Incentive Mechanisms in Industrial Development: An Evaluation through Defense and Aviation Industry of Ankara

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Abstract

There is an ongoing debate about the dynamics of technological catch-up of domestic firms in an increasingly globalized and uncertain world economy. Incentive mechanisms are one of the routes of these debates. Incentives which are related to the overall market conditions and the structure of competition, as well as government policies guide the allocation of resources and the effort to develop new knowledge. Governments often play an important role as providers of the information and technology sources, establishing or supporting science parks, clusters, coordinating the relationship between industry and university/research institutions, directing financial support to innovative enterprises, promoting exports etc. This paper explores the extent of incentive and support mechanisms which shape government policies and firm strategies in terms of industrial development through the case of defense and aviation industry in Ankara which has a leading role in the development of the sector.

The defense and aviation industry is a special sector among others in many respects. The firms in the sector invest heavily in R&D and innovation. The industry is heavily regulated and protected, and public instruments such as R&D procurement and offset agreements are commonly used to support national interests and domestic firms. Through the last 20 years, Turkish defense and aviation industry has determined its direction as meeting its requirements more domestically, having an international regional market and begin to take its place in the global competition. Incentive and support mechanisms are important to ensure the development and sustainability of this uptrend and performance in the following phase. In this respect, this study will examine the related incentive mechanisms by various institutions and the exploitation level of firms. The relation between the incentive exploitation level of the firms and the firm characteristics such as, firm size, age, quality of the labor, innovative capacity and the firm performance such as increase in turnover, exports etc. through firm surveys conducted with defense and aviation companies in Ankara will be evaluated.

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1. Introduction

Current global financial and economic crisis bring industrial policy again as a leading issue in the debates over development. Defining industrial policy is complex which include; public actions to promote enterprise competitiveness; economic interventionalism in pursuit of productivity increases; policies for enterprise development; strategic interventions by government aimed at transforming the given or inherited comparative advantage of their resource endowments; and strategic intervention in support of domestic competitiveness and boosting domestic industry (Reinert, 2007; quoted by UNCTAD, 2009). The crucial point is that industrial policy cannot be equated with a particular set of policy instruments, but may evolve over time. There are many studies showing that incentives and institutions all play a critical role in industrial development. The aim of this study is to make a contribution to the incentive dimension of development at the firm and industry level and also address the role of institutions. The paper is organized in six sections. After introduction, the second section examines the debates over incentive mechanisms and industrial development shortly. In the third section, the patterns of development of the defense and aviation industry in Turkey are presented with a special focus on institutional structure. The fourth section provides an interpretation of Turkey's industrial incentives with relation to defense and aviation industry. The fifth section, discuss the firm survey results of Ankara defense and aviation industry based on the proposed framework. Finally, the last section presents some brief conclusions.

2. Incentive Mechanisms and Industrial Development

Competition and government intervention are the major aspects which determine the incentive structure of the market (Veloso and Soto, 2001). It is assumed that competition in product and factor markets provide signals to investors about the potential returns among alternative options, thus determining their investment patterns. However, owing to externalities, missing institutions, economies of scale, and other types of market failure markets alone cannot be relied upon to coordinate the processes of capital accumulation, structural change and technological upgrading in a way consistent with sustainable growth and development. These shortcomings of the market mechanism in turn call for some sort of government intervention.

UNCTAD report (2009) discusses about the market-friendly functional measures and market-supporting selective interventionalism which are distinguished generally in economic literature. It puts forward that while most orthodoxy accepts the need for functional interventionism to deal with market failures, it rarely accepts selective interventionism (targeting the most promising sectors or engines of growth), on the grounds that governments are corruptible, less competent and less capable of improving upon allocation by markets. Whether it is better for the government to support particular activities (selective) or a wide range of related activities (functional) will depend on the specific economic context (UNCTAD, 2009).

Governments are concerned with making sure that societal costs and benefits are endogenized in the decisions of private firms. In a learning environment this may mean subsidizing research activities, investing in education, protecting infant industries, promoting exports, etc. Industrial development patterns are conditioned by different institutional settings that affect incentives. In particular, a cooperative environment and the presence of support organizations enhance the dissemination of knowledge, induce long term commitments to relevant technologies and export markets, and facilitate equalization of bargaining power among economic agents. A lively debate continues over the role of institutions in economic growth and development. Learning and innovation, sine qua non of growth, may arise from a variety of sources, such as research and development (R&D - which is codified knowledge), tacit learning-by-doing, investments in new machinery and equipment, technology suppliers, mobility of labor, etc. But firms do not innovate alone; they are heavily supported by a dense array of support institutions that promote institutional learning on a continuous basis. Institutions are socially constructed rules of the game that reduce uncertainty by establishing a stable structure of interactions and linkages (North, 1990). The main argument of those who favor policy intervention is that it is the interaction of policies and institutions that make up the incentive structures which instigate, accelerate or delay economic change. The state, through industrial policy, can shape the structure of social and economic interactions through the provision of incentives. Incentives and institutions represent the main coordinating devices for economic and social activities. Incentives - interpreted as rules that
govern the exchange of goods and services as well as the creation of new markets - coordinate activities of economic and productive agents (UNCTAD, 2009).

3. Turkish Defense and Aviation Industry

Turkey has set ambitious targets to develop its local defense and aviation industry with a focus on innovation. The objective is to decrease the dependence on foreign products by supporting the development of the national industry and increasing exports. In the beginning of 1990s, Turkey had adopted 'joint production model', instead of 'direct procurement' in defense/military procurement policies. Since 2003, Turkey has changed this policy and adopted ‘local design/local production’ policies and ‘local content/offset’ applications (Van Herk, 2012). Accordingly, a foreign company that wishes to sell a product in Turkey has either to subcontract a certain percentage of its production to Turkish producers, or has to make direct procurement of equipment from Turkey. Due to these defense procurement policies and offset requirements applied since 2003, local content ratio, which was around 20-25% in 2003, has increased to 54% in 2011. In 2011, offset policies were revised, obliging foreign companies to increase their local content from 50% to 70%. Government policies target to increase this ratio even higher. These policies reflected in the exports, as well. Exports reached 1.3 billion dollar in 2012 (www.turksavunmasanayi.gov.tr).

Due to these policies, Turkish companies are encouraged to develop their own indigenous products, enrich their product portfolio and are expected to increase their international market share. Collaboration among the industry, small and medium sized enterprises, universities and research organizations is being strengthened, while R&D projects are being determined and prioritized. Advanced technology and investments are supported. To benefit from international know-how, co-operation with international companies in terms of joint production, joint marketing, production under license, participation in joint development programs, multinational partnerships is also being promoted. The defense and aviation industry is shaped and developed by many actors. The Undersecretariat of Defense Industries (SSM) which was established in 1985 is the government body supporting all initiatives and providing guidance to the sector. A specific law (no. 3238) governs all issues related to the defense industry and SSM executes the decisions of the defense Industry Executive Committee, which is chaired by the Prime Minister and consists of the Minister of defense and the Chief of the General Staff. According to the 2012-2016 Strategic Plan of SSM (SSM, 2009), a turnover of 8 billion dollar and exports of 2 billion dollar is targeted for 2016. The Turkish Exports Strategy and Action Plan for 2023 (TUBÍTAK, 2003) designates defense industry as one of the priority sectors for R&D incentives and TÜBÍTAK (The Scientific and Technological Research Council of Turkey) projects in strategic areas with high import-dependency. Another government body is General Directorate of Aerospace and Space Technologies (HUTGM) under the Ministry of Transport, Maritime Affairs and Communication sets policies, strategies and objectives to improve national aviation industry and space technologies. Studies on manufacturing of a national civil passenger aircraft is currently being coordinated by HUTGM. Major defense and aviation manufacturers are members of the organization Turkish Defense and Aerospace Industries Manufacturers Association (SASAD). It was established in 1990 by 12 companies with the support of the Ministry of National Defense. In 2012, SASAD has 135 members and associate members in 10 sub-sectors of the defense industry. On the other side, the exporters have recently been united under Defense and Aerospace Industry Exporters Union (SSI). SSI has been established by 79 exporters in 2011 (reached to 160 member firms in 2013) to enable sector co-ordination and information flow and to represent the sector abroad at relevant levels and platforms. SSI’s aim is to bring all these companies under its umbrella and conduct export related activities in a more planned and systematic way in co-ordination with other institutions and organizations.

Establishing clusters and technology development zones (TDZs) with a defense and aviation industry focus are the other two important developments taking place in Turkey. As an economic development model, Turkey supports ‘clustering’ activities in certain sectors; bringing companies, universities, R&D institutions, public institutions and other relevant organizations together with the objective of developing the competitiveness of a specific sector. Technology Development Zones (TDZs) were introduced in 2011, bringing universities, researchers and industries
together to encourage and support the development of new, innovative and advanced technologies (Van Herk, 2012). R&D activities of companies operating within TDZs are supported by generous incentives in relation to income and corporate tax, VAT and the salaries of employees. There are three defense and aviation industry clusters in Turkey, located in the cities of Ankara, Eskisehir and in Izmir. There are currently two TDZs which are given a special defense and aviation focus in Turkey. One of them is the high tech cluster “Teknokent (Technology Park) Defense Industry Cluster” within Middle East Technical University’s METU Technopark in Ankara and the other one is Istanbul Technopark in Istanbul.

4. Turkey's Industrial Incentives with Relation to Defense and Aviation Industry

Turkey’s existing investment incentives scheme is specifically designed to encourage investments with the potential to reduce dependency on the importation of intermediate goods vital to the country’s strategic sectors. Amongst the primary objectives of the investment incentives scheme are: reduce the current account deficit; boost investment support for lesser developed regions; increase the level of support instruments; promote clustering activities; and to support investments that will create the transfer of technology. Effective as of January 1, 2012, the investment incentives system has been comprised of four different schemes (www.invest.gov.tr). Local and foreign investors have equal access to:

1- General Investment Incentives Scheme
2- Regional Investment Incentives Scheme
3- Large-Scale Investment Incentives Scheme
4- Strategic Investment Incentives Scheme

The investment incentives system defines certain investment areas as “priority” and offers them the regional support extended to Region 5 by the Regional Investment Incentives Scheme, regardless of the region of the investment. If the fixed investment amount in priority investments is TRY 1 billion or more, tax reduction will be applied by adding 10 points on top of the “rate of contribution to investment” available in Region 5. If priority investments are made in Region 6, the regional incentives available for this particular region shall apply.

The incentive package of the government includes considerable incentives for the defense and aviation industry. If a project investment is over 20 million TRY and approved by SSM, or when it is related to the production of a patented product covered under the R&D projects supported by the Ministry of Science, Industry and Technology, the project will be treated as ‘priority sector investment’. R&D expenditures of these sectors will be supported by 50 to 100%. The government intends to spend 7-8 billion TRY on R&D incentives in the medium term. SSM is at the managing nearly 300 projects (Van Herk, 2012). Besides the general investment incentive scheme of Turkey, there are many industrial supports provided by different institutions in the areas of R&D, SMEs, exports, special zones and sectoral priorities, which are summarized in the Table 1.
### Subject of the Support/Related Institutions

| Subject of the Support/Related Institutions | Content of the Supports |
|--------------------------------------------|-------------------------|
| **R&D support**                           | R&D Law; special incentives for R&D investments provided that a minimum of 30 personnel are employed in an R&D center. The incentives within the law (which will remain in effect up to 2024) include: 100 percent deduction of R&D expenditure from the tax base if the number of researchers exceeds 500, then half of the R&D expenditure increase incurred in the operational year compared to the previous year will also be deducted; Income withholding tax exemption for employees; 50 percent social security premium exemption for employers for a period of 5 years; Stamp duty exemption for applicable documents; Techno-initiative capital for new scientists up to TRY 100,000; Deduction from the tax base of certain funds granted by public bodies and international organizations. Projects eligible for TUBITAK incentives: Concept development; Technological research & technical feasibility research; Laboratory studies in the translation of a concept into a design; Design and sketching studies; Prototype production; Construction of pilot facilities; Test production; Patent and license studies; Activities concerning the removal of post-sale problems arising from product design. Related TUBITAK programs are; 1501-Industrial R&D projects support program 1507-SME R&D startup support program 1509-International Industrial R&D projects support program 1511- Priority Areas Research and Technology Development Program 1505- University-Industry Cooperation Program. |
| **Support for SMEs**                       | Incentives granted to SMEs (employing less than 250 employees and earning less than TRY 40 million in revenue or turnover per year.) include: 1. Exemption from customs duties 2. VAT exemption for imported and domestically purchased machinery and equipment 3. Credit allocation from the budget 4. Credit guarantee support Strengthening SMEs by various support instruments in financing, market research, marketing, export, consultancy, promotion, designing, industrial property, licensing, training. |
| **State aid for exports**                  | The main aims of this scheme are to encourage exports and to increase the competitiveness of companies in international markets. This specific package mainly covers R&D activities, market research, participation in exhibitions and international fairs, and expenditure for patents, trademarks and industrial design. |
| **Supports for Special investment zones**  | 1. Technology Development Zones (TDZs) are areas designed to support R&D activities and attract investments in high technology fields. Advantages of TDZs are; Profits from software development and R&D activities exempt from income and corporate taxes; Sales of application software produced are exempt from VAT; Wages of R&D and support personnel employed in the zone are exempt from all taxes; Investments for the production of the technological product obtained as a result of the R&D projects conducted in the zone may be made in the TDZ, if deemed suitable by the operator company and allowed by the Ministry; 50 percent of the employer’s share of the social security premium will be paid by the government for 5 years. 2. Organized Industrial Zones (OIZs) are designed to allow companies to operate within an investor-friendly environment with ready-to-use infrastructure and social facilities. The existing infrastructure provided in the zones includes roads, water, natural gas, electricity, communications, waste treatment, and other services. Advantages of OIZs: no VAT for land acquisitions; Exemption from real estate duty for five years starting after the construction of the plant; Low water, natural gas, and telecommunication costs; For unification and/or separation of plots, no tax to be paid. Exemption from municipality tax for construction and usage of the plant; Exemption from the municipality tax on solid waste if the OIZ does not benefit from the municipality service. 3. Clusters Declaration on the Development of International Competitiveness (UR-GE): it is aimed to promote the local dynamics based on a clustering approach and to initiate a mobilization for export under the leadership of cooperation organizations. Thus, the firms are encouraged to develop export strategies on the basis of common problems, common opportunities and common visions in a planned way. Cluster Support Program: Minimum 20 firms should be subscribed for an alignment to cooperate. The support subjects are; - Developing cluster coordination, awareness and/or effectiveness - Developing factor conditions and markets - Productivity boosting practices - Innovation related activities. |
| **Defense and Aviation Industry Supports**  | R&D activities which are consistent with the priority areas and objectives and necessities of the main system projects, including industry-university-research institution collaboration is supported by SSM. R&D activities include; basic research, applied research, and experimental development. The main function of TUBITAK-SAGE is to perform research and development activities for defense systems including engineering and prototype production, starting with their fundamental research and conceptual design. Most of the projects are performed in coordination with related defense institutions. |
5. Incentive Exploitation Level of the Firms in Ankara Defense and Aviation Industry

Ankara is the center of the defense and aviation industry, hosting 60-70% of all defense and aviation companies in Turkey. The existence of OIZs, Technology Development Zones, Clusters and qualified universities support the industrial infrastructure. 6 out of 11 defense industry companies that are listed among the first 500 biggest industrial enterprises of Turkey are in Ankara. These 6 companies constitute 62% of the total turnover with their turnover values summing up to 2.4 billion TL (SSM, 2011). Ankara companies realized 71% of the total defense products export and 57% of overall civilian aviation products export done by the 40 companies determined by SSM (SSM, 2011). 71% of overall R&D expenditures, 42% of equity R&D expenditures and 99% of R&D expenditures realized through external financing provided from institutions such as TÜBİTAK, SSM, TEYDEB and Ministry of Science, Technology and Industry have been realized by Ankara companies (SSM, 2011). 72% of all work share amount transferred to domestic subsidiary industry have been realized by Ankara companies (SSM, 2011).

OSSA (OSTİM Defense and Aviation Cluster) was established in 2008 as the first cluster of Turkey in defence and aviation sector, bringing companies that are working as a sub-industry to defense and aerospace industries within the Ankara OSTİM Organized Industrial Zone. It consists of companies which either provide goods and services, or act as sub-suppliers to key industry companies like ASELSAN, TAI, Boeing, and Sikorsky etc. OSSA has 122 member companies (www.ostimsavunma.org). OSSA is supported by SSM, Small and Medium Sized Enterprises Development Corporation (KOSGEB), Turkish Technology Development Foundation (TTGV), Ankara Chamber of Industry (ASO), Turkish Scientific and Technical Research Organization (TÜBİTAK), SASAD, ODEM, OSTİM, Metutech and THK University.

Middle East Technical University (METU) technopark, has initiated the defense industry cluster, namely Teknokent Defense Industry Cluster (TSSK), as of the end of 2010. ODTÜ Teknokent holds more than 70 defense industry companies. TSSK aims at developing technologies with R&D studies in co-operation with universities and local defense companies (www.tssk.org.tr). Another important cluster initiation is Turkish Defense and Aviation Specialty Zone by SSM in the Kazan district, near to the largest aviation firm TAI-TUSAŞ. It aims to bring all companies and suppliers to the defense and aerospace industry together within this zone, which will benefit from special incentives. SSM is developing a special incentive-credit system to contribute to the technological development of the local industries and to encourage their R&D activities in developing quality products.

5.1. Methodology and Data

In this study, the units of analysis are the SMEs in defense and aviation industry in Ankara. Large firms (such as TAI, ASELSAN, ROKETSAN, MKEK) in the sector is left outside the study as they are very big and have different structure than the SMEs. In order to define the sample of the field survey, the firm lists of different institutions (such as, SSM, SSI, SASAD, OSSA, TSSK) are gathered together. These lists were joined in one list that includes nearly 250 firms. All firms in defense and aviation industry in Ankara were contacted in the field survey during September 2014-January 2015. However, due to the high security requirements of the sector the number of questionnaire forms returned with full information only reached to 104 (nearly 40% of the total number of SMEs). The questionnaire form included questions related to structural characteristics of firms, institutional memberships, subject, number and value of supports of various institutions utilized by firms; perception of firms about the importance of the supports in different areas and about the importance of the role of different actors in reaching the knowledge of innovation.

5.2. Results

The characteristics of surveyed SMEs in defense and aviation industry in Ankara are summarized in Table 2. Nearly half of the firms are established after 2000s when the sector moves on an uptrend process. 20 percent of the firms are very small which have an employment number less than 10. More than half of the firms have employment 11-49, and nearly 30 per cent of the firms are relatively medium sized firms. 90 per cent of the firms stated that their
turnover in the last five years has been increased. Nearly half of the firms are exporting firms and 71.2% of the firms are subcontractors. 59 per cent of the firms have one or more than one innovations. Only 25% of the firms take general supports and 28% take R&D supports from the institutions.

Table 2. The characteristics of surveyed SMEs in defense and aviation industry in Ankara

| Firm Characteristics                  | Frequencies | Valid Percent |
|---------------------------------------|-------------|---------------|
| Firm age (establishment date)         |             |               |
| Before 1980                           | 7           | 7.5           |
| Between 1980-2000                     | 42          | 44.7          |
| After 2000                            | 45          | 47.9          |
| Total                                 | 94          | 100.0         |
| Missing                               | 10          |               |
| Firm size (number of employment)      |             |               |
| Less than 10                          | 19          | 19.0          |
| 11-49                                 | 52          | 52.0          |
| 50-250                                | 22          | 22.0          |
| 250+                                  | 7           | 7.0           |
| Total                                 | 100         | 100.0         |
| Missing                               | 4           |               |
| Turnover (change in the turnover in the last five years) |             |               |
| Increased                             | 86          | 90.5          |
| Decreased/not changed                 | 9           | 9.5           |
| Total                                 | 95          | 100           |
| Missing                               | 9           |               |
| Exporting                             |             |               |
| Exporting firms                       | 48          | 46.6          |
| Non-exporting firms                   | 55          | 53.4          |
| Total                                 | 103         | 100.0         |
| Missing                               | 1           |               |
| Innovation (number of innovations in the last three years) |             |               |
| 1-2 innovations                       | 17          | 16.3          |
| 3 and more innovations                | 44          | 42.3          |
| No innovations                        | 43          | 41.4          |
| Total                                 | 104         | 100.0         |
| Missing                               | 1           |               |
| Production Organization               |             |               |
| Subcontractor firms                   | 74          | 71.2          |
| Non-subcontractor firms               | 30          | 28.8          |
| Total                                 | 104         | 100.0         |
| Missing                               | 1           |               |
| Total value of supports taken from institutions ($) |             |               |
| Less than 10.000                      | 9           | 13.3          |
| 10.000-50.000                         | 5           | 18.5          |
| 50.000-100.000                        | 6           | 22.2          |
| 100.000+                              | 7           | 25.9          |
| Total                                 | 27          | 100           |
| Missing                               | 77          |               |
| Total value of R&D supports taken from institutions ($) |             |               |
| 50.000-100.000                        | 7           | 23.3          |
| 100.000-500.000                       | 12          | 40.0          |
| 500.000+                              | 11          | 36.7          |
| Total                                 | 30          | 100           |
| Missing                               | 74          |               |

Table 3. represents the memberships of the firms to the related institutions. Firms have memberships of more than one institution. Most of the firms are members of Ankara Chamber of Industry and Ankara Chamber of Trade. It is seen that, Ostim Defense and Aviation Cluster is an important agglomeration for SMEs in Ankara.
Table 3. Membership of the firms to the related institutions

| Institutions                                                                 | Number of Member Firms |
|------------------------------------------------------------------------------|------------------------|
| Ankara Chamber of Industry                                                   | 58                     |
| Ankara Chamber of Trade                                                      | 55                     |
| Defence and Aerospace Industry Manufacturers’ Association                     | 28                     |
| Defence and Aerospace Industry Exporters’ Association                        | 13                     |
| OSTE Defence and Aviation Cluster                                            | 46                     |
| ODTU Teknokent Defence Industry Cluster                                      | 14                     |
| Total                                                                        | 104                    |

Table 4. represents the number of general and R&D supports utilized by firms according to institutions. Ministry of Economy and Small and Medium Enterprises Development Organization (KOSGEB) are the institutions whose supports are more utilized by the firms. The subjects of the general supports are investment incitements, marketing, advertisement, exporting, training/education, skilled labor, counselling etc. TUBİTAK is the most important institution related to the R&D supports. There are many technology and innovation support programs utilized by firms such as, 1501-industrial R&D projects support program, 1507-SME R&D startup support program, 1509-International Industrial R&D projects support program, 1511- Priority Areas Research and Technology Development Program and 1505- University-Industry Cooperation Program.

Table 4. Number of General and R&D Supports Utilized by Firms According to Institutions

| Institutions                                                                 | Number of General Supports | Number of R&D Supports |
|------------------------------------------------------------------------------|-----------------------------|------------------------|
| Undersecretariat for Defence Industries (SSM)                                | 5                           | 5                      |
| Ministry of Science, Technology and Industry                                 | 3                           | 4                      |
| Ministry of Economy                                                          | 17                          | 1                      |
| Ministry of Finance                                                          | Total 1                      | 86                     |
| Scientific and Technological Research Council of Turkey (TUBİTAK)            | -                           | 34                     |
| Ankara Development Agency                                                    | 4                           | 6                      |
| Small and Medium Enterprises Development Organization (KOSGEB)               | 17                          | 18                     |
| The Technology Development Foundation of Turkey (TTGV)                       | -                           | 4                      |
| Ankara Chamber of Industry                                                   | 1                           | -                      |
| Eximbank                                                                      | 1                           | -                      |
| Clusters                                                                      | 6                           | -                      |
| Total number of firms getting supports                                       | 35                          | 40                     |
| Missing                                                                       | 69                          | 64                     |
| Total                                                                         | 104                         | 104                    |

Table 5. examines the relation between incentive exploitation level of the firms and the firm characteristics and firm performance, such as firm age, size, production organization, innovative capacity, increase in turnover and exporting. It is seen that 26 firms get general supports and 30 firms get R&D supports from different institutions. Chi-square analysis shows generally that there is no relation between firm characteristics and getting supports. Only the exporting and subcontracting firms’ relation with total value of R&D supports is significant in a 95% reliability level. It is seen that exporting and subcontractor firms are getting higher values of R&D supports from the institutions than the non-exporter and non-subcontractor firms.

Table 5. The relation between firm characteristics and the value of supports taken by the firms

| Firm Characteristics             | Total Value of General Supports | Total Value of R&D Supports |
|----------------------------------|---------------------------------|-----------------------------|
|                                 | Less than 100.000 $ | More than 100.000 $ | Total | $ | Less than 100.000 $ | More than 100.000 $ | Total | $ |
| Firm age (establishment date)    |                                |                            |   |   |                        |                            |   |   |
| Before 2000                      | 9     | 5     | 14  | .275 | 5     | 10    | 15  | .231 |
| After 2000                       | 10    | 2     | 12  | p>.05 | 2     | 12    | 14  |    |
| Total                            | 19    | 7     | 26  | .557 | 5     | 13    | 18  | .481 |
| Firm size (number of employment) |                                |                            |   |   |                        |                            |   |   |
| Less than 50                     | 15    | 6     | 21  | .557 | 5     | 13    | 18  | .481 |
| More than 50                     | 5     | 1     | 16  | p>.05 | 2     | 10    | 12  |    |
| Total                            | 20    | 7     | 27  | .557 | 7     | 23    | 30  |    |
| Turnover                         |                                |                            |   |   |                        |                            |   |   |
| Increased                        | 17    | 6     | 23  | .223 | 6     | 22    | 28  | .603 |
Table 6. The perception of the firms about the importance of the supports taken from the institutions according to their subject

| Supports Taken from Institutions | Very Important | Important | Not Important | Total | Missing |
|----------------------------------|----------------|----------|--------------|-------|---------|
| Education                        | 29 43,3        | 19 28,4  | 19 28,4      | 67 37 |         |
| Counselling                      | 23 37,1        | 19 30,6  | 20 32,3      | 62 42 |         |
| Technical                        | 6 12,0         | 15 30,0  | 29 58,0      | 50 54 |         |
| R&D                              | 6 12,2         | 9 18,4   | 34 69,4      | 49 55 |         |
| Financial                        | 21 36,2        | 17 29,3  | 20 34,5      | 58 46 |         |
| Marketing & Advertising          | 13 23,6        | 21 38,2  | 21 38,2      | 55 49 |         |
| Skilled Labour                   | 7 6,7          | 17 16,3  | 30 31,5      | 54 50 |         |
| Exporting                        | 18 29,0        | 26 41,9  | 18 29,0      | 62 42 |         |
| Sectoral Information             | 34 51,5        | 14 21,2  | 18 27,3      | 66 38 |         |

Table 7. The perception of the firms about the importance of different actors for reaching the knowledge of innovation

| Actors                          | Very Important | Important | Not Important | Total | Missing |
|---------------------------------|----------------|----------|--------------|-------|---------|
| Suppliers                       | 34 47,9        | 30 42,3  | 7 9,9        | 71 33 |         |
| Customers                       | 58 71,6        | 18 22,2  | 5 6,2        | 81 23 |         |
| Competitive firms               | 36 52,9        | 22 32,4  | 10 14,7      | 68 36 |         |
| Counselling firms               | 22 33,8        | 31 47,7  | 12 18,5      | 65 39 |         |
| Universities                    | 36 56,3        | 23 35,9  | 5 7,8        | 64 40 |         |
| Sectoral Institutions           | 38 56,7        | 22 32,8  | 7 10,4       | 67 37 |         |
| Public Institutions             | 42 61,8        | 19 27,9  | 7 10,3       | 68 36 |         |
| Research Institutions           | 38 56,7        | 19 28,4  | 10 14,9      | 67 37 |         |
| Fairs                           | 50 69,4        | 18 17,3  | 4 5,6        | 72 32 |         |
| Internet                        | 47 65,3        | 18 25,0  | 7 9,7        | 72 32 |         |
| Social Relations                | 25 39,7        | 33 52,4  | 5 7,9        | 63 41 |         |

6. Conclusion

Turkish defense and aviation industry is in an uptrend process. In this respect there is a wide range of incentive mechanisms initiated by the government bodies and other related institutions. However, it seems that support utilization level of defense and aviation industry SMEs in Ankara is not at a desirable level. The results of the study
show that exporter and subcontractor firms are using high-cost R&D support tools more than the other firms. The role of the state is essential for creating the right set of incentives for investment, through regulating prices of both inputs and outputs via exchange rate policies, sectoral policies to promote technical change, and fiscal policies especially for strategic sectors such as defense and aviation industry. Major models of economic development leave institutional dimension out of the analysis. However, it is important to take institutional patterns and how they interact with policy into consideration. A theory of industrialization will have to account for institutions. The level of firm behavior may provide an interesting line of research to merge with traditional views on development. Therefore, understanding the relationships between the key stakeholders and how they affect firm strategies and industrial patterns is critical for a successful analysis and developing firm-level capabilities is essential for development models.

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