

Science, Technology and Innovation in Turkey

2010



TÜBİTAK

THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY

2010



© The Scientific and Technological Research Council of Turkey, 2011
All rights reserved.

Written and visual materials, in whole or partially, can not be published
without permission. In use for scientific purposes, it is compulsory to
furnish reference.

Graphic designer: Ayşe Taydaş

Contact:

TÜBİTAK – Department of Science, Technology and Innovation Policy
Address: Atatürk Bulvarı No.221 06100 Kavaklıdere Ankara TURKEY
Web: www.tubitak.gov.tr/stipolicy
E-mail: politikalar@tubitak.gov.tr
Phone: +90 312 4673659
Fax: +90 312 4673659

Turkey has long been and continues to be an advocate of raising science and technology to new heights, and has recently been engaged in a significant science, technology and innovation (STI) impetus with the vision to contribute to new knowledge and develop innovative technologies to improve the quality of life by transforming the former into products, processes and services for the benefit of the country and humanity. Such an advocacy is rooted in the advancement of a dynamic ideal based on continuous renewal and modernization under the guidance of science, technology and knowledge. Today, the actors as a whole have succeeded to put forth a determination to continue to invest in R&D and innovation, which is a key driver of future sustainable growth, and increase demand for STI.



STI POLICY

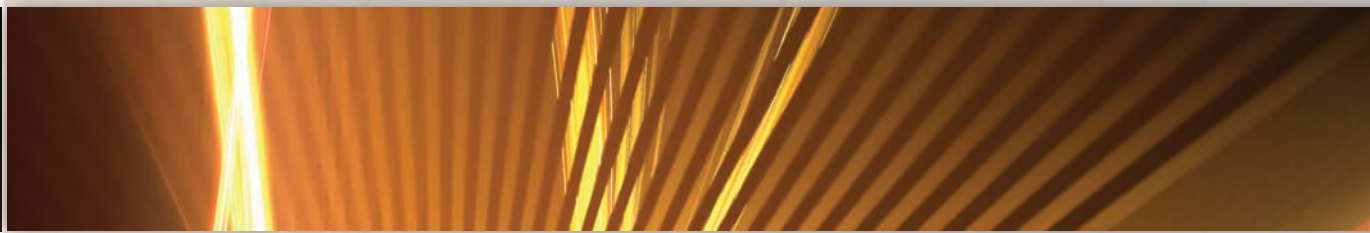


Table of Contents

1.	STI POLICY SYSTEM IN TURKEY	5
1.1.	Establishment of the Turkish Research Area (TARAL)	5
1.2.	S&T Governance and Policy-Making Structure	6
2.	R&D PERFORMANCE OF TURKEY: HIGHLIGHTS	9
3.	R&D INVESTMENTS	13
3.1.	R&D Performers by Sector	14
3.2.	R&D Funding by Sector	15
3.3.	Financial Flows for R&D	15
3.4.	Direct Public R&D and Innovation Funds	16
3.5.	Promoting Entrepreneurship and Technological or Innovation-Driven Research	17
3.6.	Promoting Curiosity-Driven Academic Research to Sustain Innovation	19
3.7.	Strengthening Demand for R&D and Innovation Through Public Procurement	20
3.8.	Enhancing International S&T Cooperation	20
4.	HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY	23
4.1.	Stock of HRST in Total	23
4.2.	Stock of HRST by Sectors	24
4.3.	Stock of HRST by Gender	24
4.4.	Sustaining the Development of Human Resources for Science and Technology	24
5.	STI PRODUCTIVITY	29
5.1.	Scientific Publications	29
5.2.	Patents and Utility Models	30
6.	SUMMARY	32
	APPENDIX: MAJOR S&T RELATED INSTITUTIONS IN TURKEY	33

STI POLICY SYSTEM IN TURKEY



1. STI POLICY SYSTEM IN TURKEY

1.1. Establishment of the Turkish Research Area (TARAL)

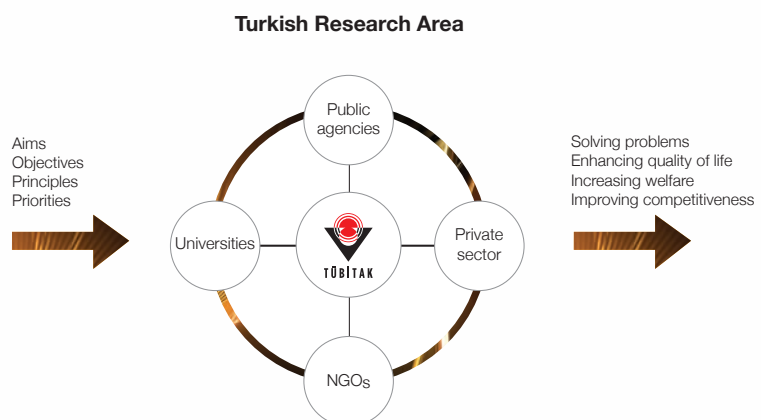
Launched in 2004, one of the subsequent triggers in Turkey is the conceptualization of the Turkish Research Area (TARAL). TARAL set into motion a mobilization with which the business enterprise and public sectors, together with NGOs, strategically focus and collaborate on R&D and innovation.

The TARAL objectives that are to be achieved are to:

- enhance the quality of life,
- find innovative solutions to societal challenges and opportunities,
- increase the competitiveness of the country,
- foster and diffuse S&T awareness in society.

To make such a mobilization possible, the TARAL targets were determined as bolstering:

- the share of R&D expenditures in Gross Domestic Product (GDP),
- the demand for R&D,
- the number of qualified R&D personnel.



A critical stimulus was the formulation of a new, additional public investment TARAL budget for the utilization of the R&D and Innovation activities of TARAL actors. Hence, TARAL triggered a particular kind of mobilization, both in the sense of resources and in guiding system actors towards socio-economic goals, which continues to be instrumental in the Turkish Model.

1.2. S&T Governance and Policy-Making Structure

The Supreme Council for Science and Technology (SCST) is the highest ranking STI policy-making body in Turkey chaired by the Prime Minister with the decision-making power for national S&T and innovation policy.

SCST was established and granted the role of identifying, monitoring and coordinating policies in S&T areas in accordance with national goals for economic and social development and security. Accountable directly to the Prime Minister, SCST upholds important functions, such as to assist the government in determining long-term S&T policies (Box 1). Established in 1983, SCST realized its first operational meeting in 1989, thus opening a new era for the STI policy system, and started to convene with increasing intensity towards and after the turn of the new millennium. Since the mid-nineties, SCST had also been engaged in a shift towards innovation oriented S&T policies. Starting with the 10th meeting in 2005, this momentum was transitioned into the dynamic of meeting two times annually. The 22nd meeting was realized in December 2010.

SCST is chaired by the Prime Minister and composed of its permanent council members of Ministers of State, National Defense, Finance, National Education, Health, Agriculture and Rural Affairs, Industry and Trade, Energy and Natural Resources, Environment and Forest, Chairman of Council of Higher Education, Undersecretary of State Planning Organization, Undersecretaries of Treasury and Foreign Trade, Chairman of Turkish Atomic Energy Authority, President of TÜBİTAK and a Vice President, General Director of Turkish Radio and Television, Chairman of Union of Chambers and Commodity Exchanges of Turkey, and a member to be appointed by a university to be designated by the Council of Higher Education with other relevant stakeholders that are invited to the meetings with advisory capacity. In total, over one hundred different actors from the governmental bodies, higher education and business enterprise sectors are represented in SCST meetings. Hence, SCST is the culmination of governmental and non-governmental stakeholders from across Turkey in the STI fields. The inclusion of such a broad base of stakeholders in SCST not only serves as an effective medium for systematic consultation and dialogue, but also sustains robust interactions among the stakeholders, which enables a more participatory policy-making process. Moreover, SCST contributes to diffusing the developments on recent STI policies while increasing commitments for policy implementation. The biannual meetings of SCST since

2005 have further served to advance a culture within the participating institutions themselves, which holds promise to further the level of S&T governance to sustain the STI impetus in which Turkey is currently engaged.

In all of these ways and others, SCST is at the apex of the S&T governance structure in Turkey in which policy instruments are selected, (regulatory, meta-instruments or soft instruments), long-term goals are established by decree, and tasks for the implementation of the adopted decrees are assigned to the respective stakeholders, accordingly. Thus, by its very structure that includes a broad base of stakeholders, SCST contributes to establish the link between policy on the one hand and its implementation on the other. As the secretariat of SCST, TÜBİTAK is responsible for disseminating and following-up on the decrees' implementation. Furthermore, while one of the State Ministers has always upheld permanent membership in SCST and been responsible for the field of S&T, in the current Cabinet of Ministers, the role was formally redefined as

Box 1: Functions of SCST

According to statutory decree 77, The Supreme Council for Science and Technology (SCST) was established to fulfill the functions determined as:

- a) To assist the government in the determination of long-term S&T policies,
- b) To identify R&D targets related to S&T areas,
- c) To identify the priority areas in R&D and prepare related plans and programs,
- d) In accordance with these plans and programs, to assign tasks to public organs as well as to cooperate with the business enterprise sector as necessary to identify regulations and promotion schemes related to business enterprise sector,
- e) To have bills and legislations prepared aiming to develop and increase the effectiveness of the S&T system,
- f) To identify the means for development and effective utilization of R&D human resources, and assure their implementation,
- g) To set the procedures for establishment of R&D centers of private institutions, and monitoring and evaluating their activities,
- h) To determine in which research fields and in what proportions the R&D investment is to be made,
- i) To provide coordination among sectors and institutions in programming and implementation stages.

1. STI POLICY SYSTEM IN TURKEY ■

the coordination of R&D activities and institutions, holding promise to further support the STI impetus.

In addition to the highest ranking STI policy-making body in Turkey as SCST, there are individual organizations that are continuously contributing to the S&T policy-making process to further influence the efficacy of S&T and respond to the

arising needs of the innovation system. These organizations have the role and capability to integrate policy design and program implementation. Such a capability brings the advantage of allowing institutions to incorporate feedback from program management into policy learning and also enabling the policy design to better reflect corresponding policy objectives.

Main actors in Turkish STI system with their systemic functions is given in Figure 1.1¹:

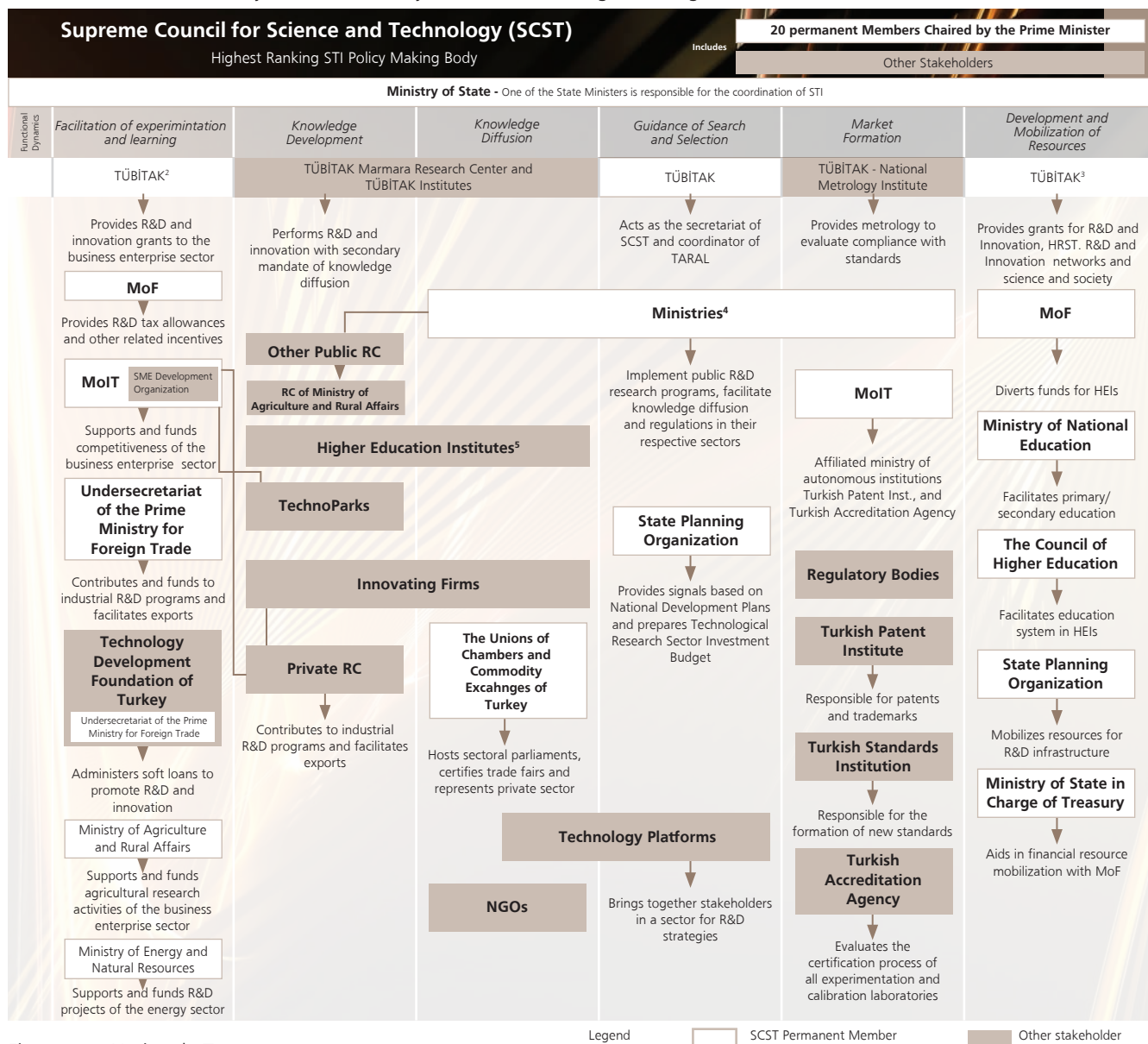


Figure 1.1: National STI System

¹ The systemic functions provided in Figure 1.1 are based on the definitions provided in the "OECD Country Review of Innovation Policy: Current Status and Draft Synthesis Report," DSTI/STP (2009) 4/REV1, pp.10-11.

² The TÜBİTAK Directorate that pertains specifically to the first function is TÜBİTAK-TEYDEB (TÜBİTAK Technology and Innovation Grant Programs Directorate).

³ The TÜBİTAK Directorates that provide grants which are TÜBİTAK-ARDEB (TÜBİTAK Academic Research Funding Programs Directorate), TÜBİTAK-TEYDEB, TÜBİTAK-BİDEB (TÜBİTAK Science Fellowships and Grant Programmes Department) and the Science and Society Activities and Grant Programs Unit.

⁴ The sectors of the Ministries that implement public R&D programs.

⁵ SCST permanent members include a rector as designated by the Council of Higher Education per meeting.

R&D

PERFORMANCE

OF TURKEY:

HIGHLIGHTS



2. R&D PERFORMANCE OF TURKEY: HIGHLIGHTS

Turkey's investment in STI has recorded a fast-paced increase between the years 1998 and 2009. The results indicate multiple aspects of Turkey's swift STI impetus that exhibit top level rates of increase. The increasing trends in all major fields of STI were especially accelerated beginning in the year 2004 with the launch and implementation of the Turkish Research Area (TARAL). Moreover, the business enterprise sector has been a key driver behind the STI impetus, putting forth noteworthy dynamics to boost the ongoing trends. As a summary of the swift STI impetus between 1998 and 2009, Turkey:

Investment in STI¹:

- Increased GERD from 2 billion to about 9 billion in PPP \$, which has been spurred forth by the launch of the conceptualization of the Turkish Research Area (TARAL) in 2004. Turkey exhibited more than three-fold growth rate, which is almost quadruple the OECD and EU27 averages².
- More than doubled the level of GERD as a percentage of GDP from 0.37% in 1998 to 0.85% in 2009. This puts forth a significant catching-up dynamic towards taking sustained strides to reach the target of raising the share of GERD to 2% of GDP by 2013.
- Exhibited a fast rate of growth in GERD as a percentage of GDP based on the growth rate at 129% between 1998 and 2009 and 95% between 1998 and 2008. These rates are by far above the 10.1% for the OECD and 8.4% for the EU27 averages³.
- Fostered a business enterprise sector 40% of R&D in 2009 after a rapid climb and emerging dynamic.
- Fostered a business enterprise sector that outspent the government to become the leading sector to fund R&D for the first time in 2005, reaching a share of funding at 41% of GERD in 2009.
- Fostered a business enterprise sector as the biggest investor in R&D with a self-funding that reached 33% of GERD in 2009 from 30.7% of GERD in 1998⁴ in addition to the transfer of funds for R&D to be performed in the higher education sector, which the business enterprise sector also funded.

■ 2. R&D PERFORMANCE OF TURKEY: HIGHLIGHTS

- Sustained a manufacturing sector as the leading performer of R&D in the business enterprise sector based on its share of business expenditures on R&D (BERD) at 62.3%.

STI Human Resources⁵:

- Tripled in quantitative terms the stock of Full Time Equivalent (FTE) R&D personnel to about 74 thousand and FTE researchers to about 58 thousand in 2009 based on 1998 values of FTE R&D personnel and researchers.
- Met its target of 40,000 FTE researchers for the year 2010 much earlier after which SCST resolved for 150,000 FTE R&D personnel by 2013, which contribute to technological advancement and the transmission of scientific and technological knowledge to future generations.
- Increased the number of FTE R&D personnel and researchers per 10,000 total employment in 2009 to 35 and 27 from 11 and 9 in 1998, respectively, in which the presence of a relatively young population is considered as a future asset.
- Put forth noteworthy dynamics in the distribution of FTE R&D personnel by the main performing sectors of R&D activities, i.e. higher education, business enterprises, and governmental sectors. These dynamics strike the balance of 43% for the business enterprise, 42% for the higher education and sectors

with 15% for the government sector as shares of the total stock in 2009 where it was 60% for the higher education, 23% for the business enterprise and 17% for the government sector in 1998.

- Remarkably increased the stock of FTE R&D personnel in each sector in which the business enterprise sector outformed the higher education sector for the first time in 2009 increasing six-fold between 1998 and 2009, reaching to 31,5 thousand in 2009. This shows a parallelism with the dynamics of R&D investment.

Scientific Publications and Patents⁶:

- Increased its value on scientific publication more than 25 thousand in 2009, nearly four-fold increase between 1998 and 2009 with an exponential rate of increase.
- Is found to be the most dynamic sizeable country leading the catch-up process after South Korea based on an average relative annual growth rate in scientific publications and a share in world total S&T publication output in 2004.⁷
- Experienced a boom in the total number of domestic utility model and patent applications being filed to Turkish Patent Institute, namely nearly ten-fold increase in one decade reaching to 5,430.
- Increased the number of international patent applications being filed to PCT as well as triadic patent families.

NOTES:

¹⁻⁵ Source: TurkStat.

²⁻³ Between the years 1998 and 2008

⁴ Since financial resources provided by the foundation universities were included in the business enterprise sector instead of higher education sector before 2008, 1998 value of business enterprise sector's self-funding is overestimated.

⁶ Source: Thomson's ISI Web of Science, TPI.

⁷ Glänzel, W, Debackere, K, and Meyer, M. 'Triad' or 'tetrad'? On global changes in a dynamic world. *Scientometrics*, Vol.74, No.1 (2008) 71-88.



PERFORMANCE

KEY:

RIGHTS

R&D

INVESTMENTS



3. R&D INVESTMENTS

Between the years 1998 and 2009, Turkey put forth a fast-paced, rising trend in GERD in million current PPP \$ (Figure 3.1). In particular, GERD has risen from 2 billion to about 9 billion in PPP\$, making more than three-fold increase. Such a level of growth is the highest in the OECD members. The steepest increases in GERD take place after 2003, i.e. an increase of 42% for the first six years and 147% for the last six years.

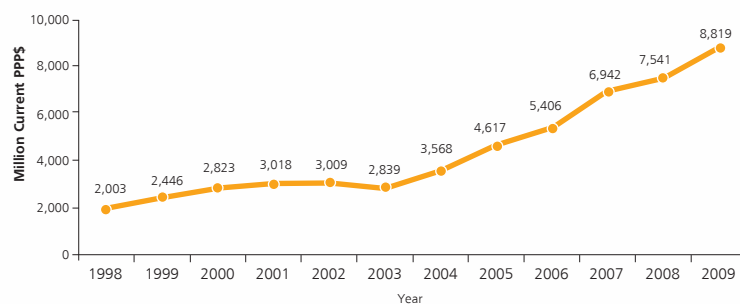


Figure 3.1: R&D expenditures of Turkey (Million current PPP \$) (Source: TurkStat)

Note: Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006.

Regarding GERD as a percentage of GDP, Figure 3.2 gives two series calculated with the previous and revised GDP (In March 2008, TurkStat changed its method of calculating GDP and announced EU definition of GDP). While the GERD values remain as provided above in Figure 3.1, the value of GERD as a percentage of GDP drops by nearly 0.15% since the revised GDP is higher. Between the years 1998 and 2009, there has been an increasing trend in GERD as a percentage of the revised GDP, which has risen from about 0.37% to 0.85%, more than doubled.

All of these patterns in GERD indicate that a catching-up dynamic is taking place. In particular, these dynamics constitute significant progress towards reaching one of the major targets for the S&T system, namely increasing GERD to 2% of GDP by 2013. Accordingly, with a substantially increased allocation of direct public funding for TARAL since 2005 and stimulated business enterprise sector expenditures in R&D, it is anticipated that Turkey will reach the target for 2013.

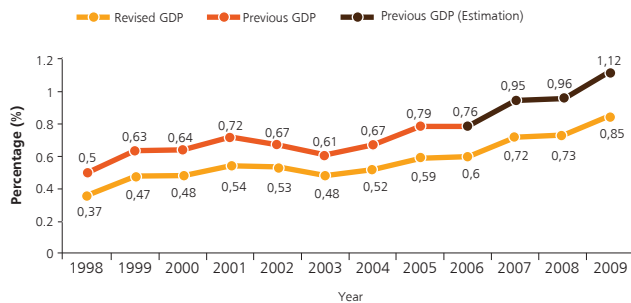


Figure 3.2: GERD as a percentage of GDP (Source: TurkStat)
(Note: Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006.)

3.1. R&D Performers by Sector

In the conjecture of a rising GERD all sectors have increased the amount of their R&D expenditures, performing 40% for the business enterprise sector and 47.4% for the higher education sector in 2009 (Figure 3.3). The increasing business expenditures on research and development (BERD) from 632 million current PPP \$ in 1998 to 3,528 million current PPP \$ is a substantial achievements. Moreover, the increasing higher education expenditures on research and development (HERD) with a

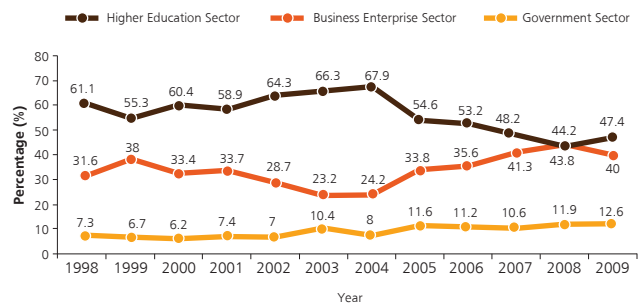


Figure 3.3: GERD by sector of performers (%) (Source: TurkStat)
(Note: Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006)

decrease in its proportion compared to 1998 are expected developments. These achievements confirm the path that Turkey has resolved to take under its 2013 targets.

According to the 2013 targets, the proportion of BERD and HERD are expected to be 60% and 26%, respectively. As for the share of the government sector in the decade between 1998 and 2009, there was a gradual increase to reach 12.6% of GERD in 2009. This is also an expected result for 2013 targets, which is 14% for the government sector.

3.2. R&D Funding by Sector

For the first time in 2005, the business enterprise became the leading sector to fund R&D at 41.5% of GERD, outspending the government sector that funded 34.5% of GERD (Table 3.1). This trend continued through 2009

so that the business enterprise funded 41% of GERD as the highest funder of R&D, followed by the government sector that funded 34% of GERD in 2009. Based on a new classification scheme used by TurkStat, the higher education sector has been reported as a separate R&D funding sector.

Table 3.1: GERD by funding sector for Turkey (%)

Funding Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Business Enterprise	41.8	43.3	42.9	41.2	40.9	34.3	36.2	41.5	44.4	46.2	47.3	41.0
Government	53.3	47.7	50.6	51.5	50.6	35.5	38.7	34.5	34.6	31.9	31.6	34.0
Higher Education	-	-	-	-	-	23.4	20.0	17.9	15.7	17.5	16.2	20.3
Other National Sources	4.5	4.2	5.3	6.5	7.2	5.2	4.7	5.3	4.8	3.9	3.6	3.7
Abroad	0.4	4.8	1.2	0.8	1.3	1.6	0.4	0.8	0.5	0.5	1.3	1.0
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: TurkStat

Note: Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006

3.3. Financial Flows for R&D

Table 3.2 gives the financial flows for R&D from source of fund to R&D performing sector in 2009 as a percentage of GERD. The greatest financial flow takes place from the business enterprise to be performed by the business enterprise sector, i.e. self-funding, which reached 33% in 2009. Such a profile indicates that significant capabilities are being accumulated in the business enterprise sector in

performing R&D. The business enterprise also provided funds for R&D to be performed in the higher education sector at 7.6% and governmental research institutes at 0.4%. The government self-funded its R&D activities at 12.1% of GERD while providing funds for R&D to be performed in the higher education sector at 15.8% and to the business enterprise sector at 6.1%. All of these flows are indicative of intra-sector linkages.

Table 3.2: R&D expenditures by sector and source of fund for Turkey (%) (2009)

Performing Sector	Source of R&D Fund					Total
	Business Ent.	Government	Higher Education	Other National	Abroad	
Business Enterprise	33.0	6.1	0.0	0.1	0.8	40.0
Government	0.4	12.1	0.0	0.0	0.1	12.6
Higher Education	7.6	15.8	20.3	3.6	0.1	47.4
Total	41.0	34.0	20.3	3.7	1.0	100.0

Source: TurkStat

Note1: Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006.

Note2: Up to the year 2008, financial resources provided by the State Universities were included in government sector and financial resources provided by the Foundation Universities were included in the business enterprise sector.

3.4. Direct Public R&D and Innovation Funds

Direct public financial support for R&D and innovation in Turkey is exhibited in Table 3.3. A significant trend as observed in Table 3.3 is that the mobilization of financial resources for R&D and innovation has been sustained over years. Various knowledge diffusion activities further

increase the demand for R&D and innovation activities. Moreover, the heading of R&D and innovation takes place in the State Planning Organization Mid-Term Plan (2010-2012). In these ways and others, financial resources for the utilization of TARAL are mobilized as a springboard for sustainable growth.



Table 3.3: Direct public financial support for R&D and innovation (Million current PPP\$)

		2003	2004	2005	2006	2007	2008	2009
Funds utilized by TÜBİTAK, including Turkish Research Area (TARAL) programs		18	21	164	481	615	615	869
Technological Research Sector Investment Budget (DPT), excluding those funds allocated for TARAL and own revenue ¹		209	173	272	264	322	288	393
Total Includes	Universities	131	116	144	146	142	127	178
	Governmental Organizations	20	24	44	58	94	84	131
	TÜBİTAK	58	33	84	60	86	77	84
Small and Medium Industry Development Organization Funds (KOSGEB)		6	24	15	6	5	7	7
Technology Development Foundation of Turkey (TTGV) Funds ²		25	26	19	29	23	28	35
HEIs Scientific Research Projects Funds (BAP) (Ministry of Finance)		191	257	316	295	304	339	477
Undersecretariat of Foreign Trade (DTM) to TARAL for industrial R&D /innovation		71	81	81	50	72	60	89
Participation Fees for EU Framework Program		72	93	146	97	20	55	59
TOTAL		592	675	1,013	1,222	1,361	1,392	1,929

¹ Own revenue includes institutions' income earned by own R&D and innovation activities except from treasury aid.

² TTGV provides long term loans for R&D projects.

3.5. Promoting R&D, Innovation and Techno Entrepreneurship in Business Enterprise Sector

Promoting innovative entrepreneurship and technological/innovation-driven research is one of the vital aspect of STI policy mix. The target is to increase the share of the business enterprise sector in GERD as a percentage of GDP to 60% by 2013 and to stimulate the business enterprise sector in partaking even more actively in STI.

With an aim to increase technology development capability, innovation culture, and competitiveness of Turkish companies, institutions like TÜBİTAK, Ministry of Industry and Trade, Small and Medium Enterprises Development Organization (KOSGEB), and the

Technology Development Fund of Turkey (TTGV) deploy policies that provide finance to the R&D activities of the business enterprise sector. The largest grant program for R&D and innovation projects of the business enterprise sector (both large enterprises and SMEs) is administered by TÜBİTAK-TEYDEB (Technology and Innovation Grant Programs Directorate). The number of applicant firms and the number of project proposals for all of the Grant Programs of TÜBİTAK TEYDEB is seen in Figure 3.4. Between 1998 and 2009, the Program provided about 1.7 billion PPP \$ in grants and triggered about 3.5 billion PPP \$ in R&D expenditures as the largest program to stimulate the R&D activities of the business enterprise sector (Figure 3.5). The sectors that upheld the largest

share of the grants during the timeframe 1998 to 2009 was machinery and manufacturing, including the automotive sector, followed by information technologies and electronics (Figure 3.6).

In the knowledge-based economy, national systems of higher education are a strategic asset provided that linkages with the industry are strengthened and the transfer of technology is enhanced and accelerated.

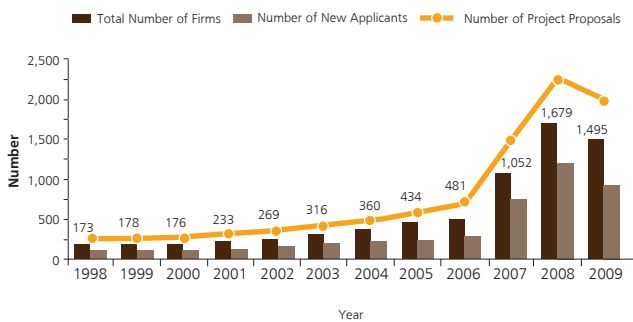


Figure 3.4: The number of applicant firms and the number of project proposals during 1998-2009 for all of the grant programs of TÜBİTAK-TEYDEB for the business enterprise sector

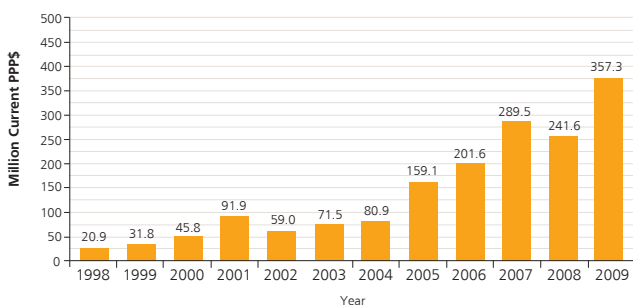


Figure 3.5: Distribution of total grants during 1998-2009 for all grant programs of TÜBİTAK-TEYDEB

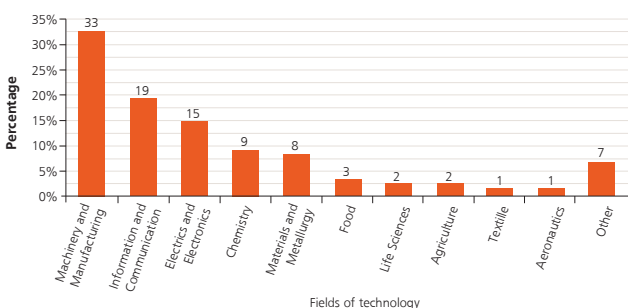


Figure 3.6: Share of the TÜBİTAK TEYDEB grants during the timeframe 1998 to 2009

The support for the establishment of Technology Parks (the Law on Technology Development Zones) of Ministry of Industry and Trade which is an on-going measure that act upon the importance of establishing strong linkages between the private sector and the research community came into force in 2001. The Law on Technology Development Zones fosters the establishment of Technology Parks (Techoparks) in higher education institutes and/or research centers to enhance knowledge circulation. In a quantitative perspective, as of 2009, there are 37 active Technology Development Zones in Turkey housing 1,254 companies, employing 11,021 personnel and implementing 3,403 R&D projects (Figure 3.7 and 3.8). Most of the R&D projects as implemented in the Zones are mostly in the field of ICT followed by electronics, advanced material technologies, industrial design, nanotechnology, medical/bio-medical research, automotive industry, sustainable energy and environmental technologies.¹

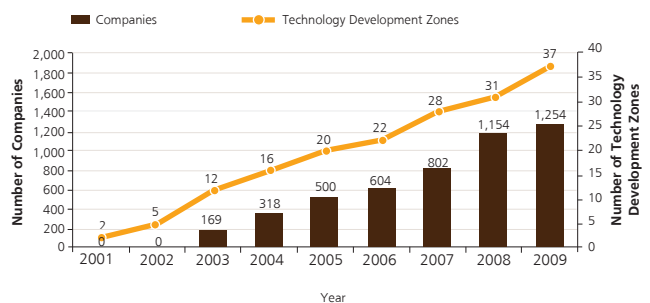


Figure 3.7: Number of Technology Development Zones and companies (Source: MoIT)

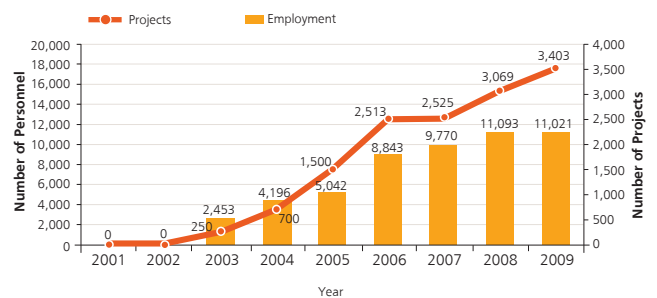


Figure 3.8: Number of personnel employed and projects implemented in Technology Development Zones (Source: MoIT)

NOTES:

¹ Source: SCST 22nd Meeting (2010), Assessments Regarding Developments and Decrees, Ankara, 15 December 2010.

The Law on Technology Development Zones provides special benefits to firms located in the Zones including several tax incentives. In the same way, the Law on Supporting Research and Development Activities (No. 5746 issued in 2008), is a policy tool that primarily aims at addressing the need of creating R&D centers with a critical mass. The Law covers technology centers by Small and Medium Industry Development Organization and R&D centers in Turkey, R&D projects, pre-competition cooperation projects and support and incentives with respect to technopreneurship capital. The support that are provided within the framework of the Law no. 5746 include R&D allowance, income tax withholding incentive, insurance premium support, stamp duty exemption and technopreneurship capital subsidy. Support and incentives provided under this law in the years of 2008 and 2009 are given in Table 3.4. Increase in the numbers in 2009 from their 2008 values indicate that increasingly more firms are being stimulated by the incentives and partake more intensively in R&D and innovation in a stimulating environment.

Table 3.4: R&D Tax Allowance in terms of Income Tax Law, Corporate Tax Law and Law on Promoting Research and Development Activities (Million Current PPP\$)

	Number of Beneficiaries		Tax Allowance (Million Current PPP\$)	
	2008	2009	2008	2009
Income Tax	61	71	6.6	8.7
Corporate Tax	402	549	640.0	1,414.3
TOTAL	463	620	646.6	1423.0

Source: Ministry of Finance (SCST 22nd Meeting (2010), Assessments Regarding Developments and Decrees, Ankara, 15 December 2010)

3.6. Promoting Curiosity-Driven Academic Research

Higher education and research institutes play an important role in knowledge-based economies as a vital source of human resources. For this reason, institutions like TÜBİTAK and State Planning Organization (DPT) provide funds for high quality, target-oriented research, including those to promote curiosity-driven academic R&D to sustain innovation in Turkey. State Planning Organization is responsible for preparing the Technological Research

Sector Investment Budget, which includes resources allocated for TARAL under the coordination of TÜBİTAK programs. DPT's Technological Research Sector Budget between the years 2003-2009 is given in Figure 3.9.

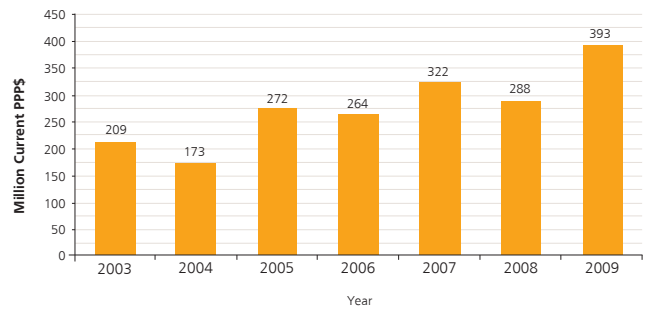


Figure 3.9: Technological Research Sector Investment Budget of DPT (Source: DPT)

The project-based funding for fundamental, academic research is provided through various grant programs of TÜBİTAK as implemented by the TÜBİTAK Academic Research Funding Programs Directorate (TÜBİTAK-ARDEB). The most popular program of ARDEB is the Funding Program for Scientific and Technological Research Projects where beneficiaries as scientists from universities, public research institutes, and private enterprises are funded for their research projects targeting the creation of new knowledge to make scientific interpretations and to solve technological problems. ARDEB's funding increased substantially from 1998 to 2009 with a significant increase in the number of projects (Figure 3.10 and Figure 3.11).

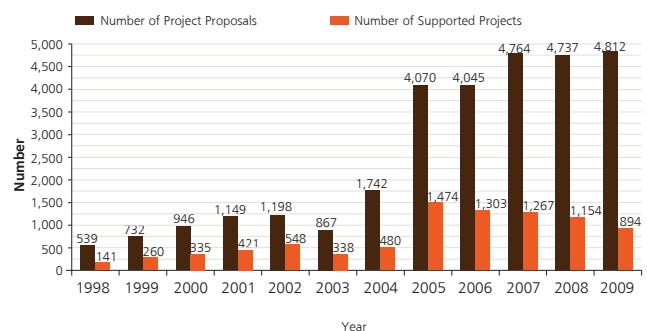


Figure 3.10: The number of project applications and supported projects during the years 1998-2009 for the grant programs of TÜBİTAK-ARDEB

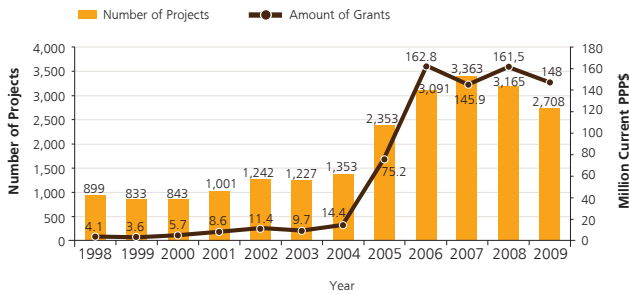


Figure 3.11: The number of annual active projects and the amount of funds given for projects during the years 1998-2009 within the context of Research Support Program of TÜBİTAK-ARDEB

As institutional level funding, the MoF diverts funds to public higher education institutes under the Scientific Research Program (BAP) with which each institute has their own mechanisms for allocating this fund to R&D projects. Higher education institutes’ scientific projects funds between the years 2003 and 2009 is given in Figure 3.12.

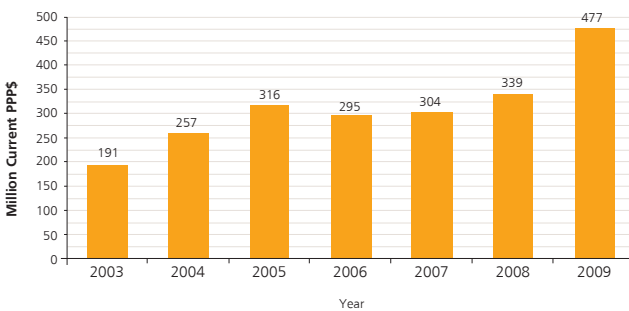


Figure 3.12: HEIs Scientific Research Project Funds (BAP) (Source: MoF)

Infrastructure is an essential element for R&D activities. Establishing, maintaining and updating high quality research infrastructure in an efficient way is a challenging task given the magnitude and distribution of universities in a wide geographical area as in Turkey. DPT funds research infrastructures of higher education and public research institutes on a project basis. With respect to yearly action plans of the five-year development plans, DPT publishes a call for research infrastructure projects to universities and other government bodies engaged in research activities. The proposed projects are examined by whether they are in line with the national and regional priorities, respond

to the needs of public and private sectors, can run basic, applied and multi-disciplinary R&D activities, and build up the environment supporting qualified researchers and their collaboration. For the universities and institutions that achieve a threshold value of human resources and research infrastructure, projects for the establishment of advanced expertise centers, particularly in prioritized technology fields, are funded.

3.7. Strengthening Demand for R&D and Innovation Through Public Procurement

In line with the TARAL’s strategic view of “fostering demand for innovation”, TÜBİTAK launched the Funding Program for Research Projects of Public Institutions in 2005. Through this program, TÜBİTAK funds projects aiming to address public institutions’ R&D needs by encouraging partnerships between the industry, academia, and public research institutions. Public institutions, such as ministries, announce their R&D needs through their research programs and welcome projects from the above-mentioned organizations to solve these problems. The program is designed in such a way that early customer involvement and user-producer interaction throughout the process is assured. TÜBİTAK not only provides the necessary funding to run the project, but also monitors the implementation of the results of the funded projects. By the end of 2009, a total of about 400 million PPP \$ has been provided by TÜBİTAK to public institutions. The sectoral distribution of grants is provided in Figure 3.13.

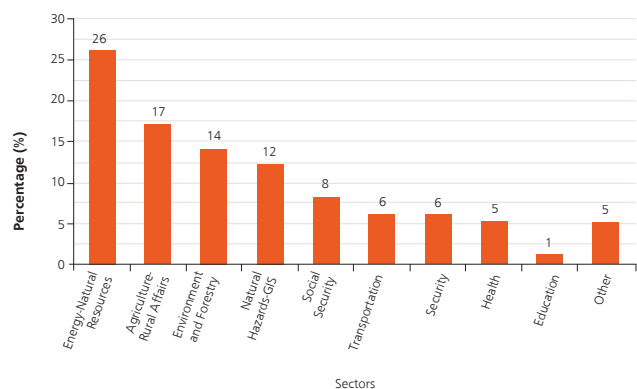


Figure 3.13: Distribution of grants according to sectors of public research program (%) (including 2009)

■ 3. R&D INVESTMENTS

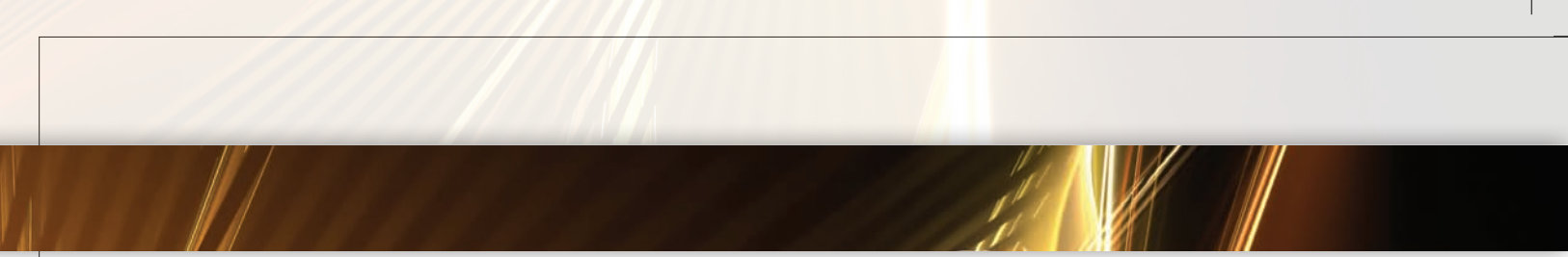
3.8. Enhancing International S&T Cooperation

Conceiving policies, designing tools, and building collaborations within the perspective of international relations is an important strategy that aims to improve and highlight the STI capabilities of Turkey on a global scale.

Turkey attaches considerable importance to enhancing international cooperation and putting STI cooperation agreements into action. Within the framework of numerous current bilateral S&T cooperation agreements, TÜBİTAK has 27 bilateral S&T cooperation agreements with institutions from 23 different countries that are project based under which joint research projects are funded and monitored and financial support is provided for activities such as joint scientific meetings, exchange of scientists, scientific visits, etc. There are approximately 300 international projects going on as of the the end of 2009 whereas the volume of these projects equals to more than 7.9 million €. TÜBİTAK also takes part in the intergovernmental meetings in the field of S&T and assists in preparation of the documents resulting from these meetings. Turkey participates actively in the European research programs or schemes, such as COST (European Cooperation in Science and Technology),

EUREKA, ESA (European Space Agency), ESF (European Science Foundation), EUROHORCs (European Heads of Research Councils) and EMBC (European Molecular Biology Conference), as well as regional organizations, such as BSEC (Black Sea Economic Cooperation) and ECO (Economic Cooperation Organization) and international organizations, such as NATO, OECD, UNESCO, ICSU (the International Council for Science), etc.

In an STI framework in which international cooperation in R&D gains increasing prominence, Turkey has been participating in the EU Framework Programs (FP) as an associate country since FP6. As Turkey has become increasingly more experienced and broadened its international networks, Turkish researchers, including those in public and private sectors and higher education institutes, have increased their success in FP7 considerably. In particular, since the beginning of FP7 in 2007, 400 partners from Turkey have taken part in projects which have a total budget of 950 million € where the Turkish organization's direct expense raised to 70 million € since the beginning of FP7 in 2007. Another development in comparison to FP6 is the increasing share of businesses in their level of participation in FP, which increased from 14% to 19% in FP7.



MENTS

4. HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY

Human resources for science and technology (HRST) is one of the most essential factor for innovation and economic growth. As in GERD, Turkey exhibits a leap in the stock of HRST that is also driven mainly by the business enterprise sector.

4.1 Stock of HRST in Total

With the impetus in R&D budgets in Turkey, the stock of full-time equivalent (FTE) R&D personnel has nearly tripled in quantitative terms between 1998 and 2009. In particular, in 2009, the stock of FTE R&D personnel reached about 74 thousand in which the stock of FTE researchers held a share of about 80% of this total at about 58 thousand (Figure 4.1). Hence, given a fast-paced level of growth, Turkey met its initial national target of 40,000 FTE researchers for the 2010 much earlier after which the SCST raised the national target to 150,000 FTE R&D personnel by 2013. A significant factor in this achievement is the increased budget of the support programs for HRST as implemented by TÜBİTAK, Ministry of National Education (MEB), State Planning Organization (DPT), the Council of Higher Education (YÖK) and Ministry of Industry and Trade (MoIT).

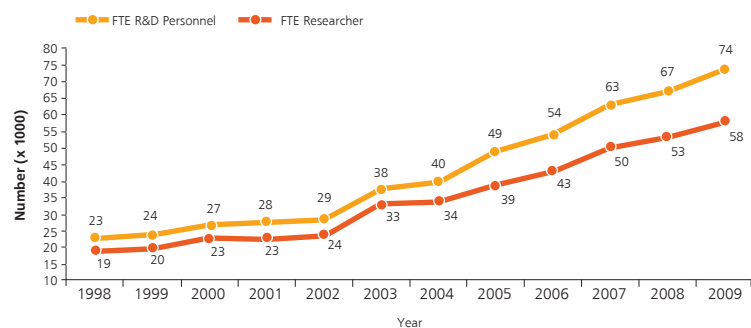


Figure 4.1: Number of FTE R&D personnel and researchers in Turkey (FTE)
(Source: TurkStat)

In the conjecture of a large and relatively young population rather than an aging one, the number of R&D personnel and researchers per 10,000 of total employment in 2009 had risen to 35 and 27, respectively (Figure 4.2). In 2009, FTE R&D personnel and researchers per 10,000 total employments more than tripled over their 1998 values, respectively.

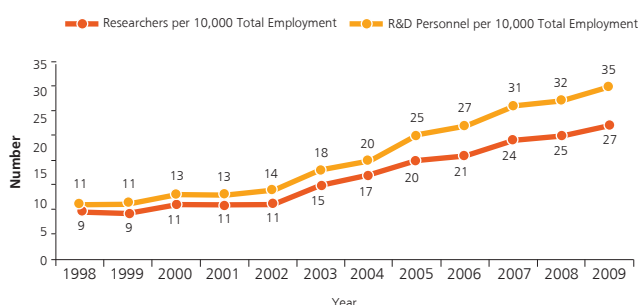


Figure 4.2: Number of FTE R&D personnel and researchers per 10,000 of total employment in Turkey (Source: TurkStat)

4.2 Distribution of HRST by Sectors

In addition to the rapid increase in the total stock of HRST in the timeframe leading to 2009, the stock of FTE R&D personnel and researchers in each of the main performing sectors of R&D activities, i.e. higher education, business enterprise, and governmental sectors, increased remarkably (Figure 4.3). Most impressively, FTE R&D personnel in the business enterprise sector increased to six-fold and outformed the higher education sector for the first time in 2009. In the total stock of FTE R&D

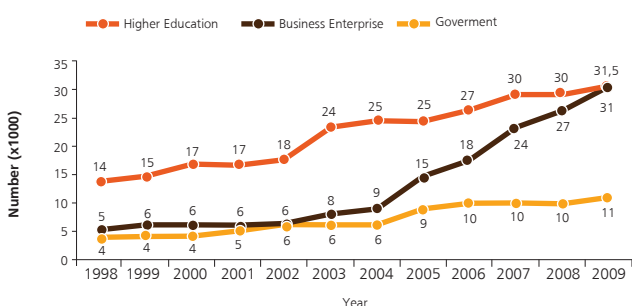


Figure 4.3: Number of FTE R&D personnel by sector of employment (Source: TurkStat)

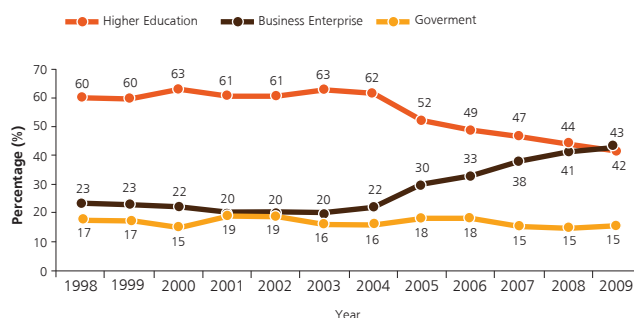


Figure 4.4: Share of FTE R&D personnel by sector of employment (Source: TurkStat)

personnel, these dynamics strike the balance of 43% for the business enterprise and 42% for the higher education sectors with 15% for the government sector in 2009 (Figure 4.4).

The distribution of FTE R&D personnel are further distinguished by those that are directly engaged in R&D activities, i.e. researchers, those that are technicians and equivalent staff, and those that provide other support, such as R&D managers and administrators. Figure 4.5 indicates that FTE researchers have maintained the lions' share in the total stock of FTE R&D personnel in the decade between 1998 and 2009.

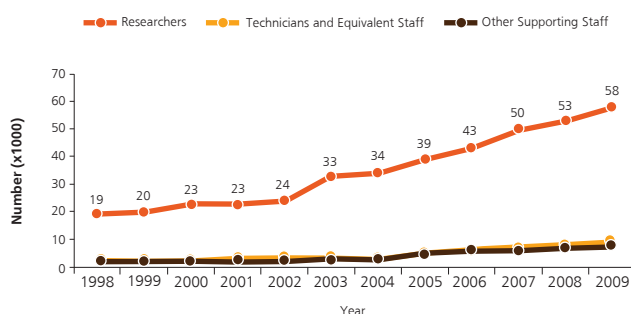


Figure 4.5: Number of FTE R&D personnel by occupation (Source: TurkStat)

4.3 Stock of HRST by Gender

When the gender distribution of total FTE R&D personnel is considered, as of 2009, about 30% of the personnel is female. Proportion of woman is 33% in FTE researchers, 16% in technicians and equivalent staff, and 22% in other supporting staff. Regarding the gender distribution in performing sectors, higher education sector remains

the most balanced in terms of gender distribution with 41% of FTE R&D personnel being females which is a noteworthy dynamic of Turkey. Proportion of woman FTE R&D personnel by sectors is exhibited in Figure 4.6. Similarly, receiving graduate degrees, especially doctorate degree is an important aspect of human capital development for STI. Number of people receiving PhD degrees has more than doubled in Turkey between the years 2000 and 2009 reaching the proportion of woman PhD holders to 44% in 2009 (Figure 4.7).

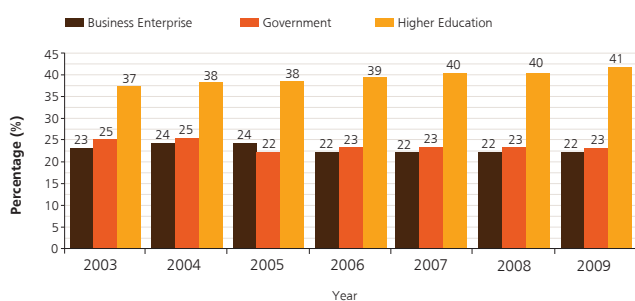


Figure 4.6: Proportion of woman FTE R&D personnel by sectors (Source: TurkStat)

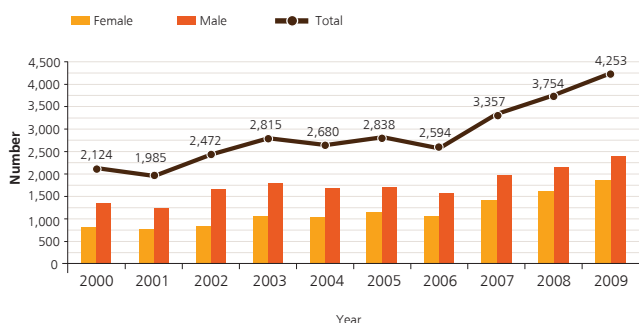


Figure 4.7: Number of people receiving PhD degree by gender (Except Medical Specialist Training Graduates) (Source: Student Selection and Placement Center)

4.4 Sustaining the Development of Human Resources for Science and Technology

New instruments and programs have been designed in this area and the target of raising the number of FTE R&D personnel to 150,000 in 2013 has been adopted by SCST towards which Turkey has taken some of the fastest-paced strides in the world. Currently, the diversity of programs for the development of HRST are implemented by TÜBİTAK, Ministry of National Education, State Planning Organization, the Council of Higher Education

4. HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY ■

and Ministry of Industry and Trade. Currently, TÜBİTAK mainly supports HRST through the programs of its respective directorate, the Science Fellowships and Grant Programmes Department (BİDEB). As can be clearly seen from Figure 4.8 and Figure 4.9, the number of scholars supported by TÜBİTAK-BİDEB and TÜBİTAK-ARDEB and total amount of grants provided by TÜBİTAK-BİDEB increased significantly with the launch of TARAL in 2005.

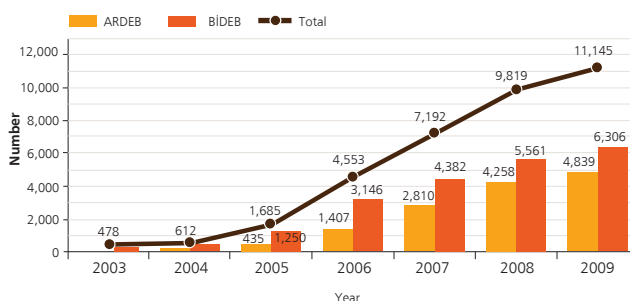


Figure 4.8: Distribution of TÜBİTAK-BİDEB and TÜBİTAK-ARDEB scholars by years

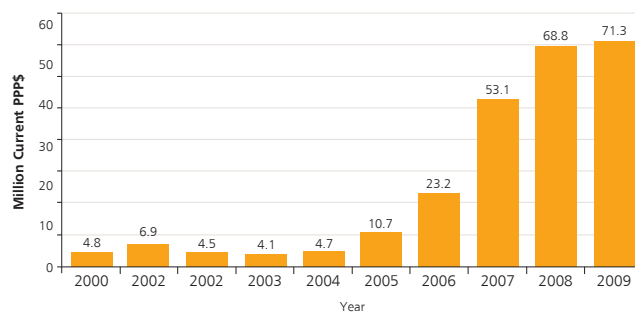


Figure 4.9: Annual distribution of grants for HRST (TÜBİTAK-BİDEB)

Table 4.1: Number of students applying to and benefiting from the Program of 5,000 Students within 5 years of Ministry of National Education

Timeframe	Number of Applications	Number of Placements	Number of Students Going Abroad
2006-2007	2,830	678	444
2007-2008	1,450	794	418
2008-2009	3,509	1,102	573
TOTAL	7,789	2,574	1,435

■ 4. HUMAN RESOURCES IN SCIENCE AND TECHNOLOGY

In order to meet the need of professional human resources, Ministry of National Education adopted the resolution of sending 5,000 students abroad for graduate studies in 5 years time starting from 2006. In terms of this project, number of students applying to and benefiting from the program is given in Table 4.1.¹

Similarly, State Planning Organization (DPT) supports human resources development in terms of two programs. The first one, Industrial Doctorate Program, is designed for industry which aims at developing qualified researchers in need of business enterprise sector such as Ceramics, Industry and Textile & Leather Industry PhD Programs. The second program, namely "Programs for Developing Human Resources in Research" aims at developing researchers in the fields where number of researchers are insufficient in Turkey. Different from the previous program, this program focuses on areas on which researchers should be developed in the light of recent developments in the world and Turkey's needs although there is no demand from the business enterprise and/or government sector. Moreover, DPT also supports private universities in terms of human resources development and infrastructure.

In order to build up new and developing universities, development of qualified academic staff has a vital importance parallel with country's needs. In this respect, DPT has launched the programs of "Scientific Human Resources Development Program (ÖYP)" starting in the year of 2002. By this way, other universities are able to benefit from the accumulations of developed universities in any areas. Recently, 8 central universities implement this program for developing human source and by the end of 2009 there have been about 1000 active students. Starting from 2010, this program is implemented by

the Council of Higher Education (YÖK) and by the end of 2023, it is planned to develop 20,000 researchers by YÖK.²

Ministry of Industry and Trade also implement a program for human resources development for the benefits of the business enterprise sector, namely The Industrial Graduate Thesis (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 processes in their graduate (M.S. 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. Eligible projects are provided with a grant up to 75 percent of the project budget while the rest is financed by the private sector. The test and laboratory services are covered by the universities where the projects are being carried out. Between 2006-2009, totally 519 SAN-TEZ project proposals were submitted to the MoIT and 206 of them was eligible to be supported (Figure 4.10).³

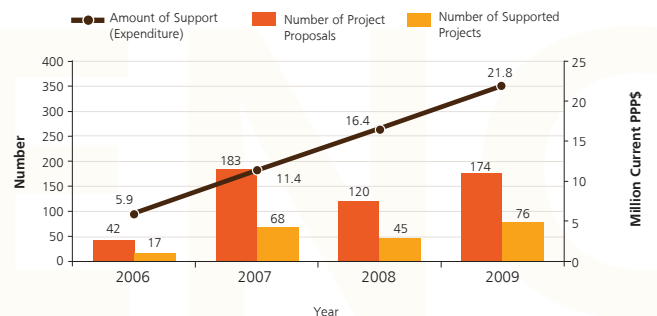


Figure 4.10: The number of project proposals, supported projects and the amount of funds given for projects during 2006-2009 within the context of SAN-TEZ program of MoIT

NOTES:

^{1, 2, 3} Source: SCST 22nd Meeting (2010), Assessments Regarding Developments and Decrees, Ankara, 15 December 2010.



FORCES IN
E AND
DLOGY

5. STI PRODUCTIVITY

Turkey's impetus in R&D spending and HRST is closely matched, if not exceeded, with an impetus in STI productivity. To illustrate, the increase in international publications and patents, which are the two common output indicators of STI performance, can be taken as an example. As will be apparent from these indicators, the level of increase in R&D inputs has been transformed into levels of increase in STI performance and outputs as greater STI productivity.

5.1 Scientific Publications

As a measure of scientific performance and the capacity to transfer and/or exchange the produced knowledge, international publications is an intermediary output in the innovation system that may lead to new products and processes. Turkey exhibited a rate of increase in publications, nearly four-fold increase between 1998 and 2009 based on an exponential rise reaching 25,264 ISI publications in 2009 (Figure 5.1). Given the large population of Turkey, this puts the number of scientific publications per million population in 2009 at 348 publications as given in Figure 5.2, which represents nearly three-fold increase based on 1998 values. There is also significant increase in the number of citations from 32 thousand in 1998 to 129 thousand in 2009 as indicated in Figure 5.3.

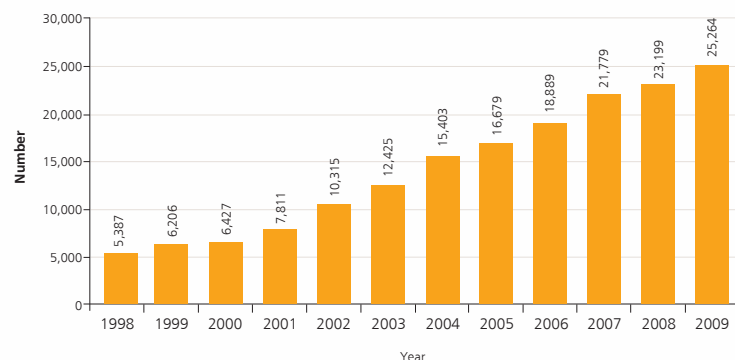


Figure 5.1: Number of scientific publications in Turkey
(Source: Thomson's ISI Web of Science)

Updated on 09.12.2010

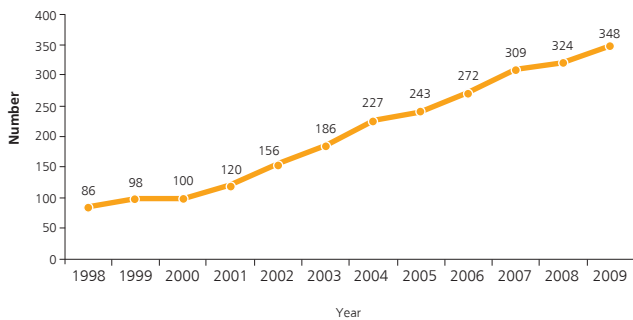


Figure 5.2: Number of scientific publications per million population in Turkey (Source: Thomson's ISI Web of Science)

Updated on 30.06.2010

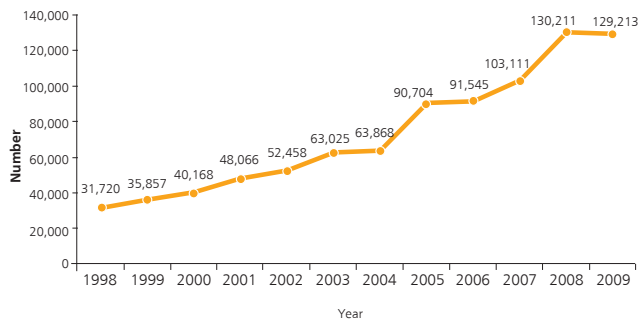


Figure 5.3: Number of citations corresponding to authors' country as Turkey (Except Self Citations) (Source: TÜBİTAK-ULAKBİM based on Thomson's ISI Web of Science)

Figure 5.4 represents the number of Turkish addressed scientific journals in the internationally recognized databases of ISI (Institute for Scientific Information). The first Turkish addressed scientific journal took place in the ISI databases in the year of 1985. Until 2007, the number of journals increased to 8. In the year of 2007, 31 new scientific journals took place in the databases and in 2009 this number reached to 74 in the databases of ISI SCI (Science Citation Index), SSCI (Social Science Citation Index) and A&HCI (Arts & Humanities Citation Index).

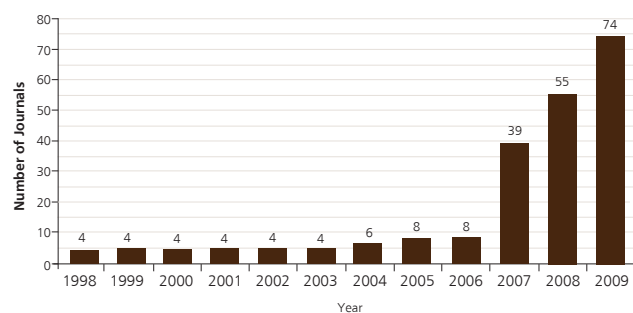


Figure 5.4: Number of Turkish addressed scientific journals in the ISI databases (SCI, SSCI and A&HCI) (Source: TÜBİTAK-ULAKBİM)

Bibliometric analysis further suggests that Turkey, along with BRIC countries (Brazil, Russia, India and China) and fast growing science countries, e.g. South Korea, is in the process of driving a catch-up to the TRIAD countries. In particular, based on an average relative annual growth rate in publications and a share in world total S&T publication output, Turkey is found to be the most dynamic sizeable country leading the catch-up process after South Korea for the year 2004.¹ After that, number of scientific publications increased more rapidly which confirms the role of S&T productivity in Turkey as a driving force behind the catching-up process. The trends provided in Figures 5.1 and 5.2 confirm the ongoing, increasing share of Turkey in world total S&T publications.

5.2. Patents and Utility Models

As another measure of the outputs from R&D, patents contribute to technology diffusion and provide incentives for further innovation, hence affecting economic performance². Since 1998, the patent applications to the Turkish Patent Institute (TPI) have boomed with an exponential rate of increase, reaching a total of 5,430 utility model and patent applications being filed in 2009, the highest level in its history, (Figure 5.4) and nearly ten-fold increase in 2009 from 1998. The majority of the applications are utility models, which are cheaper and easier than patent applications and are referred to as "petty patents" or "innovation patents". Some actors, particularly SMEs, opt to apply for the more practical utility model although their disclosed invention may itself be

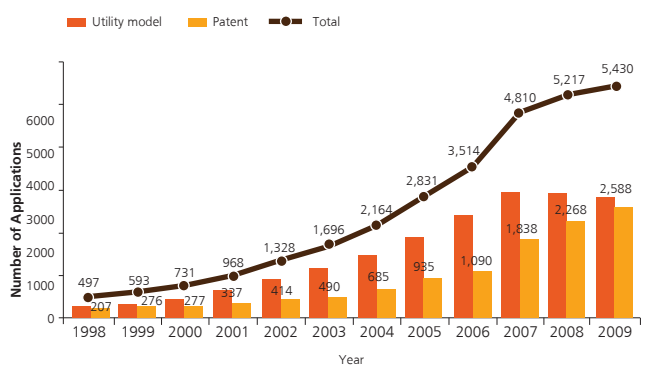


Figure 5.5: Domestic patent and utility model applications (Source: TPI) * Updated on 13.01.2010

patentable. In particular, there were 2,842 utility model and 2,588 patent applications in 2009, representing a 52% and 48% of the total number of applications in 2009.

Due to the combined effect of intellectual property awareness and increasing R&D expenditures, since 1998, Turkey has exhibited a rapid increase in the number of international patent applications being filed to the USPTO, EPO, and JPO, either separately or simultaneously as triadic patent applications and Patent Cooperation Treaty (PCP) applications (Table 5.1). In PCT patent

applications, Turkey exhibited a ten-fold increase from 33 applications in 1998 to 393 applications in 2008. In triadic patent applications, Turkey exhibited more than two-fold increase in its triadic patent applications reaching 18 in 2008. While the United States, Japan and Germany account for about three quarters of the total triadic patent families, Turkey has been successful in rapidly increasing its share. Furthermore, as the 17th largest economy in the world, Turkey attracts increasing attention from other countries as a destination of patent applications.

Table 5.1: Number of patent applications

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of patent applications to the PCT (priority year)	33	56	72	76	85	112	115	174	269	359	393
Number of triadic patent families (priority year)	7	3	4	9	8	8	12	11	16	19	18

Source: OECD Main Science and Technology Indicators (MSTI) 2010/1, WIPO

NOTES:

¹ Glänzel, W, Debackere, K, and Meyer, M. 'Triad' or 'tetrad'? On global changes in a dynamic world. *Scientometrics*, Vol.74, No.1 (2008) 71-88.

² OECD (2004), *Patents and Innovation: Trends and Policy Challenges*, Paris: OECD, <<http://www.oecd.org/dataoecd/48/12/24508541.pdf>>.

6. SUMMARY

The trends in the STI indicators of Turkey allude to an STI impetus across the board from fast paced increases in GERD and the total stock of HRST to scientific productivity. As given in Table 6.1, such an impetus based on the STI indicators provides a momentum to reach the targets as resolved by the SCST and drive a greater convergence towards the EU27 and OECD averages.

Table 6.1: Science, technology and innovation indicators

Indicator	TURKEY													EU27 Total (2008)	OECD Total (2008)
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Target 2013		
GERD as a percentage of GDP (by 1998 base GDP)	0.37	0.47	0.48	0.54	0.53	0.48	0.52	0.59	0.60 ¹	0.72 ¹	0.73 ¹	0.85 ¹	2	1.81	2.33
GERD per capita population (PPP\$)	32	39	44	46	46	42	53	67	78 ¹	98 ¹	106 ¹	122 ¹	124	554.9	786.4
Total Researchers (thousand FTE)	19	20	23	23	24	33	34	39	43	50	53	58	120 ²	1,494	4,128 ³
Total R&D Personnel (thousand FTE)	23	24	27	28	29	38	40	49	54	63	67	74	150	2,444	-
Business Enterprise Sector R&D expenditures (% of GDP)	31.6	38.0	33.4	33.7	28.7	23.2	24.2	33.8	35.6	41.3	44.2	40.0	60	62.7	69.8
Government Sector R&D expenditures (% of GERD)	7.3	6.7	6.2	7.4	7.0	10.4	8	11.6	11.2	10.6	12	12.6	14	13.1	11.0
Higher Education Sector R&D expenditures (% of GERD)	61.1	55.3	60.4	58.9	64.3	66.3	67.9	54.6	53.2	48.2	43.8	47.4	26	23.1	16.8
Scientific publications per million population	86	98	100	120	156	186	227	243	272	309	324	348	400 ⁴	1,262 ⁵	1,416 ⁵
Number of triadic patent families	7	3	4	9	8	8	12	11	16	19	18	-	100 ⁴	14,789	47,861

Source: TurkStat, OECD-MSTI 2010/1, Thomson's ISI Web of Science

¹ Gross salaries are used for the calculation of R&D labour cost in higher education sector after the year 2006

² This target was set as 40,000 for the year 2010 and revised in 17th meeting of SCST after achieving the target much earlier than 2010.

³ For the year 2007

⁴ These targets are for the year 2010

⁵ For the year 2009

APPENDIX: Major S&T Actors in Turkey

Actors	Web Page Address/Links
The Supreme Council for Science and Technology (SCST/BTYK in Turkish)	SCST decrees are published on the websites of TÜBİTAK (in Turkish) www.tubitak.gov.tr/politikalar
The Scientific and Technological Research Council of Turkey (TÜBİTAK in Turkish)	www.tubitak.gov.tr
State Planning Organization (DPT in Turkish)	www.dpt.gov.tr/ing
The Council of Higher Education (YÖK in Turkish)	www.yok.gov.tr
Ministry of National Education (MEB in Turkish)	www.meb.gov.tr
Ministry of Industry and Trade (MoIT/ STB in Turkish)	www.sanayi.gov.tr
Undersecretariat of Foreign Trade (DTM in Turkish)	www.dtm.gov.tr
Turkish Statistical Institute (TurkStat/ TÜİK in Turkish)	www.tuik.gov.tr
Turkish Patent Institute (TPI/ TPE in Turkish)	www.turkpatent.gov.tr
Turkish Standards Institute (TSI/ TSE in Turkish)	www.tse.org.tr
Small and Medium Enterprises Development Organization (KOSGEB in Turkish)	www.kosgeb.gov.tr/English/index.aspx
Union of Chambers and Commodity Exchanges of Turkey (TOBB in Turkish)	www.tobb.org.tr
Technology Development Foundation of Turkey (TTGV in Turkish)	www.ttg.gov.tr

ACRONYMS AND ABBREVIATIONS

A&HCI	Arts & Humanities Citation Index
BAP	Scientific Research Projects Funds
BERD	Business Enterprise Expenditures on R&D
BRICs	Countries of Brazil, Russia, India, and China
DPT	State Planning Organization
DTM	Undersecretariat of Foreign Trade
EPO	European Patent Office
EU	European Union
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
HEI	Higher Education Institutions
HERD	Higher Education Expenditures on R&D
HRST	Human Resources for Science and Technology
ICT	Information and Communication Technologies
ISI	Institute for Scientific Information
ISIC	International Standard Industrial Classification of all Economic Activities
JPO	Japan Patent Office
KOSGEB	Small and Medium Enterprises Development Organization
MEB	Ministry of National Education
MoF	Ministry of Finance
MoIT	Ministry of Industry and Trade
NGO	Non-Governmental Organization
OECD MSTI	OECD Main Science and Technology Indicators
OYP	Scientific Human Resources Development Program
PCT	Patent Cooperation Treaty
PPP	Purchasing Power Parity
R&D	Research and Experimental Development
RC	Research Centre
S&T	Science and Technology
SAN-TEZ	The Industrial Graduate Thesis Program
SCI	Science Citation Index
SCST	The Supreme Council for Science and Technology
SME	Small and Medium Enterprises
SSCI	Social Science Citation Index
STI	Science, Technology and Innovation
TOBB	Union of Chambers and Commodity Exchanges of Turkey
TPI	Turkish Patent Institute
TARAL	Turkish Research Area
TRIAD countries	Three Largest National Economies of the World
TSI	Turkish Standards Institute
TTGV	Technology Development Foundation of Turkey
TurkStat	Turkish Statistical Institute
TÜBİTAK	The Scientific and Technological Research Council of Turkey
TÜBİTAK-ARDEB	TÜBİTAK Academic Research Funding Programs Directorate
TÜBİTAK-BİDEB	TÜBİTAK Science Fellowships and Grant Programs Department
TÜBİTAK-TEYDEB	TÜBİTAK Technology and Innovation Grant Programs Directorate
TÜBİTAK-ULAKBİM	TÜBİTAK Turkish Academic Network and Information Center
USPTO	United States Patent and Trademark Office
YÖK	The Council of Higher Education





TÜBİTAK

THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY (TÜBİTAK)

Contact:

TÜBİTAK – Department of Science, Technology and Innovation Policy
Address: Atatürk Bulvarı No.221 06100 Kavaklıdere Ankara TURKEY
E-mail: politikalar@tubitak.gov.tr
Phone: +90 312 4673659