		Şeçenek
1	İnternet erişimi	( )
2	E-posta	( )
3	Kendi web sitesi	( )
4	İşbirliği yaptığımız kuruluşların ortak web kaynakları	( )
5	Elektronik Ticaret Portalları	( )
6	Rakiplerin Web kaynakları	( )
7	Diğer (belirtiniz).....	( )

**S17.** Firmanızda kullanılan üretim teknolojilerini nerelerden sağladınız?

(► Anketör: Birden çok yanıt işaretlenebilir )

		Şeçenek
1	Ücretsiz ya da süresi bitmiş patentler	( )
2	Firmanızca geliştirilen patentsiz teknolojiler	( )
3	Firmanızın kendi patentleri	( )
4	Türkiye'deki diğer firmalardan satın alınan lisanslar	( )
5	Türkiye'deki üniversite-araştırma merkezlerinden satın alınan lisanslar	( )
6	Yurtdışından teknoloji satın alma (makina satın alma, yazılım alma, vd.)	( )
7	Türkiye'deki diğer organizasyonlarla yapılan işbirliği sonuçları	( )
8	Türkiye dışındaki diğer organizasyonlarla yapılan işbirliği sonuçları	( )
9	Diğer (belirtiniz) .....	( )

**S18.** Son 5 yıl içinde AR-GE ve yenilik yapmak için işbirliği içinde olduğunuz aktörlerin coğrafi olarak yüzde dağılımları?

(► Anketör: ilgili yüzdeleri (%) belirtiniz)

(► Anketör: İL İÇİ % + BÖLGE İÇİ %+ YURT İÇİ %+ YURT DIŞI % = %100 OLMALI)

**S18.1.** Son 5 yıl içinde AR-GE faaliyetleri kapsamında katıldığınız etkinliklerin coğrafi olarak yüzde dağılımları? *(ilgili yüzdeleri (%) belirtiniz)*

	Firma içi	İl içi	Bölge içi	Yurt içi	Yurt dışı	TOPLAM
Fuar ve geziler						
Panel ve toplantılar						
Eğitim programları ve seminerler						
İşbirliği ve ortaklıklar (ticaret, ihracat, ürün geliştirme, vb.)						

## **BÖLÜM 4: YENİLİK FAALİYETLERİ HAKKINDA**

**S19.** Son 5 yıl içinde firmanız, ÜRÜN YENİLİĞİ yaptı mı?

1.  Evet

2.  Hayır

(► Anketör: Cevap Hayır ise, S23 'e geçiniz.)

**S20.** Son 5 yıl içinde ürettiğiniz bütün ürünlerin % kaç yeni ürün olarak değerlendirilebilir?

Yeni Ürün %.....

**S21.** Son 5 yıl içinde ürettiğiniz bütün ürünlerin % kaç iyileştirilmiş ürün olarak değerlendirilebilir?

İyileştirilmiş Ürün %.....

**S22.** Son 5 yıl içinde firmanız tarafından (yeni ürünler ve iyileştirilmiş ürünler olarak) gerçekleştirilen ÜRÜN YENİLİĞİ faaliyetlerinin özgünlük durumları (*işaretleyiniz*)

	Evete	Hayır
Dünya çapında yeni olan ürün yeniliği yaptınız mı?	1( )	2( )
Dünyada var olan ama Türkiye için yeni olan ürün yeniliği yaptınız mı?	1( )	2( )
Türkiye'de var olan ama firmanız için yeni olan ürün yeniliği yaptınız mı?	1( )	2( )

**S23.** Son 5 yıl içinde firmanız, SÜREÇ YENİLİĞİ yaptı mı?

1.  Evet

2.  Hayır

(► Anketör: Cevap Hayır ise, S29 'a geçiniz.)

**S24.** Son 5 yıl içinde kullandığınız bütün süreçlerin % kaç yeni süreç olarak değerlendirilebilir?

Yeni Süreç %.....

**S25.** Son 5 yıl içinde kullandığınız bütün süreçlerin % kaçını iyileştirilmiş süreç olarak değerlendirebilirsiniz?

İyileştirilmiş Süreç %.....

**S26.** Son 5 yıl içinde firmanız tarafından (yeni süreçler ve iyileştirilmiş süreçler olarak) gerçekleştirilen SÜREÇ YENİLİĞİ faaliyetlerinin özgünlük durumları nedir?

	Evet	Hayır
Dünya çapında yeni olan süreç yeniliği yaptınız mı?	1 ( )	2 ( )
Dünyada var olan ama Türkiye için yeni olan süreç yeniliği yaptınız mı?	1 ( )	2 ( )
Türkiye’de var olan ama firmanız için yeni olan süreç yeniliği yaptınız mı?	1 ( )	2 ( )

**S27.** Son 5 yıl içinde ürettiğiniz yeni ürünlerin % kaçını süreçlere etki etmiştir?

(► Anketör: yeni ürün yaparken mevcut teknoloji kullanmak yerine yeni makine teçhizat alarak yeni üretimi gerçekleştirmek sayılabilir. Bu noktada yeni süreç kazanılmış – ya da öğrenilmiş – oluyor. Bunun etkisini soruyoruz.)

Yeni Ürünlerin Süreçlere Etkisi %.....

**S28.** Son 5 yıl içinde ürettiğiniz iyileştirilmiş ürünlerin % kaçını süreçlere etki etmiştir?

(► Anketör: Aynı biçimde mevcut ürünlerde iyileştirmeler yaparken mevcut teknoloji kullanmak yerine yeni makine teçhizat alarak üretimde iyileştirmelere gitmek varsayılabilir. Bu noktada yeni süreç kazanılmış – ya da öğrenilmiş – oluyor. Bunun etkisini soruyoruz.)

İyileştirilmiş Ürünlerin Süreçlere Etkisi %.....

**S29.** Son 5 yıl içinde firmanız, ORGANİZASYONEL(ÖRGÜTSEL) YENİLİK yaptı mı?

(► Anketör: Bir firmanın ticari uygulamalarında, işyeri organizasyonunda veya dış ilişkilerinde yeni bir organizasyonel yöntem uygulanmasıdır.)

1.  Evet (► Anketör: Cevap Evet ise aşağıdaki tablodan yararlanınız.)  
2.  Hayır

	Evet	Hayır
Yeni iş yönetimleri(tedarik zinciri yönetimi, yeniden tasarım, kalite yönetimi, yalın üretim...gibi)	1 ( )	2 ( )
Sorumluluklar ve kararları düzenleyen yeni yönetimler (takım çalışması, eğitim programları ...gibi)	1 ( )	2 ( )
Diğer işletme ve kurumlarla olan ilişkileri düzenleyen yeni yöntemler (ortaklık kurma, dış kaynaklardan yararlanma, taşeron kullanımı...gibi)	1 ( )	2 ( )
Diğer.....		

**S30.** Son 5 yıl içinde firmanız, PAZARLAMA YENİLİĞİ yaptı mı?

(► Anketör: 4P olarak adlandırılan (ürün, fiyat, dağıtım, tutundurma) pazarlama karması elemanlarının tümünde gerçekleştirilecek yenilikleri kapsamaktadır.)

1.  Evet (► Anketör: Cevap Evet ise aşağıdaki tablodan yararlanınız.)

	Evet	Hayır
Ürün/hizmetin tasarımındaki veya paketlenmesindeki estetik açıdan değişiklikler(ürünün temel niteliklerindeki değişiklikler hariç)	1 ( )	2 ( )
Ürün/hizmetin promosyonu için yeni reklam ve tanıtım yöntemleri(reklam için yeni bir araç kullanma, yeni bir marka imajı... gibi)	1 ( )	2 ( )
Ürün konumlandırması veya satış kanalları için yeni yöntemler kullanma (ilk defa franchising ve dağıtım lisansı kullanma, doğrudan satış ... gibi)	1 ( )	2 ( )
Ürün veya hizmetlerin fiyatlandırmada yeni bir yöntem kullanma (ilk defa kullanılan indirim sistemleri, talebe göre değişken fiyat... gibi)	1 ( )	2 ( )
Diğer.....		

2.  Hayır

**S31.** AR-GE ve yenilik faaliyetleri sonucunda firmanızda aşağıdakilerden hangileri gerçekleşmiştir?

(► Anketör: Birden çok yanıt işaretlenebilir)

		Derece
1	Girdi-makine-teçhizat maliyetleri azalmıştır	( )
2	İşgücü maliyetleri azalmıştır	( )
3	Üretilen ürün çeşidi artmıştır	( )
4	Ürün kalitesi artmıştır	( )
5	Üretim kapasitesi artmıştır	( )
6	Verimlilik artışı gerçekleşmiştir	( )
7	Pazar payı artmıştır	( )
8	Çevre, sağlık ve güvenlik açısından iyileşmeler sağlanmıştır	( )

**S32.** Firmanız açısından AR-GE ve Yenilik faaliyetlerinin önündeki engeller nelerdir?

(► Anketör: Birden çok yanıt işaretlenebilir)

		Derece
1	Firmanızın veya girişim grubunuzun parasal kaynak yetersizliği	( )
2	Firmanız dışındaki kaynaklardan finansman sağlanamaması	( )
3	Yenilik maliyetlerinin çok yüksek olması	( )
4	Nitelikli personel yetersizliği	( )
5	Teknoloji konusunda gerekli bilginin yetersizliği	( )
6	Pazarlar hakkında bilgi yetersizliği	( )
7	Yenilik konusunda işbirliği yapılacak bir ortak bulmanın güç olması	( )
8	İstikrarlı ve güçlü firmaların piyasaya hakim olması	( )
9	Yeni mal/hizmetlere olan talebin belirsiz olması	( )
10	Ülke ekonomisindeki belirsizlikler	( )
11	Daha önceki yenilik faaliyetlerinden dolayı ihtiyaç duyulmaması	( )
12	Yeniliğe talep olmadığı için ihtiyaç duyulmaması	( )
13	Diğer (belirtiniz) .....	( )

## **BÖLÜM 5: PATENT ve LİSANS KULLANIMI HAKKINDA**

**S33.** Son 5 yıl içinde “BAŞVURDUĞUNUZ” fikri mülkiyet haklarının sayılarını belirtiniz.

	TPE	WIPO	EPO	Diğer	Toplam Başvuru
Patent					
Faydalı model					
Endüstriyel Tasarım					
Marka					

(► Anketör: TPE: Türk Patent Enstitüsü, WIPO: Dünya Fikri Mülkiyet Hakları Örgütü, EPO: Avrupa Patent Ofisi.)

**S34.** Son 5 yıl içinde “ALDIĞINIZ” (tescil edilen) fikri mülkiyet haklarının sayılarını belirtiniz.

	TPE	WIPO	EPO	Diğer	Toplam Başvuru
Patent					
Faydalı model					
Endüstriyel Tasarım					
Marka					

(► Anketör: TPE: Türk Patent Enstitüsü, WIPO: Dünya Fikri Mülkiyet Hakları Örgütü, EPO: Avrupa Patent Ofisi.)

**S35.** Size ait olan herhangi bir fikri mülkiyet hakkı, başkaları tarafından yasal olmayan bir şekilde kullanıldı mı? (tasarımı korsan kopyalayan var mı?, ürün taklitleri oluyor mu?, vs.)

1.  Evet

2.  Hayır

(► Anketör: Cevap YOK ise, S37 'ye geçiniz.)

**S36.** Fikri mülkiyet haklarınızın ihlal edilmesinden dolayı bugüne yasal yollara başvurduunuz mu? Kaç kere?

1.  Evet

2.  Hayır

**S36.1.** Yurt İçinde yapılan başvuru sayısı : .....

**S36.2.** Yurt dışında yapılan başvuru sayısı : .....

**S37.** Firmanızca geliştirilen teknolojiler (yenilikler) ya da alınan patentler var mı?

1.  Evet

2.  Hayır (► Anketör: Cevap HAYIR ise, Bölüm 6' ya geçiniz.)

**S37. 1.** Eğer cevap EVET ise, firmanızca geliştirilen teknolojiler (yenilikler) ya da alınan patentler kullanım ve satışı için belirtiniz.

(► Anketör: sadece bir tanesini işaretleyiniz)

		Derece
1	Hem firma içi üretime uygulanmakta hem de diğer firmalara satılmaktadır (patent haklarınızdan para kazanıyor musunuz?)	( )
2	Diğer firmalara satılmakta ama firma içi üretimde uygulanmamaktadır	( )
3	Firma içi üretimde uygulanmakta ama diğer firmalara satılmamaktadır	( )
4	Firma içi üretimde uygulanmamakta ve diğer firmalara satış yapılmamaktadır	( )



## **BÖLÜM 6: TEKNOLOJİ TRANSFERİ ve YÖNETİMİ HAKKINDA**

**S38.** 2009-2011 döneminde (son üç yılda) firma dışından kendinize önemli gördüğünüz teknoloji transferi yaptınız mı?

1.  Evet

2.  Hayır (► Anketör: Cevap HAYIR ise, S39'a geçiniz.)

**S38.1** Teknoloji transferini hangi yöntemlerle gerçekleştirdiniz? Firmanız için önemlerini belirtiniz.

(► Anketör: 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Lisans alımı	( )
2	Makina ve teçhizat alımı	( )
3	Ar-Ge için işbirliği	( )
4	Üretim için işbirliği	( )
5	Yeni uzman istihdamı	( )
6	Firma birleşmesi	( )
7	Danışmanlık hizmeti alımı	( )
8	Açık dış bilgi kaynakları (fuvar, sergi, yayın vb.)	( )

**S39.** 2008-2011 döneminde (son üç yılda) kendi firmanızdan başka firmalara önemli gördüğünüz teknoloji transferleri yaptınız mı?

1.  Evet

2.  Hayır

**S40.** Nitelikli işgücü bulmakta sorunlar yaşıyor musunuz?

1.  Evet

2.  Hayır

**S41.** Firmalar arası ortak eğitim programlarına katılıyor musunuz?

1.  Evet
2.  Hayır (► Anketör: Cevap Hayır ise, S42 'e geçiniz.)

**S41.1.** Katıldığınız eğitim programlarının yerlerini belirtiniz.

1.  OSB içi
2.  Bölge içi
3.  Yurt içi (Bölge dışı)
4.  Yurt dışı

**S42.** Sektörünüzde nitelikli işgücü hareketliliği olduğunu düşünüyor musunuz? (firmalar arası iş değiştirmeler sıkça yaşanıyor mu?)

1.  Evet
2.  Hayır (► Anketör: Cevap Hayır ise, S43 'e geçiniz.)

**S42.1.** Ne tür bir işgücü hareketliliği gözleniyor?

1.  OSB içi
2.  Bölge içi
3.  Yurt içi (Bölge dışı)
4.  Yurt dışı

**S43.** Aşağıdaki önermeler hakkındaki fikrinizi 1’den 5’e kadar puanlayınız

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Firmanız çalışanları üretimde ve yeni ürün geliştirme de kullanılan teknolojiler için yeterli beceriye ve deneyime sahiptir.	( )
2	Firmanız kendi sektöründeki başka firmalara teknoloji transferi yapma kapasitesine sahiptir.	( )
3	Firmanızda yeni teknolojiler çalışanlarla, tedarikçilerle ve müşterilerle düzenli olarak görüşülüp tartışılır (sürekli toplantı düzenleyerek bilgi alışverişinde bulunuyor musunuz?)	( )
4	Firmanız pazar talebi sonucu Ar-Ge çalışmalarına ihtiyaç duymaktadır.	( )
5	Firmanızda Ar-Ge’den sorumlu bir üst yönetici vardır veya Ar-Ge birimi olmasa da ilgili bir personel vardır).	( )
6	Firmanız ürün tasarımına önem vermektedir	( )
7	Firmanız rekabet için rakiplerinin ürünlerini/proseslerini izleyip geliştirmektedir.	( )

## **BÖLÜM 7: BAŞKA KURULUŞLARLA İLİŞKİLER ve İŞBİRLİKLERİ HAKKINDA**

Bu bölümde firmanızın yararlandığı firma dışı ilişkiler sorulmaktadır.

**S44.** Firmanız son 5 yılda başka kuruluşlarla başarılı işbirliklerine gitti mi?

1.  Evet
2.  Hayır (► Anketör: Cevap HAYIR ise, S46' ya geçiniz.)

**S45.** Diğer firmalarla ne tür işbirlikleri yaptınız? Firmanız için önemlerini belirtiniz.

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Firma bilgilerini ve becerilerini paylaşma	( )
2	Ar-Ge işbirliği	( )
3	Tasarım işbirliği	( )
4	Yeni teknoloji edinme/geliştirme	( )
5	Üretim işbirliği (yarı mamul üretimi vd.)	( )
6	Yeni ürün geliştirme	( )
7	Pazarlama işbirliği	( )
8	Eğitim işbirliği	( )
9	Finansman paylaşımı	( )
10	Fuar, sergi, yayın vb. açık bilgi kaynaklarından yararlanmak için işbirliği	( )
11	Diğerleri Açıklama:	( )

**S46.** Firmanız son 3 yılda bilgi temelli hizmetler veren kuruluşlardan yararlandı mı?

1.  Evet
2.  Hayır (► Anketör: Cevap HAYIR ise, BÖLÜM 8' e geçiniz.)

**S47.** Firmanız bilgi temelli hizmetler veren kuruluşlardan (özel danışmanlık kuruluşları, KOSGEB vd.) hangi alanlarda yararlandı? Firmanız için önemlerini belirtiniz.

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Ar-Ge	( )
2	Tasarım	( )
3	Teknoloji geliştirme	( )
4	Ürün geliştirme	( )
5	Pazarlama	( )
6	Bilgi teknolojileri ve iletişim sistemleri	( )
7	Teknik danışmanlık	( )
8	Yasal danışmanlık	( )
9	Denetleme ve muhasebe	( )
10	Diğer Açıklama:	( )

## **BÖLÜM8: TEKNOLOJİK YENİLİK İÇİN BAŞKA KURULUŞLARLA İLİŞKİLER**

**S48.** Firmanız son 5 yılda ürün veya proses yeniliği için başka kuruluşlarla işbirliği yaptı mı?

1.  Evet,

2.  Hayır (► Anketör: Cevap HAYIR ise, S49'a geçiniz.)

**S48.1.** Firmanızın yenilik için başka kuruluşlarla işbirliği yapmasını kolaylayan etmenler nelerdir? Firmanız için önemlerini belirtiniz.

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Ortağın sahip olduğu fiziksel kaynaklar (iş ortamı, makina ve teçhizat, malzeme vb.) ve zihinsel kaynaklar (işgücü, bilgi, Ar-Ge, tasarım, kalite ve standartlar, teknolojik yetenekleri, prestij vb.)	( )
2	Ortağın sahip olduğu uzmanlık	( )
3	Ortağın sahip olduğu dış ilişkiler (işbirliği yaptığı diğer kuruluşlar, içinde yer aldığı gruplar/ağyapılar, girdiği pazarlar vb.)	( )
4	Ortak ile mevcut uzun vadeli ilişkiler (karşılıklı güven)	( )
5	Ortak ile yapılan uzun vadeli işbirliği (stratejik ortaklık)	( )

**S49.** Firmanız yenilik için hangi tür kuruluşlarla işbirliği yaptı? Firmanız için önemlerini belirtiniz.

(► Anketör: Birden çok yanıt tek tek işaretlenecek.)

		Derece
1	Satıcılar	( )
2	Alıcılar	( )
3	Rakipler	( )
4	Bunların dışındaki firmalar	( )
5	Yükseköğretim kurumları (üniversiteler vb.)	( )
6	Kamu araştırma ve teknik destek kurumları (üniversite vb. hariç)	( )
7	Kamu yenilik finansmanı kuruluşları (bakanlıklar, KOSGEB, DPT, TÜBİTAK, TGGV vb.)	( )
8	Özel danışmanlık kuruluşları, bilgi tabanlı hizmet sunucular	( )
9	Meslek kuruluşları (odalar, dernekler vb.)	( )
10	Özel yenilik finansmanı kuruluşları (bankalar, risk sermayesi vb.)	( )

**S50.** Aşağıdaki önermeler hakkındaki fikrinizi 1’den 5’e kadar puanlayınız

(► Anketör: derecelendirme; 1= kesinlikle katılmıyorum, 5= tamamen katılıyorum)

		Derece
1	OSB içinde firmalar bilgilerini ve becerilerini kolaylıkla paylaşırlar	( )
2	OSB içinde firmalar OSB yönetimlerinden gerekli teknik ve idari desteği alırlar.	( )
3	Firmanız hedeflenen ürün tasarımını kolaylıkla yapabilir.	( )
4	Firmamız, tasarım bilgi ve becerisine sahiptir.	( )
5	Tasarımını örnek aldığınız (kopyaladığınız) firmalar ile aranızda önemli teknolojik benzerlikler vardır	( )
6	Firmamız, diğer firmalar ile kolaylıkla tasarım işbirliklerine gidebilir.	( )
7	Tasarım ve üretim İşbirliği yaptığınız firmalardaki kaynaklar ile kendi kaynaklarınız birbirlerini önemli ölçüde tamamlamaktadır	( )
8	Üretim ve pazarlama işbirliği yaptığınız firmalar ile aranızda mali konularda kolaylık için karşılıklı anlayış vardır	( )
9	Üretim ve pazarlama işbirliği yaptığınız kuruluşlar ile aranızdaki ortak kültüre bağlı alışkanlıklar, anlayış ve kurallar karşılıklı güven kaynağıdır	( )
10	Ankara’da bulunmak üretim ve ticaret için önemli bir avantajdır.	( )
11	Üyesi olduğunuz organizasyonlar üyelerinin ortak hedefler için işbirliği yapmalarına yardımcı olmaktadır.	( )
12	Medikal sektöründe faaliyet gösteren firmalar, birbirlerinin ürünlerini sıklıkla kopyalarlar.	( )
13	Medikal sektöründe faaliyet gösteren firmalarda, üretimde ve tasarımda gizlilik çok önemlidir.	( )



## **BÖLÜM 9: TASARIM HAKKINDA**

**S51.** Tasarım yapıyor musunuz?

1.  Evet
2.  Hayır

**S51.1.** Firmanızda bir tasarım birimi var mı?

1.  Evet
2.  Hayır

**S51.2.** Firmanızda endüstriyel tasarımcı çalıştırıyor musunuz?

1.  Evet, tam zamanlı bir tasarımcı çalıştırıyoruz.
2.  Evet, yarı zamanlı bir tasarımcı çalıştırıyoruz.
3.  Hayır, fakat firmamızda endüstriyel tasarım işlerini ilgili diğer mühendis arkadaşlar üstleniyorlar (tasarım işlerini yürüten başka mühendisler var).
4.  Hayır, firmamızda endüstriyel tasarımcı çalıştırmıyoruz.

**S52.** Ürün tasarlarken hangi ürün özelliklerine dikkat ediyorsunuz?

(► Anketör: Birden çok yanıt 1-5 arası derecelendirilecek; derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Ergonomik özellikler ön plandadır.	( )
2	Estetik özellikler ön plandadır.	( )
3	Malzeme seçimi ön plandadır.	( )
4	Ürün kalitesi ön plandadır.	( )
5	Ürünün kullanıcı dostu olması (medikal özelliklerine göre) ön plandadır.	( )
6	Ürünün medikal teknolojisi ön plandadır.	( )
7	Ürünün çevre, sağlık ve güvenlik açısından uyumu ön plandadır.	( )
8	Ürünün bakım kolaylığı ön plandadır.	( )

**S52.1.** Ürün tasarlarken hangi faktörlerden / birimlerden faydalanıyorsunuz?

(► Anketör: Birden çok yanıt tek tek işaretlenecek.)

		Derece
1	Firmanın üretim planlama birimi (firmanın üretim tecrübesi)	( )
2	Firmanın tasarım birimi (eğer varsa)	( )
3	Firmanın içinde yer aldığı firma grupları ve diğer firmaların kaynakları	( )
4	Alıcılar ve müşteriler (alıcı ve müşterilerin talep ve bilgileri)	( )
5	Rakipler	( )
6	Başka kuruluşlarla tasarım işbirliği	( )
7	Teknik tasarım danışmanlık kuruluşları	( )
8	Medikal sektöründeki farklı patentler	( )
9	Medikal Sektöründeki diğer firmaların yeni çıkan ürünlerini taklit	( )
10	Açık dış bilgi kaynakları (fuarlar, yayınlar vb.)	( )

**S53.** Ürün farklılaştırması önemli bir firma stratejisidir. Ürün farklılaştırması için ürün tasarımı yapıyor musunuz?

1. [ ] Evet

2. [ ] Hayır (► Anketör: Cevap HAYIR ise, S54'e geçiniz.)

**S53.1.** Cevabınız evet ise, neden?

(► Anketör: Birden çok yanıt 1-5 arası derecelendirilecek; derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Ürün tasarımı rekabet için önemlidir.	( )
2	Taklit üründen yeni ürüne geçişte ürün tasarımı önemli rol oynar.	( )
3	Ürün tasarımı, markalaşma için önemlidir.	( )
4	Ürün tasarımı, toplu alım ihaleleri şartnamelerinde yeterlik için önemlidir.	( )
5	Ürün tasarımı, ihracat yapabilmek için önemlidir.	( )
6	Ürün tasarımı, üretim faaliyetlerimizin önemli bir parçasıdır.	( )

**S54.** Ürün tasarımının yerini ürün geliştirme aşamaları içinde nerede konumlandırıyorsunuz?

		Derece
1	Yeni ürün özelliklerini belirledikten sonra tasarıma geçeriz.	( )
2	Ürün tasarımından sonra imalat süreçlerini tasarlarız.	( )
3	Diğer ürün geliştirme süreçlerimiz ile tasarım süreçlerimiz örtüşür.	( )

**S55.** Tasarımdan sonraki süreçler için aşağıdakilerden hangilerini yapabiliyorsunuz?

(► Anketör: Birden çok yanıt 1-5 arası derecelendirilecek; derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Tasarımdan sonra ürün tasarımı müşteri taleplerine göre sürekli güncellenmektedir (sürekli ürün iyileştirme yapılmaktadır).	( )
2	Tasarım sonrası, ürün kullanım kitapçığı (dokümantasyon) hazırlanmalıdır.	( )
3	Tasarım sonrası, prototip üretimi yapılmalıdır.	( )
4	Tasarım sonrası, ürünün kalite ve güvenlik süreçlerine / koşullarına uygunluğu test edilmelidir.	( )
5	Tasarım sonrası, ürünün satış sonrası servis süreçleri planlanmalıdır.	( )
6	Tasarım sonrası, ürünün faydalı model başvurusu için gerekli çalışmalar yapılmalıdır.	( )

**S56.** Tasarım sürecinde başardığınız ürün farklılaştırmada (ürün değişikliklerinde) aşağıdaki kriterler ne derecede etkili oluyor?

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Üretim maliyetlerini azaltma	( )
2	Üretilen üründe fonksiyon (işlev) değişikliği	( )
3	Ürünün kullanımında ve ürün verimliliğinde değişiklik	( )
4	Yeni tasarlanmış ürüne ilişkin talep değişikliği	( )
5	Pazardaki rekabet koşulları	( )

**S57.** Ürün tasarımı yaparken aşağıdaki özellikler ne derecede etkili oluyor?

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Hedef ürün maliyeti	( )
2	Paketleme ve nakliyat	( )
3	Üretim tesisinin üretim altyapısı	( )
4	Yasal sorumluluklar (sigorta gereksinimleri vb.)	( )
5	Çevre Faktörlerine uyum	( )
6	Ağırlık ve boyut	( )
7	Kalite güvenilirlik	( )
8	Standart ve şartnameler	( )
9	Estetik görünüm	( )
10	Test güvenliği	( )

**S58.** Son 3 yıllık dönem içerisinde, mevcut tasarımların değiştirilmesi yoluyla kaç tane ürün tasarımı yapıldı?

Ürün Tasarım sayısı ..... (► Anketör: Cevap Hayır ise, S60'a geçiniz.)

**S58.1.** Mevcut ürünlerde tasarım değişikliği yaparken hangi faktörler etkili oldu?

(► Anketör: Birden çok yanıt işaretlenebilir)

		Seçenek
1	Yurtiçindeki ürünlerin incelenmesi	( )
2	Yurtdışındaki ürünlerin incelenmesi	( )
3	Yapılacak değişikliklerin ürün yapısına etkilerinin incelenmesi (değişiklik riski)	( )
4	Değişik çözüm seçeneklerinin test edilip incelenmesi (Risk Yönetimi)	( )

**S59.** Ürün tasarlarken, müşterinin karşılaştığı yeni ürünü hangi yönleriyle değerlendireceğini var sayarsınız?

(► Anketör: derecelendirme; 1 = önemsiz, 2= az önemli, 3= orta önemli, 4= çok önemli, 5= vazgeçilmez)

		Derece
1	Ürünü tamamı (bütünselliği) üzerinden değerlendiririm.	( )
2	Ürünün işlevselliği daha önemlidir.	( )
3	Tasarım ayrıntıları daha önemlidir.	( )
4	Ürünün teknik özellikleri daha önemlidir.	( )

**S60.** Son 3 yıllık dönemde tasarım faaliyetleri ürün satışlarını ne şekilde etkilemiştir?

1. [ ] Satışlarda ARTIŞ
2. [ ] Satışlarda DEĞİŞİM YOK
3. [ ] Satışlarda AZALIŞ

**S61.** Son 3 yıllık dönemde tasarım faaliyetleri ürün Pazar payını ne şekilde etkilemiştir?

1.  Pazar payında ARTIŞ
2.  Pazar payında DEĞİŞİM YOK
3.  Pazar payında AZALIŞ

## APPENDIX B: TEZ FOTOKOPİSİ İZİN FORMU

### ENSTİTÜ

Fen Bilimleri Enstitüsü

Sosyal Bilimler Enstitüsü

### YAZARIN

Soyadı : CEYHAN

Adı : SEMİH

Bölümü : YÖNETİM VE ORGANİZASYON (İNGİLİZCE)

**TEZİN ADI** (İngilizce) : ANALYSIS OF THE IMPACT OF THE INTER-FIRM COLLABORATION ON INNOVATION: ANKARA İVEDİK ORGANIZED INDUSTRIAL ZONE MEDICAL SECTOR

**TEZİN TÜRÜ** : Yüksek Lisans

Doktora

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir.
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir.
3. Tezinden bir bir (1) yıl süreyle fotokopi alınamaz.

**TEZİN KÜTÜPHANEYE TESLİM TARİHİ**