

The Effects of Incentive Policies on Enterprises' Competitiveness and Research and Development Activities: Turkish Case

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Abstract

Nowadays, the competitiveness of countries in international markets occurs in terms of enterprises' competitiveness. Globalization causes serious alterations in enterprises' strategies and rivalry conditions. Rivalry conditions gain a new dimension and liberalize due to the international trade regulations and agreements as well as bilateral agreements between countries and regional collaborations. Overseas enterprises of developed countries gain significant advantages due to the liberalization of international rivalry conditions whereas the enterprises of developing and undeveloped countries have important disadvantages. Overseas enterprises of developed countries have serious rivalry advantages according to the enterprises of developing and undeveloped countries due to the components such as capital, qualified labor, research and development activities, large product range and professional management structure.

At this point, countries implement several incentive policies in order to gain survival skills and competitiveness to their national enterprises in this new global economic order. These incentive policies are also implemented by developed countries as well as developing countries. These policies are used as a tool for increment in competitiveness and international market efficiency of national enterprises.

The incentive policies, which are implemented by countries, possess many aspects and application areas. In this study, only technical incentive policies of enterprises, which increase the innovation capacity and research and development activities, are analyzed. For this purpose, the research and development incentives of Turkish Republic for textile and clothing sector, which successfully continues to its leading role in terms of internationalization, and the effects of these incentives on enterprises' competitiveness are analyzed. Therefore, the qualifications of research and development incentives which are used by Turkish textile and clothing enterprises; the performances of enterprises before and after incentive usage; the structural alterations due to the incentive usage in terms of enterprises and products are investigated. Also, macro and micro advantages and consequences of incentives are evaluated.

Key words: Turkish incentive policies, research and development, competitiveness, textile and clothing sector

1. Research and Development Activities in Turkey

Research and development activities provide new information and technologies. The new technologies increase the productivity and causes economic growth. Both the empirical and theoretical analyses lay emphasis on the role of research and development activities within the

economic growth [1]. The empirical studies have revealed positive relationship between research and development expenditures and economic growth. Technological improvement occurs in parallel with economic growth and contributes to economy in long term. Technological improvement is an activity which creates positive external benefit. Therefore its impacts affect the economies both nationally and internationally [2].

Besides, there is a close correlation between private sector's research and development activities and countries' economic growth rates [2,3]. The international comparative analyses indicate that research and development activities which are financed by private sector, government sector and foreign resources contribute to productivity increment [2].

Research and development (R&D) activities in Turkey are fulfilled by private sector, government sector and higher education institutions. The ratio of Turkey's R&D expenditures to gross domestic product (GDP) in 2013 is 0,95%. Turkey aims to equal the ratio of R&D expenditures to GDP to 3% in 2023. With this purpose, Law Number 5746 (Law on Supporting Research & Development Activities) is enacted on 2008 in order to support R&D activities. Three main public institutions incite R&D activities of private sector in Turkey. These institutions are Ministry of Science, Industry and Technology - General Directorate of Science and Technology; The Scientific and Technological Research Council of Turkey (TÜBİTAK) - Technology and Innovation Funding Programs Directorate (TEYDEB) and Republic of Turkey Small and Medium Sized Enterprises Development Organization (KOSGEB). Table 1 shows the expenditure ratios of R&D activities and the shares of textile and clothing sectors in private sector's expenditures and employee numbers in Turkey by years.

Table1. R&D expenditures and number of employees in Turkey as ratios [4,5,6,7,8,9,10]

	2008	2009	2010	2011	2012	2013
R&D Expenditure/GDP (%)	0,73	0,85	0,84	0,86	0,92	0,95
R&D Expenditure of Private Sector (%)	44,2	40,0	42,5	43,2	45,1	47,5
R&D Expenditure of Government Sector (%)	12,0	12,6	11,4	11,3	11,0	10,4
R&D Expenditure of Higher Education (%)	43,8	47,4	46,0	45,5	43,9	42,1
R&D Expenditure of Textiles/ R&D Expenditure of Private Sector (%)	1,27	1,53	1,30	1,66	1,53	1,11
R&D Expenditure of Clothing/ R&D Expenditure of Private Sector (%)	0,39	0,39	0,30	0,28	0,26	0,25
R&D Employees of Textiles/ R&D Employees of Private Sector (Headcount) (%)	2,07	2,21	2,00	1,72	1,88	1,57
R&D Employees of Textiles/ R&D Employees of Private Sector (Full Time equivalent) (%)	1,88	2,20	1,93	1,60	1,58	1,45
R&D Employees of Clothing/ R&D Employees of Private Sector (Headcount) (%)	0,64	0,84	0,59	0,57	0,57	0,45
R&D Employees of Clothing/ R&D Employees of Private Sector (Full Time equivalent) (%)	0,58	0,77	0,65	0,63	0,58	0,46

When Table 1 is analyzed, it can be seen that the shares of R&D expenditures in GDP are increased within years. Especially the R&D incentive law, which is enacted in 2008, makes a

significant contribution to the increment of R&D activities. The shares of government sector and higher education institutions in R&D expenditures remain unchanged or decrease within years. However, the shares of private sector are increased. The shares of textile and clothing sectors in private sector's R&D expenditures and employee numbers are increased after the R&D incentive law is enacted. However, a decline is occurred in the last two years. Although the R&D expenditures and employee numbers of textile and clothing sectors are increased in the last two years, their shares are decreased due to the R&D expenditure and employee increments in other sectors such as automotive, machinery and equipment.

2. Research and Development Incentives in Turkey

Ministry of Science, Industry and Technology - General Directorate of Science and Technology, which is one of the institutions that support the R&D activities of private sector, incites the private sector's R&D activities within the scope of four programs. These programs are research & development centers, techno-initiative capital support program, technology development zones and industrial thesis supporting program. The Scientific and Technological Research Council of Turkey (TÜBİTAK) - Technology and Innovation Funding Programs Directorate (TEYDEB) incites within the context of twelve programs whereas Republic of Turkey Small and Medium Sized Enterprises Development Organization (KOSGEB) incites on the basis of three programs.

2.1 Research & Development Centers

Research and development centers (R&D centers) are the units of capital companies that are located in Turkey and organized as a separate unit within the organizational structure, exclusively in R&D and innovative activities at least thirty full-time equivalent R&D personnel employed with sufficient experience and capabilities. Law Number 5746, Law on Supporting Research & Development Activities, provides a range of fiscal incentives for R&D and innovative activities by the private sector as well as for projects supported by public agencies and international institutions. Support and incentives are R&D allowance, incentive for income tax withholding, incentive for employer's social security contribution, stamp duty exclusion and incentive for Techno-Initiative Capital Support. The law is enacted on April 2008. As of October 2014, 186 enterprises were found eligible to establish R&D center under this Law. However, 21 enterprises' R&D center certificates are decertified [11,12,13,14,15].

The following minimum conditions are required for an application to receive an R&D center certification [12,13]:

1. Employment of at least 30 full-time equivalent R&D personnel
2. Implementation of R&D activities in Turkey
3. Enterprise should have R&D management capability and capacity regarding to technological assets, R&D human resources, intellectual property, project and information resources.
4. Enterprise should have facilities which physically control the working time of R&D and support staff in R&D center.
5. Enterprise should have R&D and innovation programs and projects with the issue, time, budget and personnel needs being defined.

6. R&D centers must be established as a separate organization within the enterprise and must be located in single premises.
7. R&D centers must be established apart from technology development zones.

Table 2. Incentives and Exemptions Provided to Enterprises with R&D Center Certification [12,13]

R&D allowance	All R&D and innovation expenditures are exempt from income tax.
Incentives for withholding of income tax	For R&D and support staff working in R&D and innovation projects, income tax is reduced by 90% for employees with PhD and by 80% for the others.
Insurance premium support	Half of the employers share for insurance premium of R&D and support staff is provided by the Ministry of Finance for five years.
Stamp tax exemption	Papers related to R&D and innovation activities are exempt from stamp tax.
Techno-initiative capital support	One-time grant is provided up to 100.000 Turkish Liras (55.000 \$) for senior undergraduate students, graduate and PhD students and for graduates of last 5 years to support their technology oriented business ideas.
a) Law No. 193 b) Law No. 5520	Exemption percentage of R&D expenditures is increased from 40% to 100%.
The duration of support	Valid until 31 December 2023.

Table 2 summarizes the incentives for enterprises which own R&D center certifications. Table 3 shows the statistics of Turkish R&D centers by October 2014 whereas Table 4 indicates the distribution of enterprises, which own R&D center certifications, by years.

Table 3. Statistics of Turkish R&D centers [14]

Number of R&D center applications	209
Number of enterprises which have received R&D center certification	186
Number of R&D centers whose center certificates are decertified	21
Number of R&D centers which are active	165
Number of R&D centers whose evaluation processes are continuing	7
Number of enterprises which haven't received R&D center certification	16

Table 4. Number of Turkish R&D center certifications by years [14]

2008	20
2009	42
2010	22
2011	29
2012	30
2013	23
2014	20
Total	186

4,24% of 165 active R&D centers operate in textile and clothing sector. The information belonging to these seven enterprises are summarized in Table 5. In Table 6, project numbers of Turkish textile and clothing enterprises' R&D centers are shown by years. Project numbers are taken from R&D centers' managers via small interviews. As it can be seen from the table, the project numbers are increased after the enactment of R&D incentive law.

Table 5. R&D centers of Turkish textile and clothing enterprises [14]

Enterprise Name	Province	R&D certification date
Gap Güneydoğu Tekstil Sanayi Ticaret A.Ş.	Malatya	13.10.2011
Kordsa Global Endüstriyel İplik ve Kord Bezi San. ve Tic. A.Ş.	Kocaeli	24.04.2009
Sanko Tekstil İşletmeleri Sanayi ve Ticaret A.Ş.	Bursa	22.04.2009
Söktaş Tekstil Sanayi ve Ticaret A.Ş.	Aydın	01.03.2012
Sun Tekstil Sanayi A.Ş.	İzmir	09.05.2013
Üniteks Gıda Tekstil Motorlu Araçlar Sanayi ve Ticaret A.Ş.	İzmir	26.01.2011
Yünsa Yünlü Sanayi ve Ticaret A.Ş.	Tekirdağ	25.10.2010

Table 6. Project numbers of Turkish textile and clothing enterprises' R&D centers

	2009	2010	2011	2012	2013	2014
Üniteks						
Accomplished projects	-	-	7	9	6	12
Continuing projects	-	-	10	11	14	12
Projects funded by public institutions	-	-	2	4	3	2
Sun Tekstil						
Accomplished and continuing projects	-	36	42	34	36	32
Projects funded by public institutions	-	2	7	10	11	9
Söktaş						
Accomplished projects	-			21	37	42
Continuing projects	-			23	31	36
Projects funded by public institutions	-			3	5	7
Sanko						
Accomplished projects	16	15	9	18	29	-
Continuing projects	12	19	8	19	19	-
Projects funded by public institutions	-	-	-	2	3	-
Kordsa Global						
Accomplished and continuing projects	-	35	60	60	22	-
Gap Güneydoğu Tekstil						
Accomplished projects	-	-			15	
Continuing projects	-	-			15	

2.2 Techno-Initiative Capital Support Program

People who have an R&D project as well as certain qualifications (students with a doctor's degree or master's degree, etc.) are provided with donations of as much as 55.000 \$ by public bodies and institutions in return for their projects. Entrepreneurs are expected to establish their own company and encouraged to locate in the technology development zones [16]. This support program isn't preferred by textile and clothing sector.

2.3 Technology Development Zones

Technology development zones are the academic, social and cultural sites which are established by the side of universities. These sites provide opportunities for entrepreneurs, researchers and academicians who want to produce new or advanced technology based goods and services. Therefore, they can maintain their industrial and commercial activities and also they can benefit from the universities [17]. This support program isn't preferred by textile and clothing sector.

2.4 Industrial Thesis Supporting Program

Ministry of Science, Industry and Technology also implement a program for human resources development for the benefits of the business enterprise sector, namely Industrial Thesis Supporting Program (SAN-TEZ) since 2007. SAN-TEZ projects stimulates co-operation between firms and universities by providing support to graduate students developing new, technology-based products and processing their graduate (M.Sc. and PhD) theses. In particular, it seeks to transform graduate research into innovative products and processes that engages in and addresses the needs and requirements of the industry. With this concept, financial support (grant) up to the % 85 of the project budget is provided by Ministry of Science, Industry and Technology, the rest of the budget is being covered by the company that will commercialize the output of the project. The test and laboratory services are covered by the universities where the projects are being carried out [18,19]. 1927 projects are applied to industrial thesis supporting program between 2007 and 2013 and only 735 projects are supported. 70 projects are belonged to textile and clothing sector. Textile and clothing sector takes the fifth place within the distribution of projects according to sectors [20].

2.5 The Scientific and Technological Research Council of Turkey (TÜBİTAK) - Technology and Innovation Funding Programs Directorate (TEYDEB)

There are 12 research and development support programs intended for private sector. These programs are listed below [21,22].

- 1501- Industrial R&D Projects Grand Program
- 1503- R&D Project Brokerage Events Grand Program
- 1505- University and Industry Collaboration Program
- 1507- Small and Medium Sized Enterprises Research, Development and Innovation Program
- 1509- TÜBİTAK International Industrial R&D Projects Grant Program
- 1511- Research Technology Development and Innovation Projects in Priority Areas

- 1512- Entrepreneurship Multi-Phase Program
- 1513- Technology Transfer Offices Grant Program
- 1514- Venture Capital Funding Program
- 1515- Frontier R&D Laboratory Support Program
- 1601- Capacity Building for Innovation and Entrepreneurship Grant Program
- 1602- TÜBİTAK Patent Support Program

Textile and clothing sector has 1% share in private sector projects, which are supported by TÜBİTAK TEYDEB, between 1995 and 2012. However, its share is 2% in terms of incentive amount [23].

2.6 Republic of Turkey Small and Medium Sized Enterprises Development Organization (KOSGEB)

KOSGEB possesses research & development and innovation program; industrial implementation program and project development support program for small and medium sized enterprises.

Objectives of three programs can be listed as below [24]:

1. Developing the small and medium sized enterprises and entrepreneurs possessing new ideas and inventions
2. Supporting techno-promoters who have technologic ideas
3. Disseminating R&D awareness throughout the SMEs and expanding R&D capacity
4. Enhancing actual R&D support
5. Supporting innovative activities
6. Need for support mechanism for the commercialization and the industrial application of the R&D and innovation project's output

The support programs provide workspace support, rental support, machinery and equipment support, software support, service purchase support, personnel cost support, project consulting support, training support, industrial and intellectual property rights support, foreign convention/conference/exhibition visit support, test, analyses and certification support. All these supports are given for 12 months to 24 months with 75% support rate [24].

According to the “Small and Medium Sized Entrepreneurships Statistics” news report which is published in October 2014 by Turkish Statistical Institute; 48,5% of the enterprises, whose employee numbers are 10 and over, are involved in innovation activities between 2010 and 2012. The ratio is 56,1% in small and medium sized enterprises in which the employee numbers are between 50 and 249. The innovative small and medium sized enterprises ratio is 49% within the industry sector. At the same period, 26,3% of the small and medium sized enterprises are involved in product and/or process innovation. The ratio is 43,2% for the enterprises which innovate in terms of organization and/or marketing [25,26].

Approximately 55.000 textile and clothing enterprises operate throughout Turkey and nearly 97% of them are small and medium sized enterprises. The small and medium sized textile and clothing enterprises intensively benefit from KOSGEB's research and development support programs.

3. Conclusions and General Evaluation

The developed countries are turned into knowledge-based societies, the knowledge leads to innovation (a new product, service or process which can be commercialized) and innovation increases the knowledge. Therefore, a cycle is started. The focal point of the cycle is research and development activities. In this context, nowadays, research and development activities almost become an obligation for enterprises. Research and development activities and innovation are indispensable obligations for textile and clothing sector in which rivalry is intensive and alteration is fast. Textile and clothing sector, which is one of the locomotive sectors of Turkey, is still in the leading position in terms of providing net added value. The sector maintains its locomotive characteristic within the development of the country due to its export and employment potential. At this point, the importance of research and development activities for sector's competitiveness can be seen once more.

The Law Number 5746, Law on Supporting Research & Development Activities, is enacted in 2008. As it can be seen from our research; research and development activities, expenditures and employees throughout the country are increased with the enactment. Naturally research and development activities of textile and clothing sector, which has an important share in the economy, are also increased since 2008.

Nowadays, the sector's research and development activities are incited by three different institutions (Ministry of Science, Industry and Technology - General Directorate of Science and Technology; The Scientific and Technological Research Council of Turkey (TÜBİTAK) - Technology and Innovation Funding Programs Directorate (TEYDEB) and Republic of Turkey Small and Medium Sized Enterprises Development Organization (KOSGEB)). As it can be seen from our study results, research and development expenditures and employee numbers of textile and clothing sector are increasing since 2008. Sector's research and development activities gain speed due to the number increment and scope enlargement in R&D incentives.

According to our study results, the textile and clothing sector has 1,36% share in private sector's research and development expenditures by 2013. The sector possesses 4,24% of the research and development centers of Turkey. It has 9,52% share in industrial thesis supporting program between 2007 and 2013. Moreover, the sector has 1% share in TÜBİTAK TEYDEB projects whereas its share becomes 2% in terms of expenditures. On the other hand, the small and medium sized enterprises intensively benefit from KOSGEB's research and development supports.

Although the large-scale textile and clothing enterprises possess research and development departments, the research and development centers are established after R&D center incentive which is enacted in 2008. The government incites research and development centers in order to provide opportunities to enterprises for employing more R&D personnel and for running projects with more sources. In this context, textile and clothing sector's accomplished projects and number of R&D employees are increased. Besides, sector's cooperation with academic institutions is increased via industrial thesis supporting program and TÜBİTAK TEYDEB programs. In the context of these programs, the research personnel of universities that give textile

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