



# Electronics Sector in Turkey



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March 2014

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# List of Abbreviations

Abbreviations	Definitions
<b>2G</b>	Second Generation
<b>3G</b>	Third Generation
<b>A.Ş</b>	Incorporation
<b>ADSL</b>	Asymmetric Digital Subscriber Line
<b>B2B</b>	Business to Business
<b>B2C</b>	Business to Customer
<b>BMI</b>	Business Monitor International
<b>BRIC</b>	Brazil, Russia, India, China
<b>BTK</b>	Information and Communication Technologies Authority
<b>CAGR</b>	Compound Annual Growth Rate
<b>CMS</b>	Content Management System
<b>Comm.</b>	Communication
<b>EFTA</b>	European Free Trade Agreements
<b>EIU</b>	Economic Intelligence Unit
<b>EMEA</b>	Europe, the Middle East and Africa
<b>EU</b>	European Union

Abbreviations	Definitions
<b>EUR</b>	Euro
<b>EPC</b>	European Patent Convention
<b>FDI</b>	Foreign Direct Investment
<b>FG</b>	Future Generation
<b>FTA</b>	Free Trade Agreements
<b>GDP</b>	Gross Domestic Product
<b>GE</b>	General Electronics
<b>HP</b>	Hewlett-Packard
<b>ICT</b>	Information & Communications Technology
<b>ISE</b>	Istanbul Stock Exchange
<b>IT</b>	Information Technology
<b>KOSGEB</b>	Small And Medium Industry Development Organization



# List of Abbreviations

Abbreviations	Definitions
<b>LCD</b>	Liquid-crystal display
<b>MBps</b>	Megabytes per second
<b>METU</b>	Middle East Technical University
<b>NGO</b>	Non-Governmental Organization
<b>PC</b>	Personal Computer
<b>R&amp;D</b>	Research and Development
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SIPRI</b>	Stockholm International Peace Research Institute
<b>SME</b>	Small and Medium Sized Entity
<b>TESID</b>	Turkish Electronics Industry Association
<b>TET</b>	Turkish Electro Technology Exporters' Association
<b>TEYDEB</b>	Technology And Innovation Funding Programs Directorate

Abbreviations	Definitions
<b>TDZ</b>	Technology Development Zone
<b>TPI</b>	Turkish Patent Institute
<b>TUBITAK</b>	The Scientific And Technological Research Council Of Turkey
<b>TUBISAD</b>	Informatics Industry Association of Turkey
<b>TurkStat</b>	Turkish Statistical Institute
<b>TL</b>	Turkish Lira
<b>TV</b>	Television
<b>UAE</b>	United Arab Emirates
<b>UAV</b>	Unmanned Aerial Vehicle
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America
<b>USD</b>	United States Dollars
<b>WITO</b>	World Intellectual Property Organization



# Executive Summary

- Electronics sector in Turkey represents 2% of the total GDP and offers great investment potential.
- Growing electronics industry allow Turkey to channel strong FDI inflow to the country. In 2011, Turkey's electronics sector received **USD 442 million** of FDI, and the country was amongst the top countries for electronics investments in that year surpassing countries such as Germany, Belgium and Denmark.
- Global consumer electronics market grew by 2.1% in 2012 and reached USD 295 billion. In 2017 the market is forecasted to have a value of USD 381.6 billion, which corresponds to an increase of 29.4 % since 2012.
- In 2012, Turkish electronics production increased by **4.1%** reaching **USD 12.4 billion** whereas exports increased by **5.2%** reaching **USD 6.8 billion** and imports decreased by **3.7%** to USD 16.1 billion.
- In the Turkish electronics market, **consumer electronics** had the **highest share of production** in 2012 with 34.8% reaching USD 4.4 billion, followed by telecommunication equipment with 19%, other professional equipment with 17%, computer equipment with 15%, defense electronics with 9%, and components with 5%.
- A noteworthy increase of **18%** between the years of 2011 and 2012 was observed for the **consumer electronics sub-sector exports** reaching **USD 2.4 billion**. Demonstrating Turkey's high potential and growing expertise in consumer electronics.
- As the second biggest sub-sector in production, **telecommunication equipment** grew by 1.7% in 2012 and reached **USD 2.3 billion**. Even though telecommunication equipment had the highest amount of export with USD 2.62 billion, its growth rate accounted for 5.4% which is significantly lower than consumer electronics export growth.
- Other major Sub-sectors such as defense electronics production and computer equipment production also increased by **14%** and **15%** respectively.
- Turkey has been already chosen as a regional hub and managing offices due its geographical and demographic advantages by many market leaders including Microsoft, Intel, General Electric and many others.
- Turkey also emphasizes on the importance of research and development centers along with clusters. Currently there are a total of 35 R&D centers related to electronics sector and 16 relevant clusters which bring together the industry and the academia for innovative technology development projects.
- Young Turkish population's motivation to work in the electronics sector provides a high quality work force for the investors. Both number of university students pursuing relevant studies and number of open employment positions in the electronics sector have been continuously increasing in the last couple of years.



# I. Macro-Economic Overview of Turkey

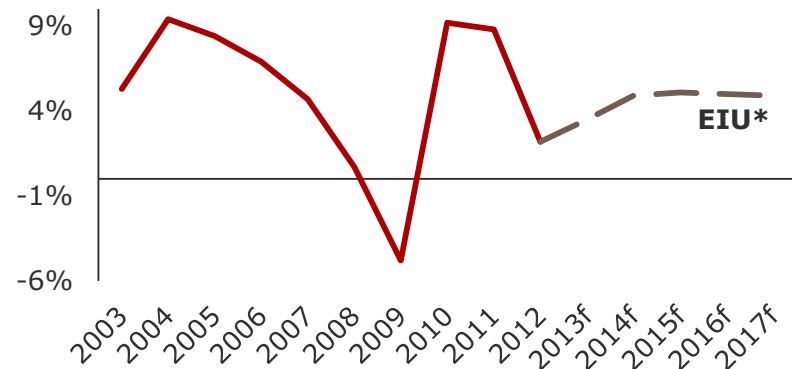
- A. Overview of Turkish Economy and Macro-Economic Outlook
- B. Foreign Direct Investments and Role of Electronics Sector
- C. Global Electronics Outlook and Electronics Outlook in Turkey



# Turkey's fast-growing economy is expected to attract more investments in the future

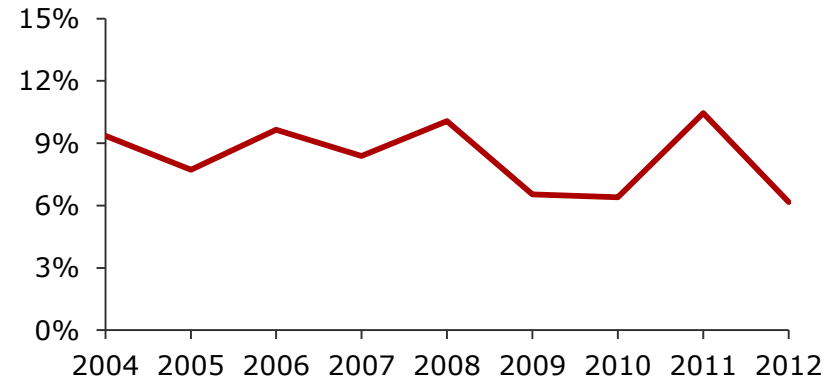
- Turkey has undergone profound economic transformation over the last decade and its economic fundamentals are quite solid. It is the 16<sup>th</sup> largest economy in terms of purchasing power parity in the world and the 6<sup>th</sup> largest economy in Europe with a current GDP of approximately USD 786 billion in 2012.
- Having boomed as fast as 9.3% and 8.8% in real terms in 2010 and 2011, the OECD projects a real GDP growth of around 4% in 2014 and 2015, while EIU projects an average 5% growth year-to-year until 2017.
- Monetary policy played a vital role in reining in inflation over the recent years. Turkish inflation has stayed under 10% since 2004 and year end inflation was realized as 6.2% in 2012. EIU forecasts that the average inflation will further ease to 4% by 2018.

**Figure 1: GDP Growth Rate (constant prices)**



Source: Turkstat, EIU  
f: forecasts

**Figure 2: Inflation, 2004-2012**

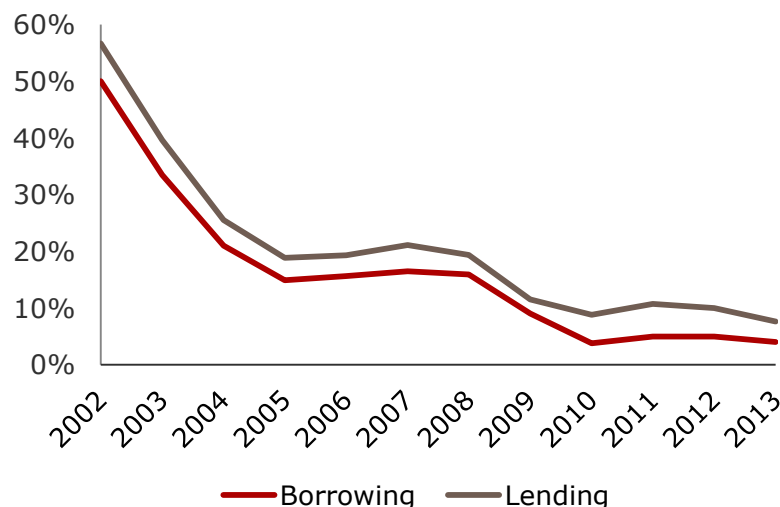


Source: Turkstat



# Capitalizing on its economic policies, the investment environment in Turkey has become increasingly more welcoming to foreign investors

**Figure 3: The Central Bank of the Republic of Turkey O/N Interest Rates**



Source: CBRT

- The overnight lending rates have been steadily decreasing over the years and was around 7.5% in September 2013, which is a 500 basis point decrease from 2002.
- Fitch Ratings announced Turkey's investment grade rating as BBB in November 2012 and Standard & Poor announced it as BB+ in March 2013. These events signal further upgrades and are expected to boost the inflow of institutional funding.
- Moody's raised Turkish government bond ratings to Baa3 and revised its outlook to stable from positive in May 2013.

**Table 1: Turkey's Credit Ratings**

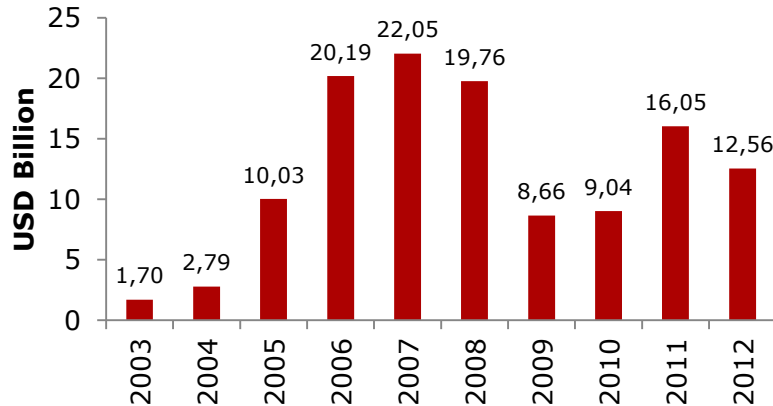
	Rating (Local Currency)	Outlook (Local Currency)	Rating (Foreign Currency)	Outlook (Foreign Currency)
<b>Standard &amp; Poor's</b>	BBB	Stable	BB+	Negative
<b>Fitch</b>	BBB	Stable	BBB-	Stable
<b>Moody's</b>	Baa3	Stable	Ba1	Positive
<b>JCR</b>	BBB-	Stable	BBB-	Stable

Source: Moody's (May 2013), S&P (March 2013), Fitch (December 2013), JCR (May 2013)



# Turkey is a popular FDI destination and expects to attract more FDI in the coming years

Figure 4: FDI Inflows to Turkey, 2003-2012

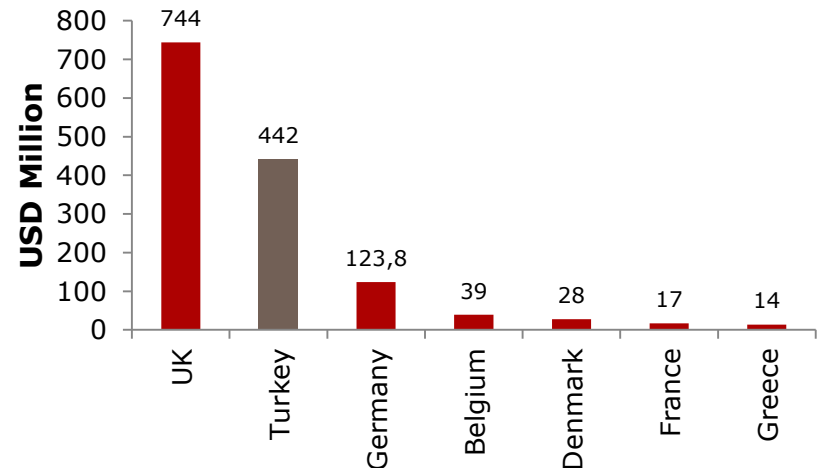


Source: World Development Indicators, World Data Bank

- Turkey has become an attractive destination for FDI. Weak FDI inflows after 2002 experienced an incremental increase, and reached a record level of USD 22 billion in 2007. The decrease in 2009 can be explained due to the global economic crisis, which lowered FDI all around the globe including Turkey. However, according to the 2011 values Turkey has recovered satisfactorily from the global crises.
- In 2012, FDI inflow has risen to **USD 12.56 billion**, compared to USD 8.66 billion in 2009.

- Majority of FDI inflows to Turkey have primarily come from the EU, followed by North America and Asia.
- Regarding the manufacturing of computers, electronic-electrical and optical equipment; Turkey received **USD 442 million in 2011**. Compared to some of the major countries in Europe, Turkey received one of the highest monetary amount in foreign direct investment in 2011, surpassing some of the leading countries in electronics sector, including Germany, Belgium and Denmark.

Figure 5: FDI in Electronics Sector, Selected Countries 2011

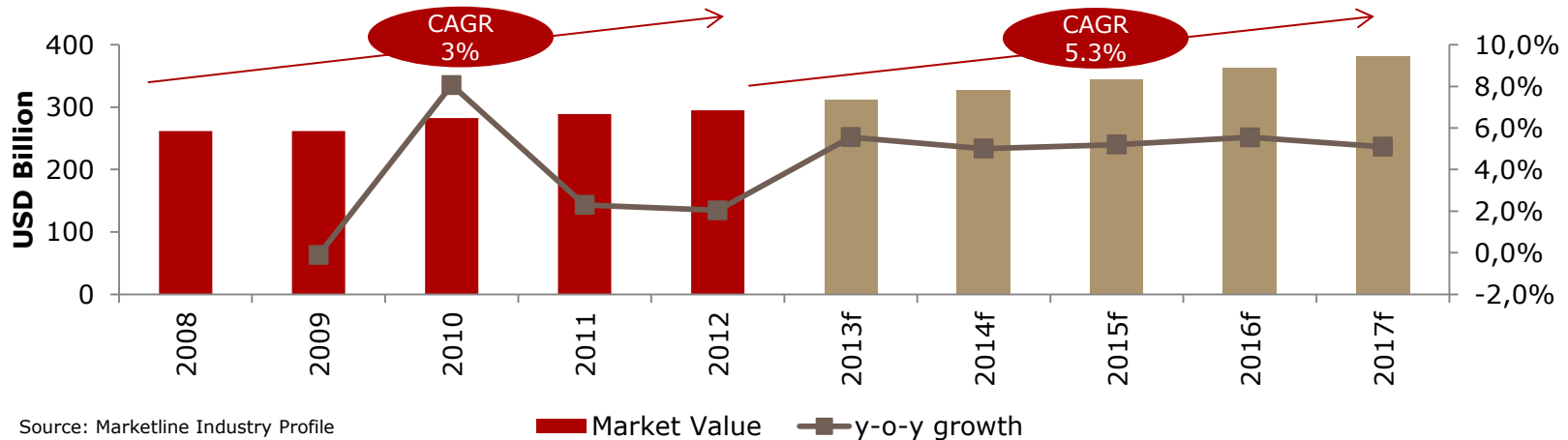


Source: International Trade Centre



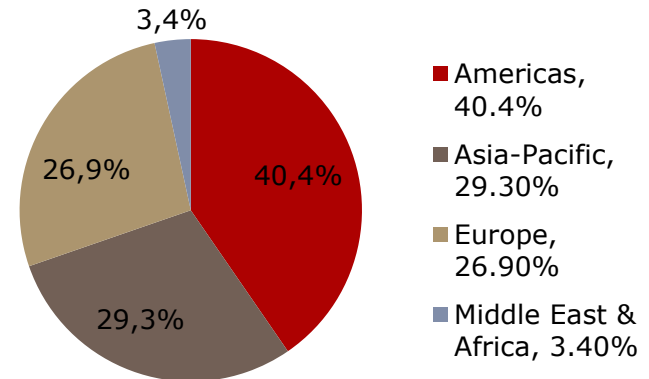
# Global Electronics Outlook

**Figure 6: Global Consumer Electronics Market Value and Forecast, 2008-2017**



- As technology plays a crucial role in today's world, electronics sector is growing at a unprecedented rate. According to Market Line Industry Profile, consumer electronics sector will have a value of USD 381.6 billion in 2017 which corresponds to an increase of 29.4% compared to 2012. It is also important to note that even though there has been a moderate increase in CAGR of the market value between 2008 and 2012, this is expected to increase to 5.3% for 2012-2017 time frame.
- Regarding the geographical distribution of market value in 2012, Europe – which includes Turkey – accounted for 26.9%. Highest share belonged to Americas with 40.4% followed by Asia-Pacific with 29.3%.

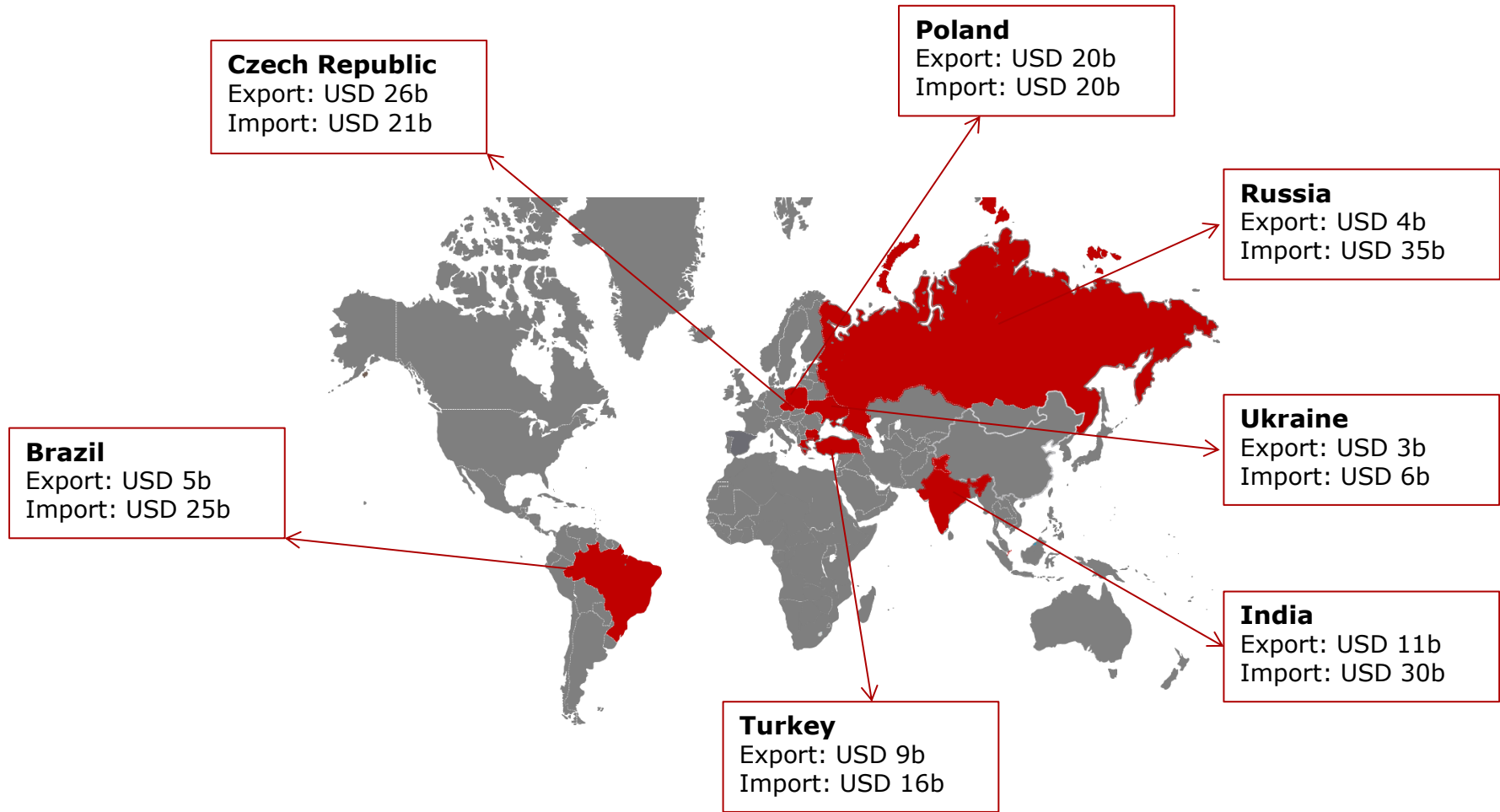
**Figure 7: Geographical Distribution of Consumer Electronics Market Value, 2012**



Source: Marketline Industry Profile



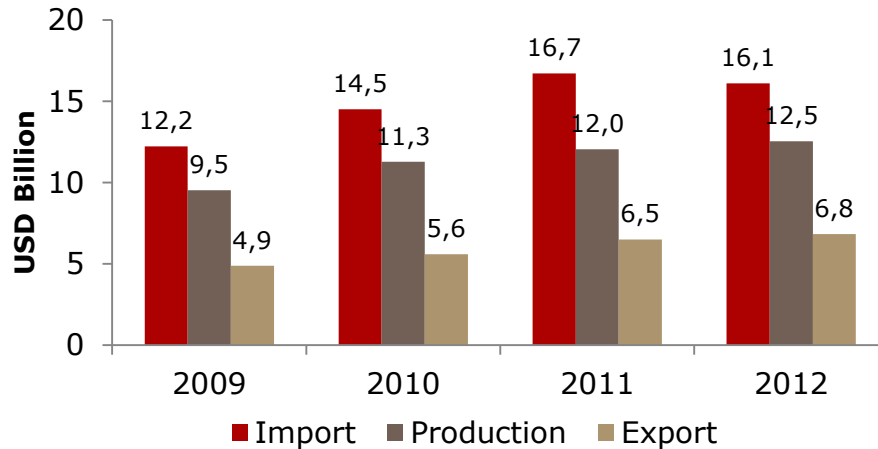
# Some of the major emerging economies and their electronics sector import & export values



Source: TESID, International Trade Centre  
b: billion

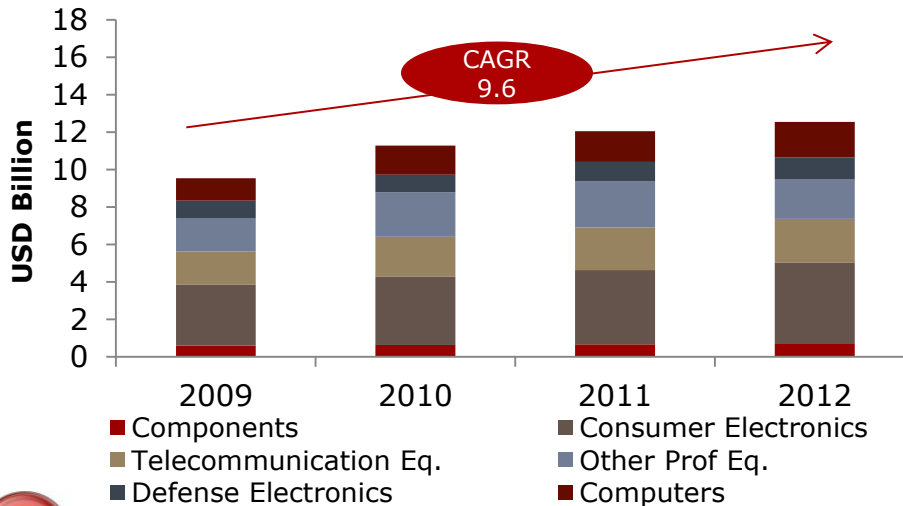
# Electronics Outlook in Turkey

**Figure 8: Electronics Sector Import, Production and Export Values, 2009-2012**



Source: TESID

**Figure 9: Electronics Sector , Production Values, 2009-2012**



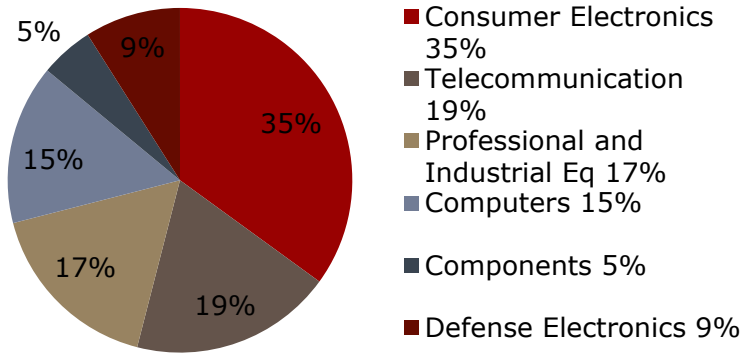
Source: TESID

- Electronics sector in Turkey has been experiencing rapid growth in the last couple of years.
- Import and production both grew at a CAGR of 9.6% from 2009 to 2012 whereas export grew at a CAGR of 12%.
- It is important to note that in 2012, production value of electronics sector in Turkey was **USD 12.5 billion** while **export value was USD 6.8 billion**.
- It is also important to note that research and development expenditures in electronics sector was **USD 250 million**, and had a share of **2%** in total electronics sector revenue in 2012. Turkey specifically acknowledges the importance of the electronics sector and research and development.
- Figure 9, demonstrates the production value of electronics sub sectors in USD billion. Consumer electronics by far has the highest share of production in the electronics sector with **35%**. Followed by, telecommunication equipment and other professional and industrial equipment.



# Electronics Outlook in Turkey

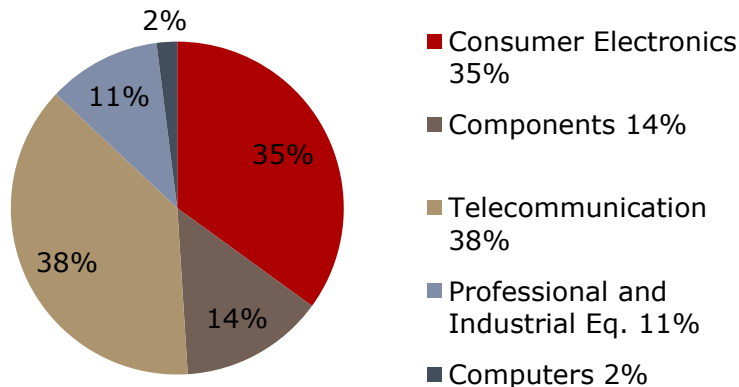
**Figure 10: Electronics Production in Turkey, 2012**



Source: TESID

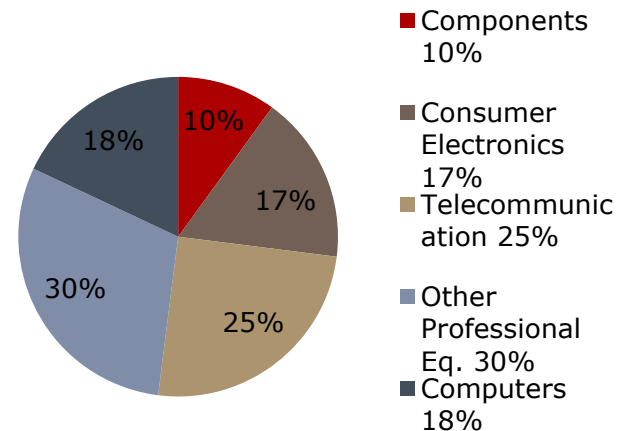
- Compared to 2011, exports grew by **5.4%** in 2012 and reached **USD 6.8 billion**. The export values are comprised of consumer electronics 35%, components 14%, professional and other professional and industrial equipment.
- The exports of the electronics sector demonstrated an increasing trend since the 1990s. This is mainly due to implementing R&D and production in accordance with the needs of the export markets.
- According to TESID, imports accounted for **USD 16.1 billion** in 2012 decreasing **3.7%** compared to 2011.

**Figure 11: Electronics Export in Turkey, 2012**



Source: TESID

**Figure 12: Electronics Import in Turkey, 2012**



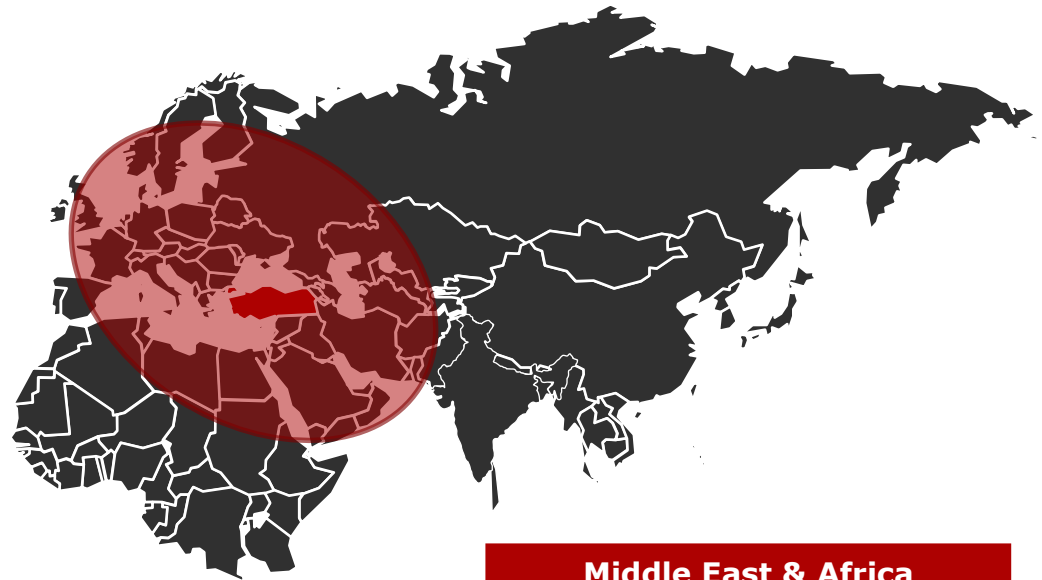
## II. Global Companies Choose Turkey to Invest in Electronics Sector

- A. Turkey has an advantageous geographical position
- B. Examples of Electronics companies Choosing Turkey as a Regional Center
- C. Ease of Doing Business in Turkey
- D. Turkey's Labor Force and Costs



# Turkey's advantageous geographical position: Europe meets Asia, within a radius of less than a 4-hour flight

- Turkey is situated between Europe and Asia, allowing the country to create a link between three continents of over 1.5 billion people and a GDP of USD 25 trillion. There are a total of 58 major cities that can be reached from Turkey in 4 hours or less.
- Airports in Ankara and Istanbul provide a practical route of travel with maximum of 4 hour direct flights to many cities in Europe, Western & Central Asia, and MENA.



## Europe

- London
- Rome
- Paris
- Berlin
- Stockholm
- Oslo
- Copenhagen
- Helsinki
- Madrid
- Prague
- Amsterdam
- Brussels
- Vienna
- Moscow
- Kiev
- Chisinau
- Vilnius
- Tallinn
- Podgorica
- Valletta
- Sofia
- Bucharest
- Warsaw
- Riga
- Belgrade
- Sarajevo
- Zagreb
- Tirana
- Athens
- Budapest
- Ljubljana
- Skopje
- Minsk
- Dublin
- Basel
- Bratislava
- Pristina
- Luxembourg

## Central & Western Asia

- Damascus
- Tehran
- Batumi
- Ashgabat
- Baku
- Tbilisi

## Middle East & Africa

- Abu Dhabi
- Riyadh
- Cairo
- Tripoli
- Baghdad
- Algiers
- Beirut
- Amman
- Tunis
- Bahrain
- Algeria
- Kuwait
- Sudan
- Tel Aviv



# Turkey as a Regional Hub

Numerous prestigious electronics/software companies choose Turkey as their headquarters and managing offices in the Middle East.

## B/S/H/

German company BSH including Bosch, Siemens and Profilo brands is centered in Turkey in order to organize operations, production and sales of the Middle East, North Africa and Central Asia. With the opening of a new manufactory in Çerkezköy, production of small house appliances shifted to Turkey.

## 3M

New manufacturing facility of US-based company 3M is established in the European Free Zone in Çorlu. The planned production Super Hub will not only serve the Turkish market, but will also provide products and solutions to primarily European, Middle Eastern and African regions.



GE Healthcare manages more than 80 countries from Turkey. The new hospital positioned as a healthcare IT hub in Istanbul is being used as an international clinical training center for doctors, clinicians and healthcare providers to serve healthcare needs of Middle East, Eastern Europe, Caucasus, Central Asia and Africa.



Microsoft has been managing the Middle East and Africa regions from its Istanbul office since 2000. Microsoft manages 79 countries, 39 offices and 3 continents from Turkey. UAE, Qatar, South Africa, Lebanon, Afghanistan, Egypt offices are some of the 39.



Since 2004, Intel is managing Middle East and Africa regions from Turkey. Turkish Office is responsible for all activities related to Sales and Marketing, distributions, investments and social responsibility projects. For Intel, EMEA region means 64 countries including Egypt, South Africa, UAE & Saudi Arabia.

**Some of the other selected companies:**



# Turkey has taken crucial steps to increase Free Trade Agreements all around the world



**Selected Countries under FTA negotiations**



**Selected Countries under FTA negotiations initiative**



- Free Trade Agreements (FTA) allow member countries to be exempt from specific tariffs, and import quotas of certain products – in some cases all products.
- FTAs have various advantages such as strengthening economic growth, increasing employment, benefiting the consumer by allowing access to greater variety of goods and services.
- As of 2012, Turkey has FTAs with 17 countries. These countries include, European Free Trade Association (EFTA), Macedonia, Bosnia-Herzegovina, Albania, Israel, Palestine, Morocco, Tunisia, Egypt, Syria, Georgia, Serbia, Montenegro, Chile, Jordan, South Korea and Mauritius.

- Also it is important to note that there are a total of 13 countries/country blocs that Turkey has started FTA negotiations. These countries include the following; Ukraine, Colombia, Ecuador, Malaysia, Moldova, Democratic Republic of the Congo, Ghana, Cameroon, Seychelles, Gulf Cooperation Council, Libya, and Faroe Islands

- Additionally, Turkey has launched initiatives to start negotiations with the USA, Canada, Japan, Thailand, India, Indonesia, Vietnam, Peru, Central American Countries, other ACP Countries, Algeria, Mexico and South Africa.

Source: Republic of Turkey, Ministry of Economy

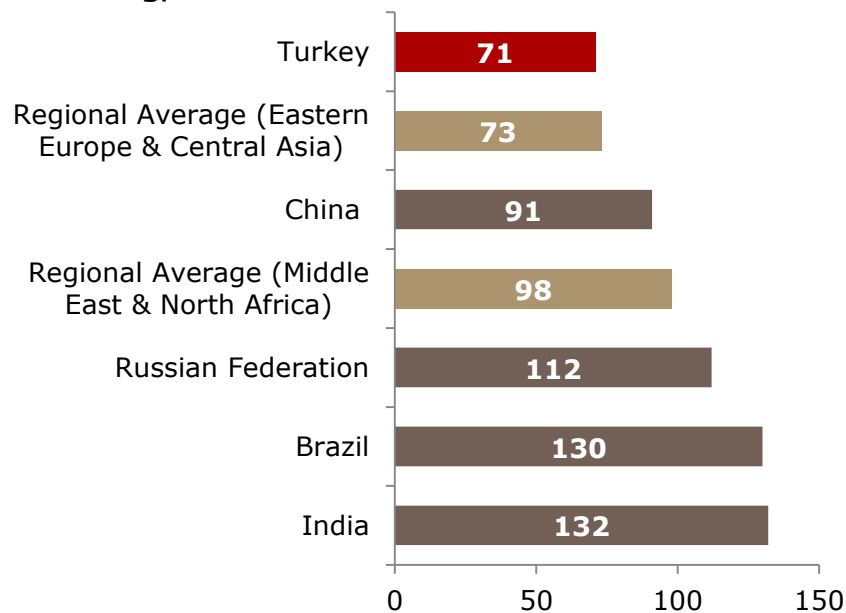


# Starting a business in Turkey is easier compared to MENA and BRIC countries

- Foreign Direct Investment Law in Turkey – which complies with international standards- came into force in 2003. The objective of this Law is to regulate the principles to encourage foreign direct investments; to protect the rights of foreign investors; to define investment and investor in line with international standards; to establish a notification-based system for foreign direct investments rather than screening and approval; and to increase foreign direct investments through established policies. This Law establishes the treatment to be applied to foreign direct investments.
- With this law, unless stipulated by international agreements and other special laws:
  1. Foreign investors are free to make direct investments in Turkey,
  2. Foreign investors shall be subject to equal treatment with domestic investors.
- Due to new developments in FDI Investment Law and Turkey's increasing reputation in the international platform has increased the number of expats significantly. For example, according to the Ministry of Labor and Social Security, number of work permits given to foreigners increased by 86% in 2012 reaching 32,272. Since 2003 a total of 125,697 permits were provided to foreigners.
- It is also crucial to note that the availability free transfer of funds in Turkey adds positively to its investment friendly environment.

- According to *Doing Business 2013* report by the World Bank, Turkey is ranked 71th among 185 countries on the ease of doing business.
- Turkey has a higher ranking compared to BRIC countries. The average of the regions close to Turkey, Eastern & Central Asia and Middle East & North Africa is ranked 73th and 98th respectively, below the rank of Turkey.

**Figure 13: Ease of Doing Business Analysis Ranking, 2013**



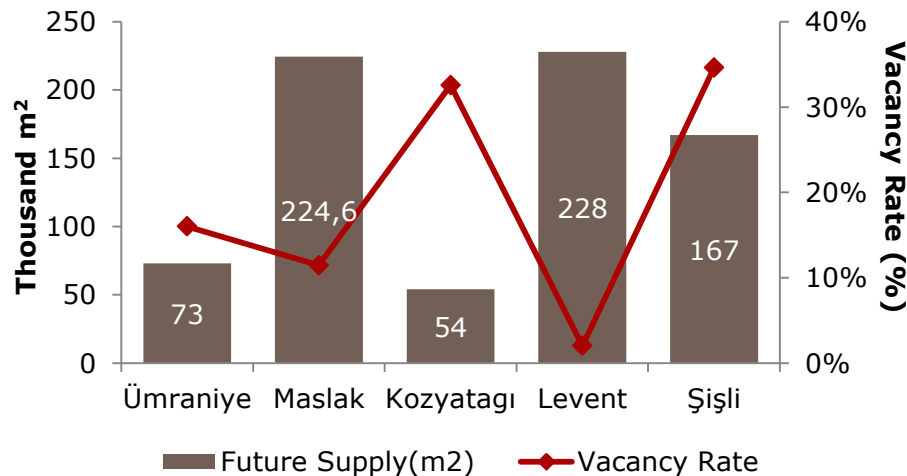
Source: Doing Business 2013, The World Bank



# Acquiring Real Estate in Turkey

- Turkey's economic stability, strong macroeconomic indicators and attractive long term loans have made the country a lucrative environment for real estate investors. For instance, in 2010 Turkey was awarded the 'highest improvement' title in the global real estate transparency index.
- It is important to note that the real estate sector contributes significantly Turkey's GDP, accounting for 5% in 2011. The number of **REITs (Real Estate Investment Trusts) traded on the ISE (Istanbul Stock Exchange) was 24**, and as of the fourth quarter of 2012, **the market value was TL 15.8 billion**.
- Sales of real estate to **foreigners started to increase in the last two quarters of 2012 because of the enactment of the Reciprocity Law**. Real estate sales to foreigners increased by 30.9% and reached USD **2.64 billion in 2012**.

**Figure 14: Supply and Vacancy of Offices in Istanbul**



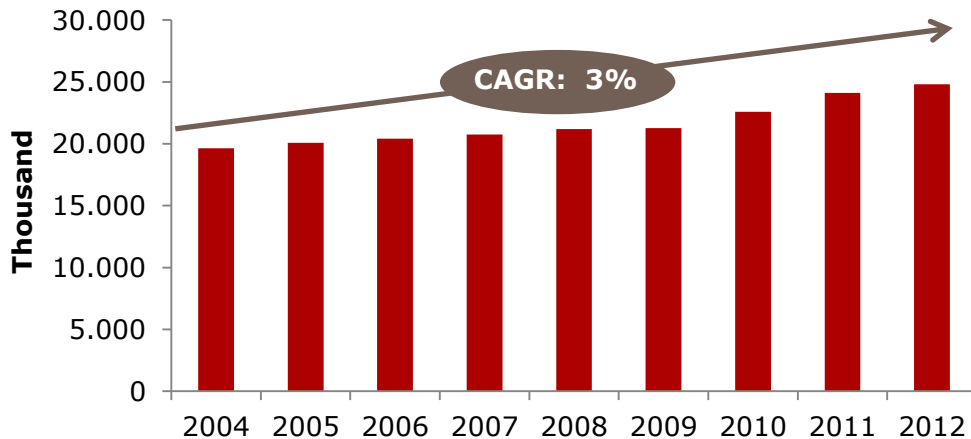
Source: ISPAT<sup>1</sup>, Colliers International, UN Economic Commission of Europe, GYODER

- According to a report by the Association of Real Estate Investment Companies (GYODER), the most active commercial real estate market was the office market in 2012. Foreign investors and developers are increasingly interested in the office market.
- Istanbul's office market is dynamic, with low vacancy rates demonstrated in type A and B offices in the CBD (Central Business District) despite new supply. Office leases have stable in the last quarter of 2012.



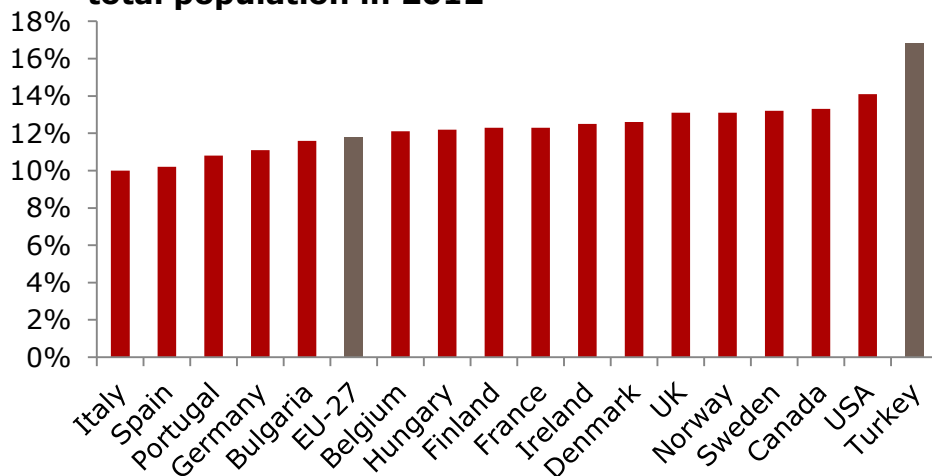
# Employment rate in Turkey have been consistently increasing

**Figure 15: Employment in Turkey, 2004-2012**



- In 2012, Turkey's workforce consisted of approximately 25 million people which demonstrates an increase at a CAGR of 3% between 2004 and 2012.
- Also it is important to note that the global crisis in 2008 did not cut back the jobs in the Turkish Economy and there was an addition of 83,000 jobs from 2008 to 2009. This number has increased significantly due to the economic prosperity and reached to an additional of 711,000 from 2011 to 2012.
- Turkey has one of the highest percentage of young people (age between 15 to 24) in the world. The young population is 42.3% higher than the EU-27 average.
- As education programs continue to expand and as the economy continues to grow, Turkey brings about exceptionally well educated and high skilled workforce into its economy.

**Figure 16: Percentage of young people (15-24) in total population in 2012**

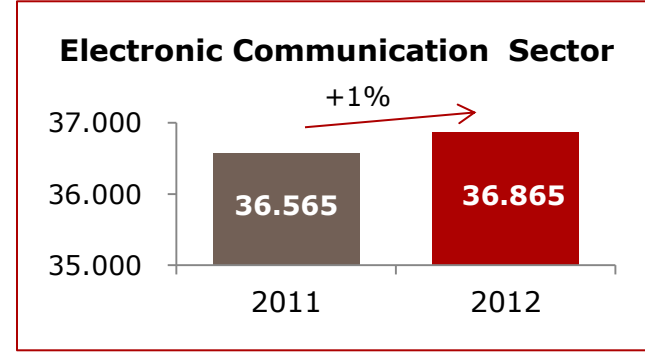
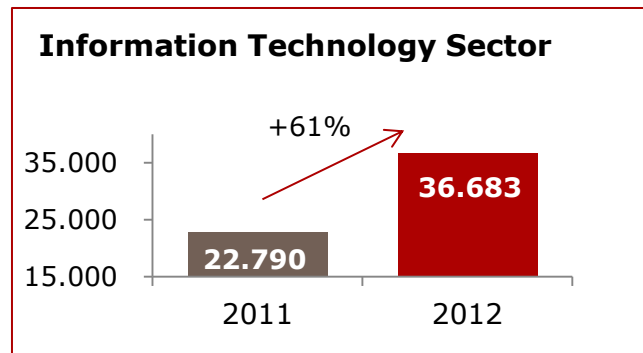
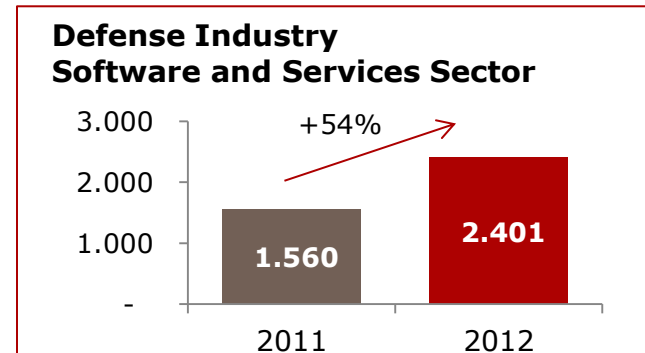
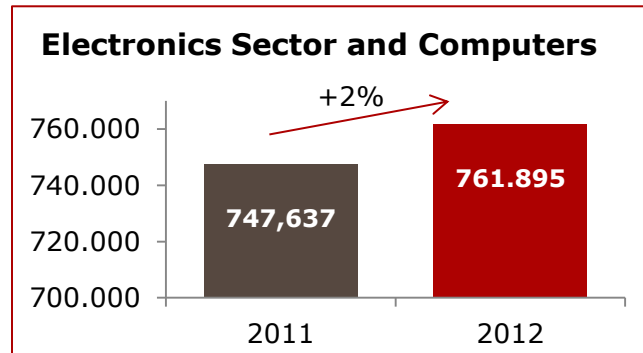


Source: TURKSTAT, United Nations Economic Commission for Europe



# Employment in Electronics sector and related industries are increasing considerably

**Figure 17: Number of people working in electronics sector and its related industries, 2011-2012**



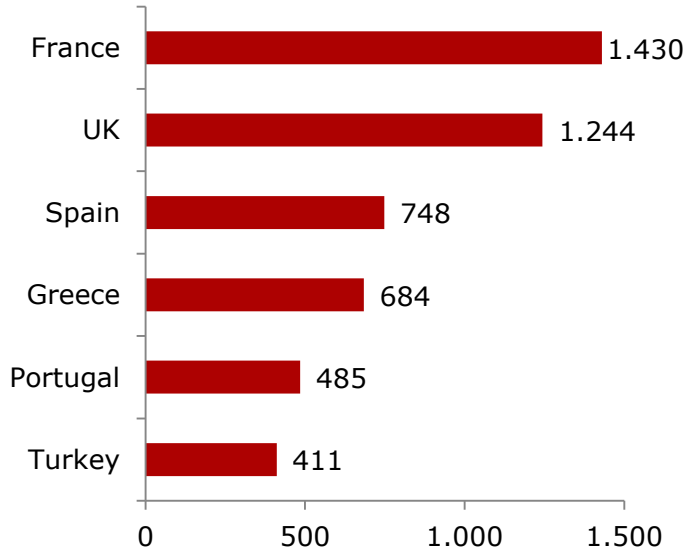
Source: TÜBISAD, ICT Market Data 2012

- Turkey has experienced significant growth in its electronics workforce and other related fields. Figures above demonstrate the precipitous increase in electronics related sectors.
- The annual increase in the number of employees of Information Technology sector and Defense Industry Software and Services sector, which are 61% and 54%, respectively, are noteworthy.
- Employment rates in electronics industry are expected to rise as the government offers additional incentives in electronics projects which will be discussed further in the report.
- Many major players in the sector also chose Turkey for its regional advantage allowing the workforce to develop by providing new jobs.



# Monthly Average Gross Wage by Statistical Regions

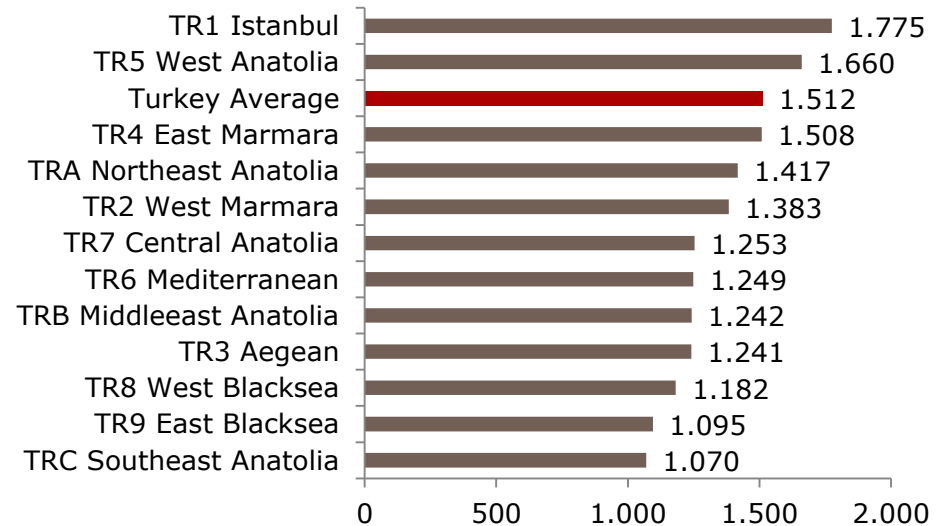
**Figure 18: Minimum Monthly Wage (EUR\*)**



Source: Eurostat

\*Exchange rate between Euro and Turkish Lira (€/TL) in 2010: 1.99

**Figure 19: Monthly Average Gross Wage by Statistical Regions (TL)**



Source: Turkstat, Structure of Earnings Survey 2010

- Turkey has a young, dynamic and an educated population. However, monthly wages are relatively lower than the EU or the US. With regards to minimum wage Eurostat states that Turkey's minimum wage was EUR 411 in 2012.
- It is important to note that, monthly wages in Turkey differ according to specified regions as it can be seen in Figure 19. According to Structure of Earnings Survey published in 2010, apart from Istanbul and West Anatolia, rest of the regions have lower monthly gross wages which is 1,512 TL. In these regions Manisa (TR3), Koceli (TR4), Izmir (TR3), Kayseri (TR7), and Adana (TR6) are the prominent cities where electronics sector is mostly centered. Therefore, according to statistics labor costs are lower in these particular cities compared to country's average.



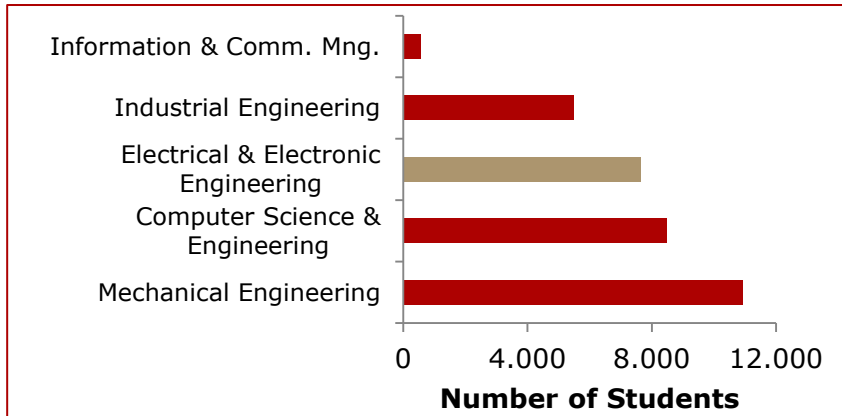


# III. Turkey has excellent engineering academia and research

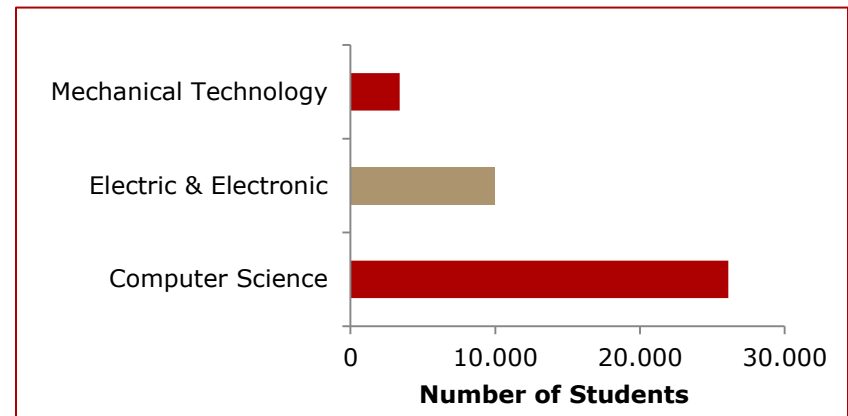
- A. University Educational Quotas Related to Electrical and Electronic Sector
- B. Research Centers and Techno Centers in Electronics Sector
- C. Electronics Clusters

# Turkey has excellent engineering academia and research

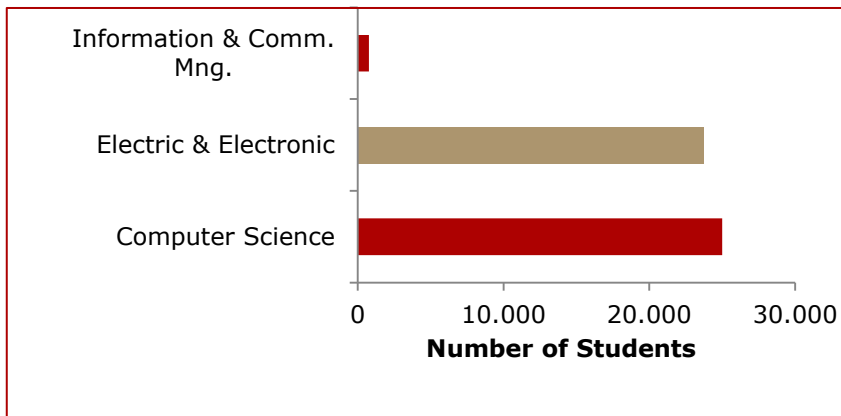
**Figure 20: University Quotas related to Electronics Sector, 2012**



**Figure 21: Vocational High School Quotas related to Electronics Sector, 2012**



**Figure 22: Vocational School of Higher Education Quotas related to Electronics Sector, 2012**



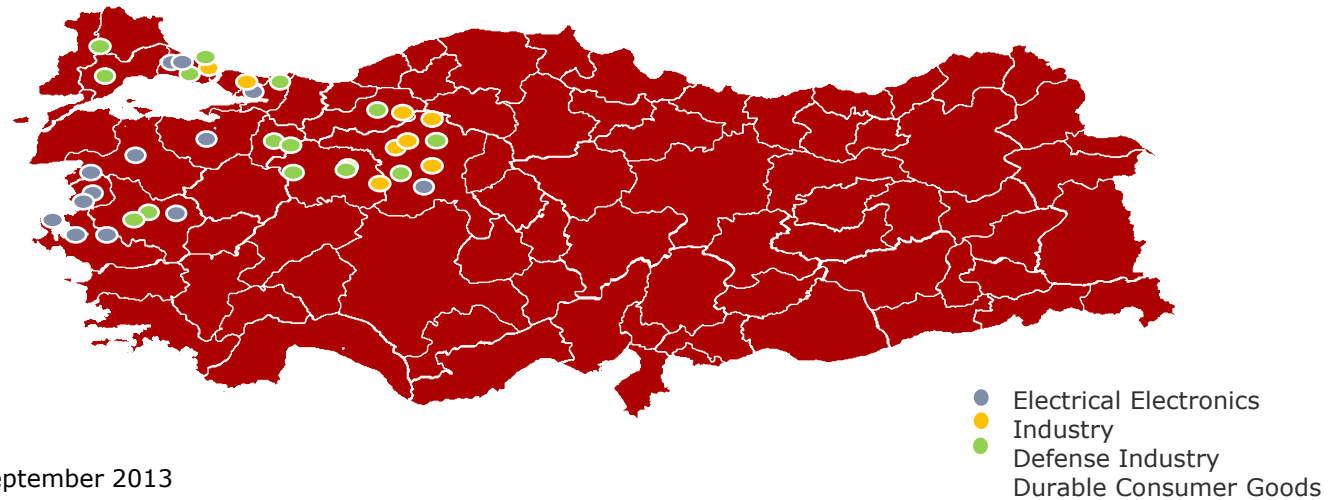
- Each year a significant number of quotas are offered for students interested in programs related with electronics sector. For instance, in **2012 there were a total of 122,026 quotas** related to electronics sector including universities, vocational high schools and vocational school of higher education.
- Also, it is important to note that departments related to electronics require exceptionally high scores for admission. Accepting brightest students in Turkey helps to provide , a high-quality workforce.
- Due to increase in number of Technology Development Zones and research centers, the quality of engineering departments are improving as well as the quantity of students in the field.
- Besides the universities, there are private education and training centers that provide certifications on coding, system & network management, database management, graphics & digital design etc.



Source: OSYM, Deloitte Analysis

# Currently Operational Research & Development Centers in Turkey regarding Electronics Sector

Figure 23: Operational Electronics Sector Related R&D Centers\*



\* As of September 2013

Applications regarding R&D Centers in Turkey are evaluated, and assessed by the General Directorate of Science and Technology under the scope of the Law No: 5746. The aim of this law is to increase the technological developments in Turkey including R&D activities, production of goods, standards and efficiency regarding innovation.

In order to increase investments, both local and foreign the law offers various incentive mechanisms as follows;

- Research and Development Remission
- Income Tax Reduction
- Insurance Premium
- Exemption from Stamp Tax
- Technological Venture Fund

Since the enactment of the law, there have been 178 applications in order to establish an R&D center. 153 of these applications were approved by the General Directorate of Science and Technology. As of September 2013 there are a total of 142 R&D centers that are operational all across Turkey, employing approximately 15,686 engineers. During this five year frame, R&D expenditure of these enterprises was realized as TL 7.3 billion.

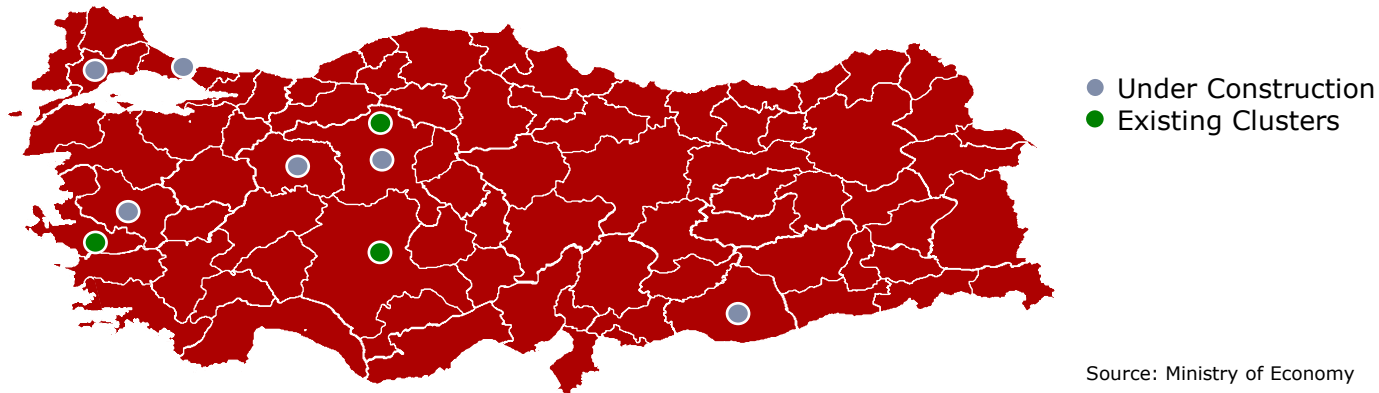
Out of these 142 R&D Centers 35 are related to the electronics sector including defense industry and consumer goods.



# There are 16 relevant Clusters in Turkey related to Electronics sector

Clustering as a horizontal policy is becoming increasingly important in the policy agenda of the Turkish government. There were many supporting initiatives had been put in place all aiming to develop a sound clustering policy with effective measures encouraging the SMEs, which are vitally important in the country's current positive economic development trend registered within the last decade. These initiatives were composed of projects carried out at the national or sectorial level and as well as in the form of government subsidies and supports for the Clusters in Turkey. Figure 24 demonstrate the Electronics – and its relevant - sector clusters.

**Figure 24: Major Electronics and Related Sector Clusters**



## Under Construction

- Ankara-METU Technopolis Cooperation Platform of Defense Industry Companies
- Ankara-Kazan Defense and Aerospace Industry Cluster
- Eskişehir Information Sector
- İstanbul- Küçükçekmece Electrical Electronics Sector
- İstanbul -Ümraniye Electrical Electronics Sector
- Manisa Electrical Electronics Appliance
- Şanlıurfa Electrical Machinery and Sub-Industry Cluster
- Tekirdağ Household Electrical Appliances Cluster

## Existing Clusters

- Ankara-METU Technopolis Software Cluster
- Ankara-OSTİM Renewable Energy and Environmental Technologies Cluster
- Ankara-OSTİM Defense and Aerospace Cluster
- Ankara-OSTİM Medical Industry Cluster
- İzmir Industrial Ventilation, Air Conditioning and Refrigeration Cluster
- İzmir-Aerospace Cluster
- İzmir-İNOVİZ Biomedical Technologies
- Konya -Automotive Supply Industry
- Eskişehir – Aviation Cluster



# IV. Government Incentives in Electronics Sector

- A. 2023 Targets
- B. Government Incentives – TUBITAK and TEYDEB
- C. Laws and Regulations Regarding the Electronics Sector
- D. Major NGOs and Public Institutions

# Turkey's public agencies set ambitious goals for 2023

## Technological Targets of Supreme Council of Science and Technology

- Increasing research and development incentives of TUBITAK from USD 190 million in 2010 to USD 1 billion in 2023.
- Increasing R&D centers from 87 in 2010 to 120 in 2023.
- Increasing university and industry collaboration projects from 84 in 2010 to 300 in 2023.

## Communication Strategy of The Ministry of Transport, Maritime Affairs & Communications

- Having 120 million mobile subscribers.
- Increasing number of broadband subscribers to 30 million.
- Providing internet connection for 14 million houses at a speed of 1000 Mbps
- Reaching an ICT sector size of USD 160 billion, requiring a market growth of approximately 15% each year.

## R&D Strategy of Supreme Council of Science and Technology

- Increasing the number of researchers from 135 thousand to 300 thousand.
- Reaching to a number of 180 thousand private sector researchers from 39 thousand.
- Increasing the R&D expenditure to GDP ratio to 3% from 0.85%.
- Increasing private sector R&D expenditure to GDP ratio to 2%.



# The Investment Incentives System in Turkey will support 2023 targets of the sector

The Investment Incentives System in Turkey has been effective since 1st of January 2012 and offers four different kinds of schemes. They can be summarized as;

## 1. General Investment Incentive Scheme:

Available for all investment types considering the investment subject is not excluded from the program list, and the minimum defined fixed investment amount is completed.

## 2. Regional Investment Incentive Scheme:

These incentives are allocated depending on the region (See Figure 25 on the next slide) to eliminate inter-regional imbalances within the country. Minimum investment amounts are determined for different kinds of investments. If not specified for the specific type of project, the minimum investment amount is 1 Million TL for Regions I and II, and 500 thousand TL for regions III, IV, V, VI. Additional labor cost deduction of 38% is available only for Region 6.

## 3. Large Scale Investment Incentive Scheme:

The goal of this program is to improve Turkey's technological abilities and R&D capacity. Through these investments Turkey aims to achieve a global competitive advantage.

**4. Strategic Investment Incentive Scheme:** This scheme is offered for production of intermediate and final goods that have high import dependence (more than 50%). Investments of 50 million TL and above are eligible to benefit from this scheme.

**Table 2: Investment Incentive Program Exemptions, Support, and Deductions**

Support Measures	General Investment	Regional Investment	Large Scale Investment	Strategic Investment
Vat Exception	✓	✓	✓	✓
Customs Duty Exemption	✓	✓	✓	✓
Tax Deduction	☒	✓	✓	✓
Land Allocation	☒	✓	✓	✓
Interest Support	☒	✓	☒	✓
Vat Refund	☒	☒	☒	✓
Employer's Social Security Premium Support	☒	✓	✓	✓
<i>Only For Region 6</i>				
Income Tax Withholding Support	✓	✓	✓	✓
Employee's Social Security Premium Support	☒	✓	✓	✓



# The Investment Incentives System in Turkey and Electronics Sector

Figure 25: Incentive Regions (1-6)

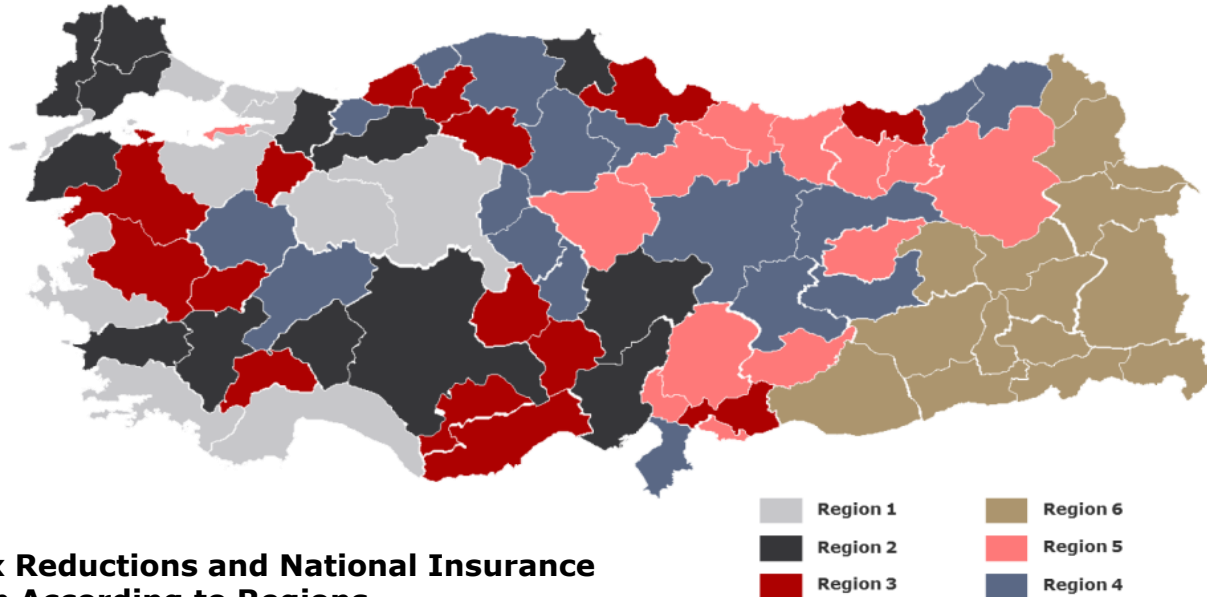


Table 3: Tax Reductions and National Insurance Contribution According to Regions

Region	1	2	3	4	5	6
<b>Regional Incentive Applications</b>						
Tax Reduction Investment Contribution Rate	15%	20%	25%	30%	40%	50%
<b>Incentive for Large Scale Investments</b>						
Tax Reduction Investment Contribution Rate	25%	30%	35%	40%	50%	60%
Support for Employer's National Insurance Contribution (Both)	2 Year	3 Year	5 Year	6 Year	7 Year	10 Year

It is important to note that the following sectors related to electronics can benefit from **Large Scale Investment Incentive Scheme** with a minimum of TL 50 million initial investment.

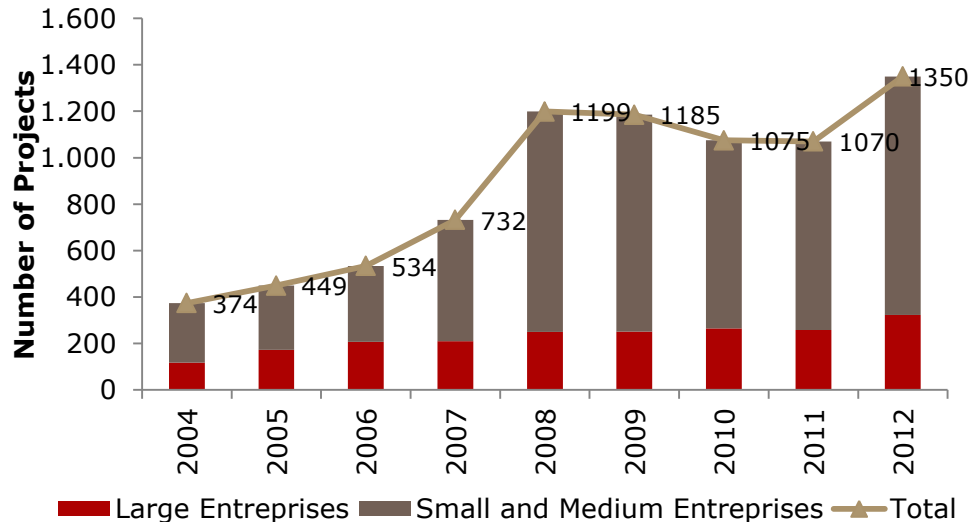
- Electronic Industry Investments
- Medical Equipment, Optical Equipment Manufacturing Investments
- Air and Aerospace Vehicles and/or Components Manufacturing Investments
- Machine (Including Electrical Machines and Equipment) Manufacturing Investments



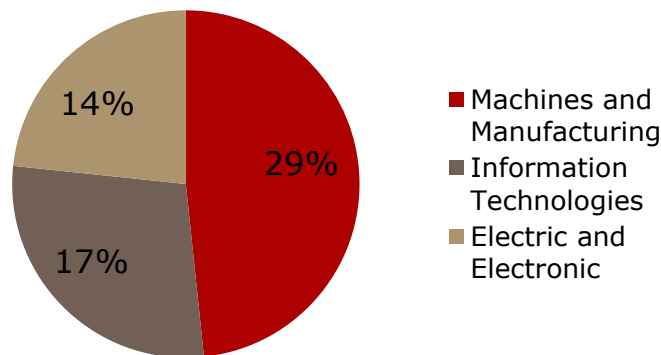


# Scientific and Technological Research Council of Turkey offer various incentives for electronics projects

**Figure 26: Number of Projects According to Enterprise Size**



**Figure 27: Project Applications According to Sectors**



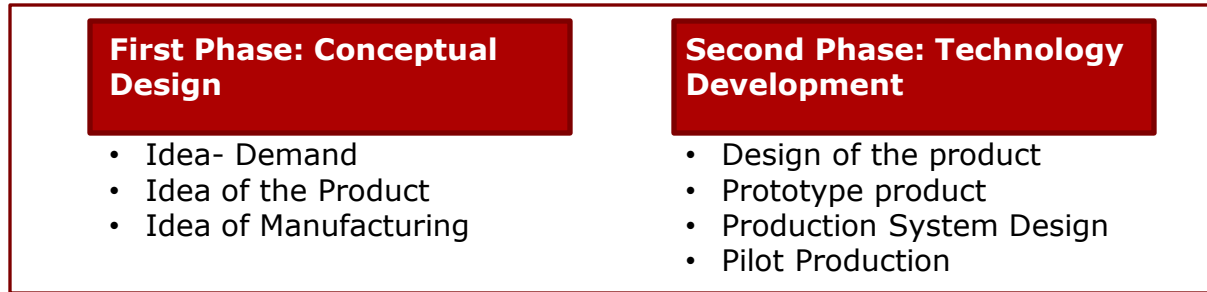
- TUBITAK is the Scientific and Technological Research Council of Turkey and it provides significant amounts of research and development funds in Turkey. TUBITAK offers various incentives and grant programs through sub departments one of the most significant one is called TEYDEB which stands for Department Technological Innovation and Support System Programs.
- TEYDEB's vision is to support research and development activities regarding innovative technologies.
- Since 1995, there were a total of 16,422 project applications, and 9,721 were supported through TEYDEB reaching approximately TL 3 billion support mechanism. During this time frame TEYDEB also granted a total of TL 5.6 billion to research and development activities.
- In 2012, total monetary value budget by TEYDEB for projects was TL 301.4 million.
- As it can be seen from Figure 26, a significant portion of incentives were granted to small and medium enterprises reaching to a total of 1,350 projects.
- Since 1995 until 2012 projects related to electrical and electronic sector received 17% of the support by TEYDEB.
- Further incentives for projects are provided in the next slide with their support program codes and names.

Source: TUBITAK



# Incentive Programs of TEYDEB and Supported Business Processes

Figure 28: Supported R&D Business Processes by TEYDEB



- **1501: Industry Research and Development Program** – This program is aimed to support companies for their technological R&D activities. Any enterprise located in Turkey which provides added value to the industry can apply to this program. This program supports up to 60% of the proposed project.
- **1502: EUREKA** – The aim of EUREKA is to enhance the collaboration between R&D centers, companies, and universities between Turkey and Europe. Support up to 50% is achievable through this program.
- **1503: Project Market Support Program** – The aim of this program is to create collaboration between the private sector/industry and universities to put ideas into real projects with combined expertise. As of 2013, the budget for the program 1503 is defined as TL 25,000 for local projects, TL 30,000 if international players are included in the project.
- **1507: Small and Medium Size Enterprises R&D Support Program** – 1507 is designed for small and medium size enterprises and their role in R&D activities to develop available goods, increase standards and decrease its costs. Incentive support for 1507 is 75%.
- **1508: Support Program for Technological and Innovative Focused Ventures** – This program is aimed at young professionals who have innovative projects. Projects that have budget of TL 100,000, TEYDEB supports 75% of this amount.
- **1509: International Industry R&D Projects Support Program** – 1509 supports international projects that are announced under EUREKA, ERA-NET and the European Union Framework Programs. For big enterprises support up to 60% is available, whereas for small and medium enterprises support up to 75% can be granted by TEYDEB.



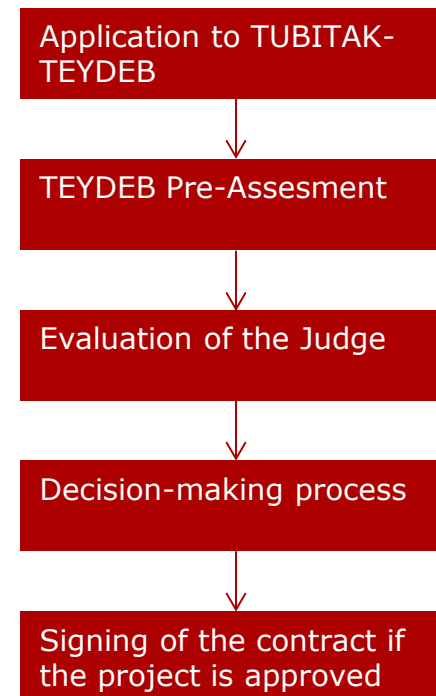
# TEYDEB Supports Further Expenditure Items

## Expenditure Items that are Supported by TEYDEB

- Personnel expenses
- Equipment, hardware, software and publication purchasing
- Consulting services locally and internationally and other services
- R&D expenditures incurred by universities within the country, R&D centers associated with TUBITAK and similar associations
- Material and consumption expenses
- Travel expenses of project personnel and -if available - of consultants
- Project preparation expenditures (only for 1507)
- Certified Public Accountant expenditures (only for 1507)
- Expenditures regarding patent registration from Turkish Patent Institute

## Application and Evaluation Process of TEYDEB

- Interested applicants can apply to TEYDEB on any date, however it is important to note that expenditures up to 3 months before the application are eligible to benefit from the incentive program.



Source: TUBITAK

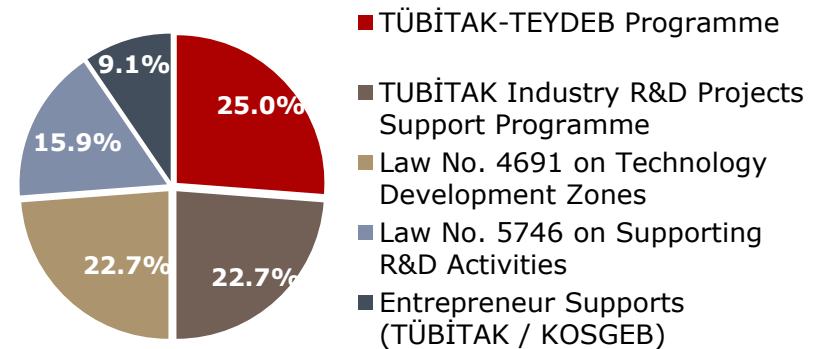


# There are different incentive programs for support and through exemptions

- In addition to the Investment Incentive Program, ICT sector investments and initiatives are supported through several regulations and incentive programs.
- In 2012, 50% of ICT companies benefited from these incentives. The TUBITAK-TEYDEB Program's incentives have the largest total share.

TUBITAK-TEYDEB Program
TUBITAK Industry R&D Projects Support Program
Law No. 4691 on Technology Development Zones
Law No. 5746 on Supporting R&D Activities
Entrepreneur Support (TUBITAK / KOSGEB)

**Figure 29: Share of Total Incentives Granted**



- Companies in Technology Development Zones (TDZs) are granted various supports and exemptions totaling TL 1.4 billion.

## Some Incentives for TDZ Investors

- Income tax gain exemption
- Corporation tax gain exemption
- Income tax exemption for researchers, developers and R&D personnel
- Social security premium support
- Value added tax exemption





**Table 4: Total Amount of Support and Exemptions Provided to Companies in TDZs from 2001 to March 2012**

<b>Income and Corporate Tax Exemption</b>	TL 448.87 million
<b>VAT Exemption</b>	TL 365.26 million
<b>Employee Income Tax Exemption</b>	TL 482.09 million
<b>Social Security Premium Support</b>	TL 95.30 million
<b>Total</b>	TL 1.44 billion



Source: Ministry of Science, Industry and Technology

# Major NGOs in Electronics Sector

Name	Logo	Web Page	What They Do
<b>Türk Elektronik Sanayicileri Derneği (TESİD)</b> Turkish Electronics Industry Association	 <p>TÜRK ELEKTRONİK SANAYİCİLERİ DERNEĞİ</p>	<a href="http://www.tesid.org.tr/">http://www.tesid.org.tr/</a>	Operates in order to help improvement of Electronics Industry and Information Technology in Turkey
<b>Kablo ve İletken Sanayicileri Derneği</b> Cable and Conductive Industry Association	 <p>iletken Kablo ve İzoleli İletken Sanayicileri Derneği</p>	<a href="http://www.iletken.org.tr/">http://www.iletken.org.tr/</a>	Aims to improve Cable and Conductive Industry and to keep the business improvement standards high.
<b>Uydu Elektronik İletişim İş İnsanları Derneği</b> Association of Businessmen of Satellite Electronic and Communication Sector	 <p>TUYAD UYDU ELEKTRONİK İLETİŞİM İŞ İNSANLARI DERNEĞİ</p>	<a href="http://www.tuyad.org/">http://www.tuyad.org/</a>	Operates for the purpose of increasing total quality of the Satellite Electronic and Communication Sector.
<b>E-Ticaret Siteleri ve İşletmecileri Derneği</b> E-Commerce Websites and Operators Association	 <p>eticad</p>	<a href="http://www.eticad.org.tr/">http://www.eticad.org.tr/</a>	Aims to make people perceive E-Commerce as Industry in Turkey and to coordinate software, logistics, banking, marketing and social media in business world.
<b>İstanbul Elektrik-Elektronik Makine ve Bilişim İhracatçıları Birliği</b> Turkish Electro Technology Exporters' Association (TET)	 <p>İSTANBUL ELEKTRİK - ELEKTRONİK, MAKİNE VE BİLİŞİM İHRACATÇILARI BİRLİĞİ</p>	<a href="http://www.tet.org.tr/">http://www.tet.org.tr/</a>	Aims to improve the export volume of the electrical-electronics, machinery and ICT industries on behalf of our members and in accordance with the needs of our country.

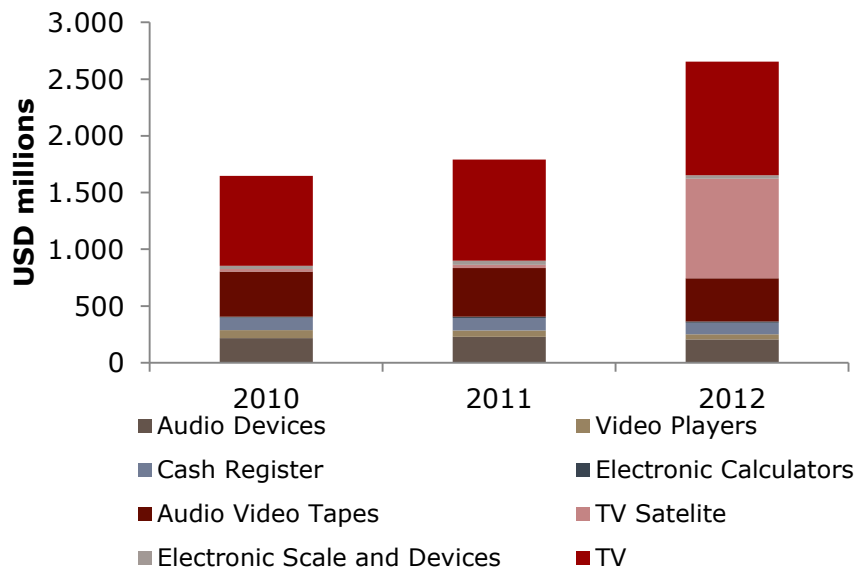


# V. Sub-Sectors of Electronics Industry: Consumer Electronics

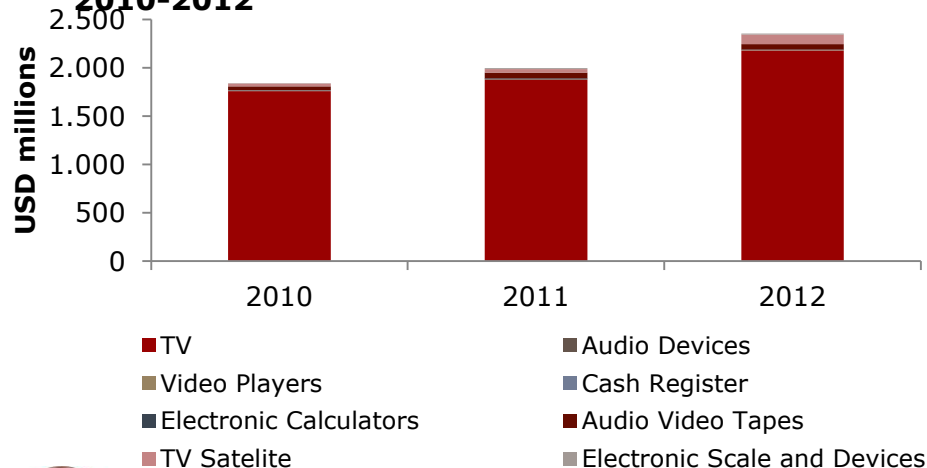
- A. Development of Consumer Electronics in Turkey
- B. White Goods and Home Appliances
- C. Air Conditioning & Refrigeration Industry
- D. Success Stories in Consumer Electronics and Major Players

# Consumer Electronics Outlook in Turkey

**Figure 30: Consumer Electronics Sub-sector Imports, 2010-2012**



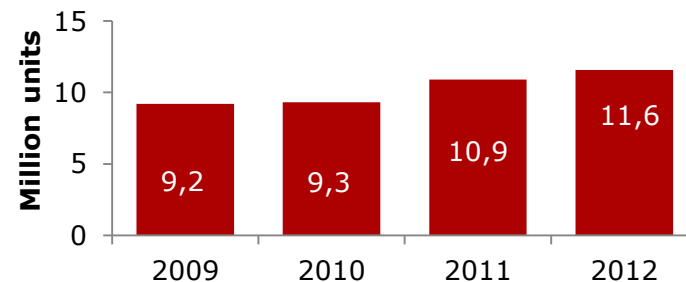
**Figure 31: Consumer Electronics Sub-sector Exports, 2010-2012**



- According to TESID, consumer electronics is divided into eight distinct categories including; electronic scale and devices, audio video tapes, cash register, audio devices, TV satellites, TVs, electronic calculators, video players and TV.
- Exports of Turkey in 2012 increased from USD 1.9 billion to USD 2.4 billion in 2011 which accounts for approximately 18% increase.
- It is also observed that imports increased by 48% in 2012, significant effect was seen on TV satellite imports which increased from USD 28 million to USD 875 million.
- Television sets have been the backbone of consumer electronics exports in Turkey. Since 2010, majority of the exports were focused on televisions reaching USD 2.2 billion.
- In 2012, 85.7% of consumer electronics were exported to European Union member states.
- Regarding manufacturing of TV units there were a total of 11.6 million TV units and 87% of them were exported overseas.

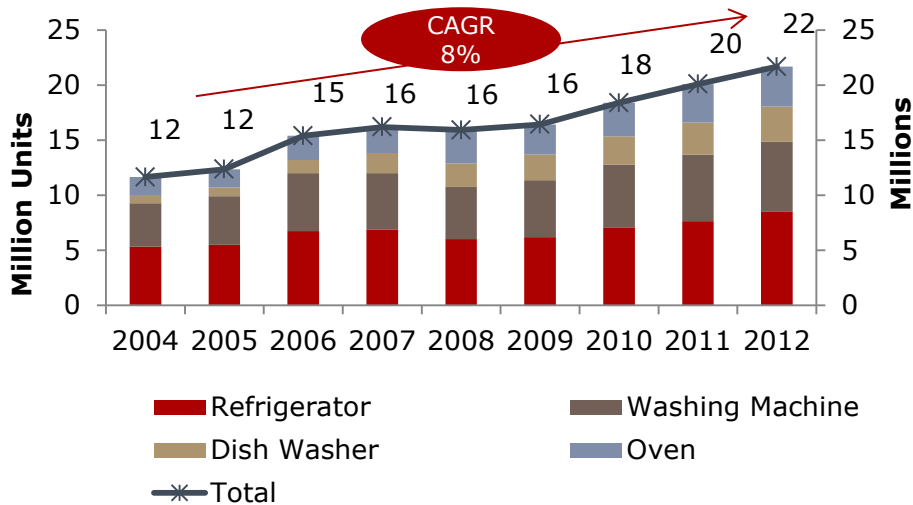
Source: TESID

**Figure 32: TV production in Turkey, 2009-2012**



# White goods and home appliances

**Figure 33: White goods unit production in Turkey, 2004-2012**



- **Turkey is one of the largest white goods producers in Europe.** Reaching **22 million units in 2012** including refrigerators, dish washers, washing machines and ovens. White goods production have increased at a CAGR of 8% between the years of 2004 to 2012.

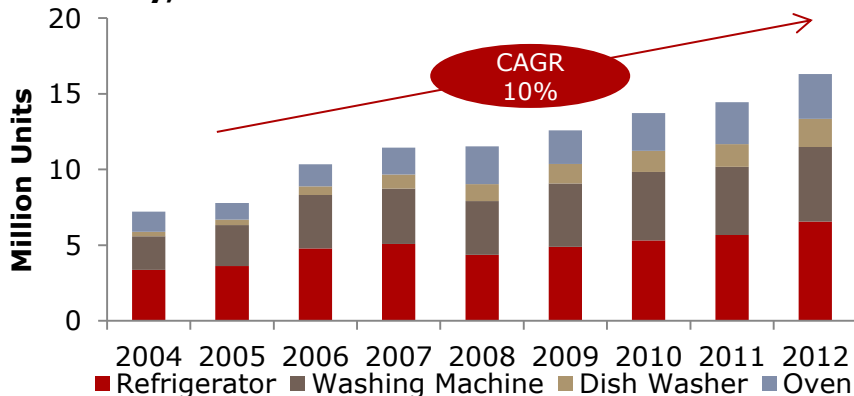
- Turkey also exports a significant number of refrigerators and washing machines to Europe including the United Kingdom (USD 680 million), Germany (USD 508 million), France (USD 433 million), Italy (USD 225 million) and Spain (USD 185 million). The number of units exported in 2012 was approximately 16.3 million – an increase by 12.7% compared to the previous year.

- According to White Goods Industry Association, white goods industry in electronics sector contribute significantly to the workforce. It is estimated that there are a total of 120,000 workers in the white goods industry, 105,000 blue collar and 15,000 white collar personnel.

- Major manufacturing sites for white goods are located mainly in the Marmara, Aegean and Central Anatolian regions. Leading manufacturing cities in these regions include Istanbul, Tekirdağ, Manisa, Eskişehir, Bolu, Bursa, Ankara, Kocaeli, Yalova, Kayseri, Konya, and Bilecik.

- Leading companies in the white goods and home appliances sector majorly consist of local brands such as Arçelik and Vestel. Foreign players in this sector include Bosch-Siemens, Indesit and Candy.

**Figure 34: White goods unit export in Turkey, 2004-2012**



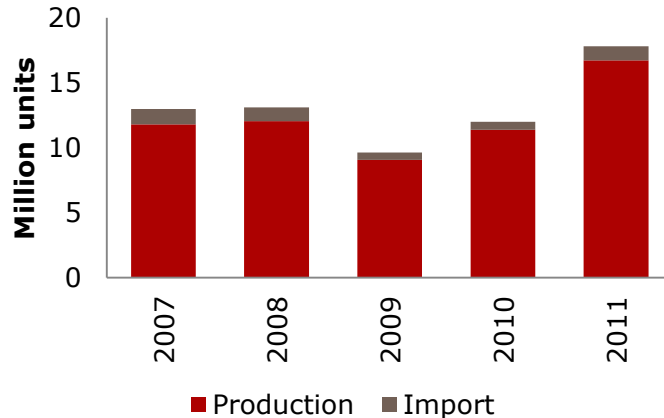
Source: White Goods Industry Association, Ministry of Science, Industry and Technology.





# Air Conditioning & Refrigeration Sector in Turkey

**Figure 35: Units of Production and Import Quantities**



Source: ISKID Air Conditioning & Refrigeration Statistics

**Figure 36: Units of Domestic Sales and Export Quantities**



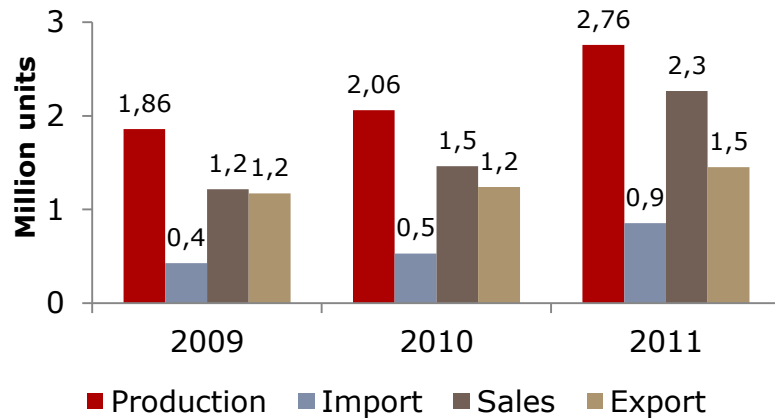
Source: ISKID Air Conditioning & Refrigeration Statistics

- Turkey has a **1.8%** market share in the global Air Conditioning and Refrigeration industry. The global market was worth USD 70 billion in 2008 and decreased to USD 63 billion in 2009 due to the global crisis and then reached to USD 85 billion in 2011, highest it has ever been in the last three years.
- The market in Turkey grew by **40%** in terms of units and **25%** in terms of value when compared with the figures of 2010 and reached approximately **USD 1.5 billion** in 2011.
- It is important to note that the graphs represented in Figure 35, 36, 37, 38 account for 80% of the total Air Conditioning and Refrigeration Market. Number of contributing companies in this statistics was 75 in 2011.
- Production, import, domestic sales and export data represented in the graphs are composed of 8 products including; Split Air conditioners (indoor and outdoor units), VRF (indoor and outdoor units), Ducted Splits, Rooftops (DX), Fan Coils, Air Handling Units, Chillers and Finned Heat Exchangers.
- Compared to 2010, units of production increased by a staggering amount of 47% in 2011 reaching approximately 17 million units. Domestic sales in air conditioning and refrigeration industry increased by 53% in 2011, and export quantity increased by 32%.

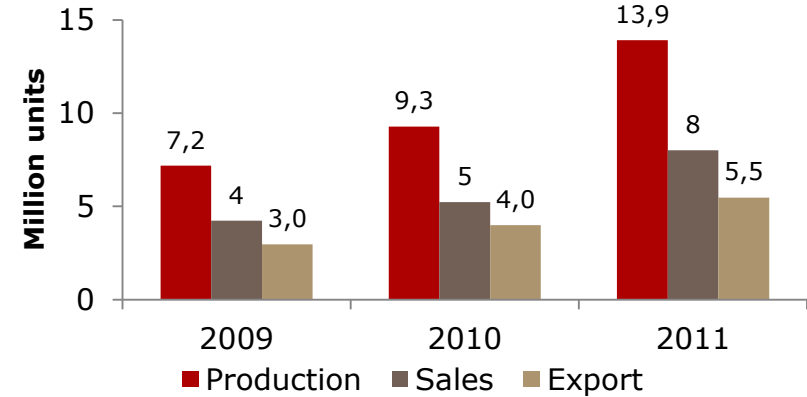


# Air Conditioning & Refrigeration Sector in Turkey

**Figure 37: Number of Units -Trend in Split Market, 2009-2011**



**Figure 38: Trend in Finned Heat Exchanger Market, 2009-2011**



**Table 5: Inputs and Outputs of Air Conditioning & Refrigeration Industry, 2011**

	Split Air Conditioners		Finned Heat Exchangers	
	Units	Share	Units	Share
<b>Production</b>	2,757,127	16%	13,920,000	83%
<b>Import</b>	854,592	79%	1,241	0.001%
<b>Domestic Sales</b>	2,265,359	21%	8,005,913	76%
<b>Export</b>	1,451,004	20%	5,476,247	78%

- Split air conditioners and finned heat exchangers are the most dominant products in air conditioning and refrigeration sector in Turkey. For instance in import, split air conditioner dominates the remaining products (VRF, Ducted Splits, Rooftops, Fan Coils, Air Handling Units, Chillers and Finned Heat Exchangers) by 79% whereas in production, domestic sales, and export finned heat exchangers are most prominent. (See Table 5).
- The split air-conditioning market achieved growth of **34%** increase in production, **55%** increase in domestic sales and **17%** in export in 2011. Whereas, for finned heat exchangers a significant increase of 37% was observed in export quantities and domestic sales increased by 53%.



Source: ISKID Air Conditioning & Refrigeration Statistics

Investment Support and Promotion Agency of Turkey

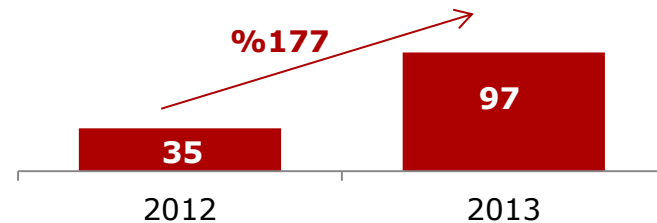
# Vestel is one of the largest consumer electronics companies in Turkey



- Turkey's leading consumer electronics, white goods and information technologies company, Vestel Electronics has become one of the country's largest private industrial enterprises as a result of a series of ambitious breakthroughs.
- Vestel is one of the top players in the European LCD market and ranks among the top 10 producers in Europe's white goods market.
- Emerging markets in MENA, Sub-Saharan Africa, Eastern Europe and Asia represent good growth opportunities for Vestel.
- Manufacturing facilities are located in Manisa. Sales, distribution and service network includes **1,114** Vestel stores, **726** Regal dealers, an E-Store for online sales, and **350** service centers spread all across Turkey.
- Under the Movement of Enhancing Opportunities and Improving Technology (FATIH) Project, Vestel Electronics continues R&D activities in various subjects with approximately 200 projects including tablet PCs and digital interactive (smart) board designs.

- Vestel has 13,693 employees and team of **900** engineers at **6** global R&D centers. Company's ratio of R&D expenditures to total sales amounted to **1.4%** in 2012.
- Zorlu Group directly owns **64.41%** of Vestel Electronics' shares and the remaining shares are traded on the Istanbul Stock Exchange (ISE).
- Despite the ongoing recession in global markets, Vestel's ratio of exports to total sales reached **72%** in 2012.
- Market capitalization of the company is app. **TL 63 million** in 2012.
- Net sales was around app. 916 million TL at the end of the 2012. In the first half of 2013, this amount raised to app. **TL 1 billion**. Gross Profit has reached app. **TL 97 million** with a rapid increase.

**Figure 39: Gross Profit (TL million)**



Source: VESTEL White Goods Investor Relations, Income Statement

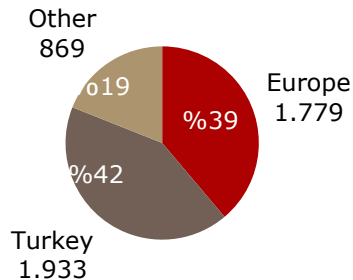


# Arçelik is a leading manufacturer and distributor of white and brown goods



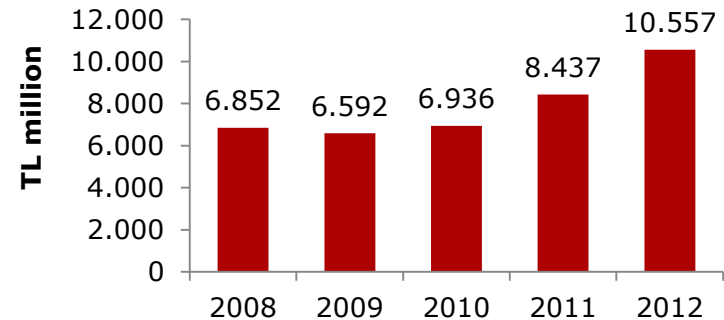
- Arçelik is a leading manufacturer and distributor of white and brown goods.
- The company produces and sells durable goods, components, consumer electronics and after-sales services under **10 brands** in 12 different production plants located in Turkey, Romania, China, South Africa and Russia.
- Arçelik has global operational network with a sales and marketing organization operating in **20** countries, products and services in over **100** countries.
- **3rd** largest company of its sector in Europe, thus Europe has a large share of net sales with 39% representing EUR 1,779 million.

**Figure 40: Regional Distribution of Net Sales (Million Euro)**



Source: Arçelik A.Ş. 2012 Annual Report

**Figure 41: Net Sales**



Source: Arçelik A.Ş. 2012 Annual Report

- In 2012, the consolidated net sales turnover reached **TL 10,557 million**, an increase of **25.1%** for total consolidated sales compared to 2011. Also, international sales which is TRY 6,103 million, comprised **58%** of consolidated sales.
- The consolidated operating profit for 2012 realized as **TL 757 million** and the net profit recorded as **TL 552 million**.
- The total number of domestic and overseas employees of Arçelik by 2012 year end is **22,552**. 7,765 of them is employed abroad and the remaining is employed in Turkey.
- Arçelik has concluded a 7-year term 100 million Euro amounted loan agreement that will be carried out between 2012 and 2015, with European Investment Bank for financing its R&D activities.



# Major Players in Consumer Electronics Sector in Turkey



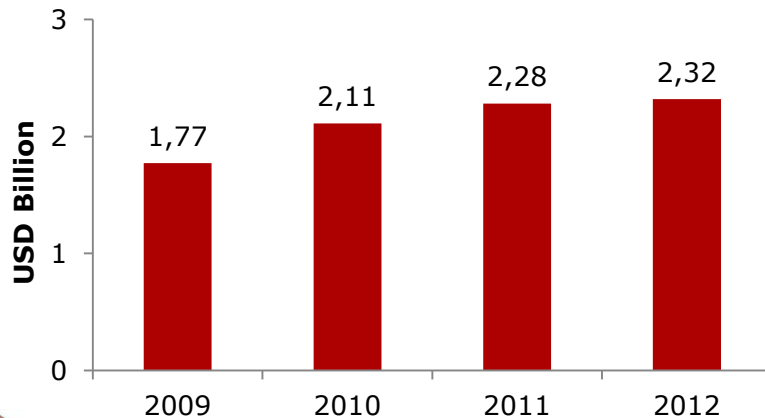
# VI. Sub-Sectors of Electronics Industry: Telecommunication Equipment

- A. Development of Telecommunication Equipment in Turkey
- B. Fixed Line Investments and Forecast
- C. Mobile Communication
- D. Access to Internet and Broadband Subscription
- E. Success Stories and Major Players

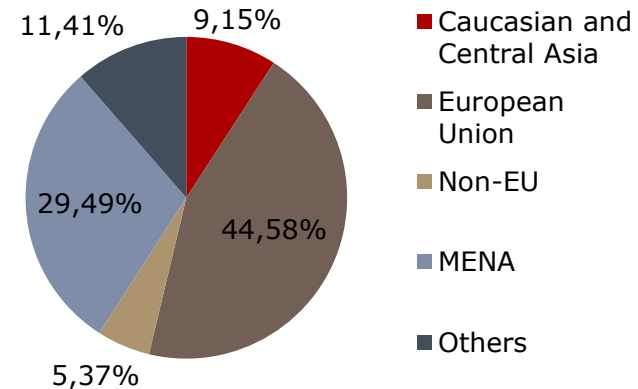
# Telecommunication Equipment Development in Turkey

- Telecommunication equipment sector in Turkey had the second highest share after consumer electronics in production valued at USD 2.3 billion in 2012.
- Regarding export values, telecommunication equipment market increased by approximately 5.4% reaching USD 2.6 billion which corresponds to 38% of the export values in electronics sector. Majority of export values belonged to the European Union Member States with 44.58%, followed by MENA with 29.49%.
- As it can be observed from Figure 44, significant amount of export values are comprised of cables which include telecommunication cables, energy cables, and fiber optic cables.

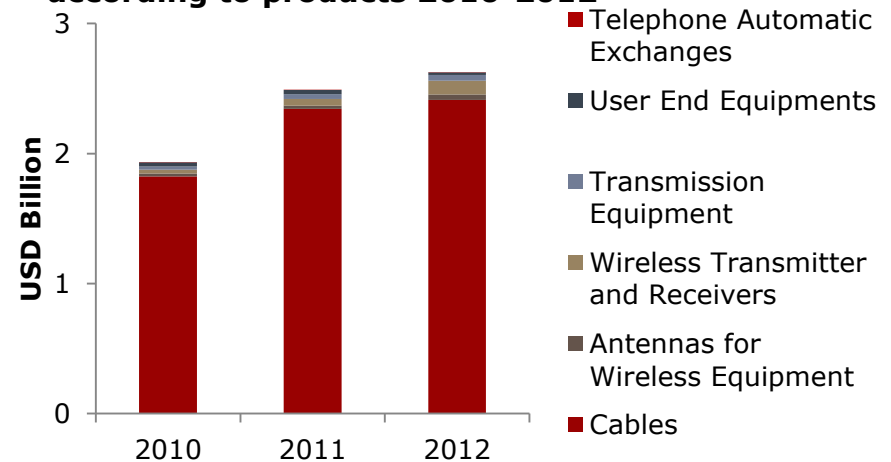
**Figure 42: Telecommunication Equipment Production, 2009-2010**



**Figure 43: Export of Telecommunication Equipment According to Regions, 2012**



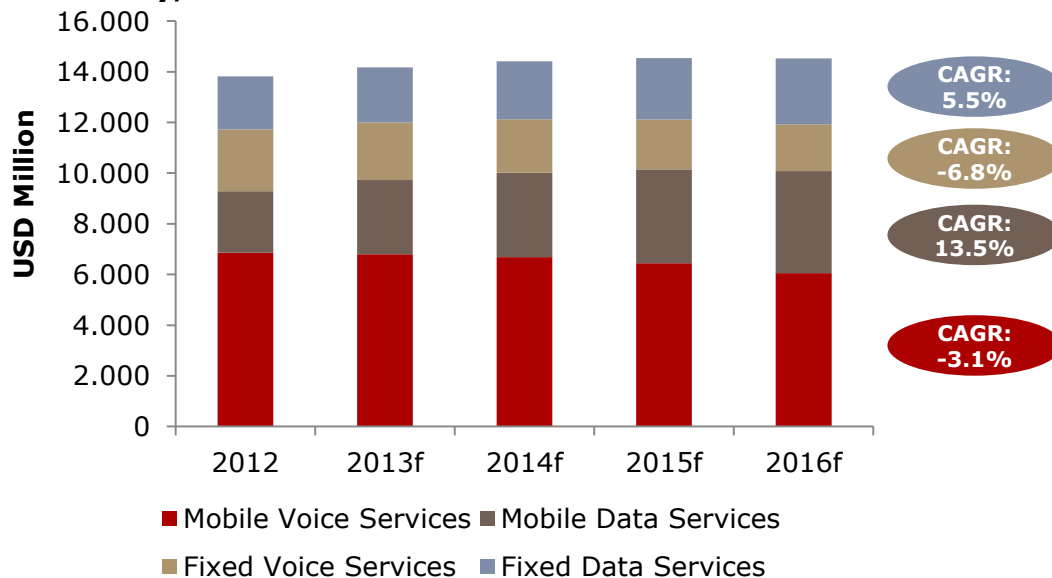
**Figure 44: Telecommunication Equipment Export, according to products 2010-2012**



# Telecommunication services are expected to grow mainly through data services

- With the advent of new technologies and the positive effects of liberalization, the communications sector has developed immensely in Turkey.
- Spending on telecommunication services is expected to grow in the near future. Although voice services are expected to be part of a decreasing trend, mobile data services and fixed data services are forecasted to have CAGRs of 13.5% and 5.5%, respectively.

**Figure 45: Spending in Telecommunication Services in Turkey, CAGR 2012-2016**



- As of July 9, 2013, the number of firms active in the electronic communications sector was 468 and the number of permits granted to these firms were 751.
- As of March 2013, there were 67.9 million mobile subscribers in the telecommunications market, corresponding to an 89.8% penetration rate. There are 13.6 million landline telephone subscribers and the penetration rate is 17.9%. However, considering that in Turkey the average household size is around 3.76 people, one can conclude that landline telephone services reach a significant proportion of Turkish citizens.



Source: Gartner  
f: forecast

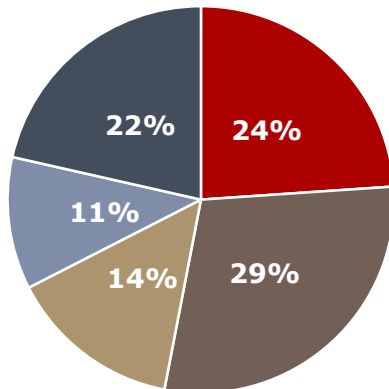
Sources: ICTA, BTK



# Revenue in the telecommunications sector increased with CAGR of 8.9% in the last two years

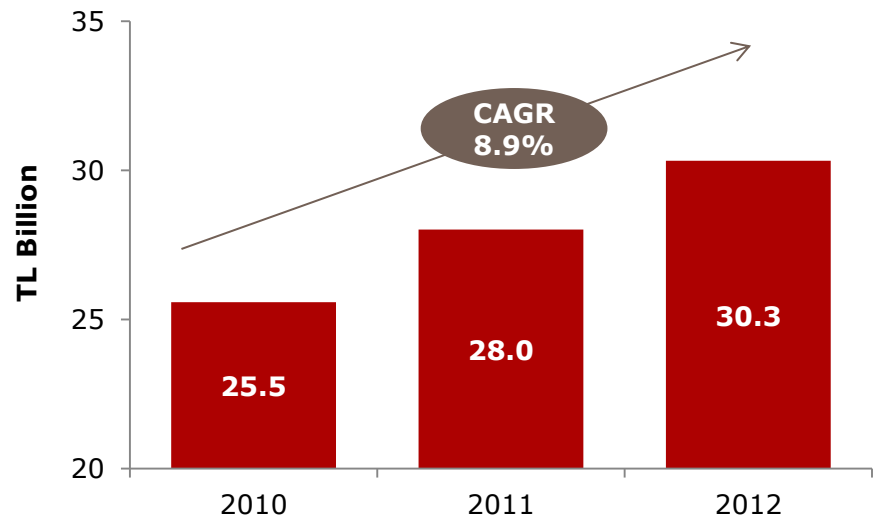
- The major mobile operators in Turkey are Turkcell, Vodafone and Avea. The Türk Telekom Group is the major landline operator with investments in both mobile and broadband services. The total market is around TL 30.3 billion.
- Turkcell is the leader in terms of total revenue in 2012. Other firms active in the sector have approximately one third of the total revenue in the market, which is TL 6.5 billion.

**Figure 46: Share of Total Revenue, 2012**



■ Turk Telecom ■ Turkcell ■ Vodafone ■ Avea ■ Others

**Figure 47: Development of Total Revenue**



Source: BTK



# The communication sector in Turkey is growing rapidly in several areas

- Nearly 78% of fixed broadband subscribers in Turkey prefer offers providing up to 8 MBps download speeds.

- The market share of alternative operators for local calls is 10.94%, while Türk Telekom has a market share of 89.06%. The market share for alternative operators for national calls is 20.86%, whereas Türk Telekom has a market share of 79.14%.

- The number of 3G subscribers has reached 43.9 million.

**The communication sector in Turkey is growing rapidly.**

- The number of broadband subscribers, which had been 6 million in 2008, is now over 20 million as of March 2013.

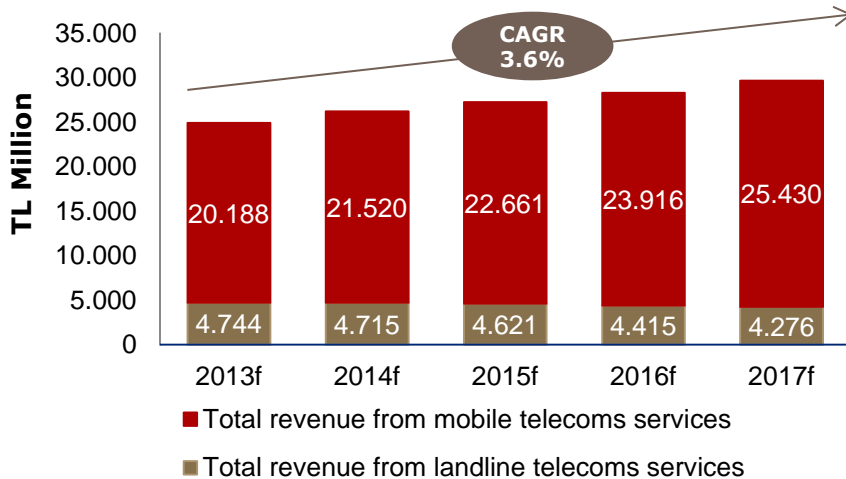
- The cable broadcasting services provider TurkStat has 1,236,016 cable television subscribers and 542,908 digital cable television subscribers.

- The total number of employees in the sector in the second quarter of 2012 is 36,865.



# Although landline business is decreasing, fixed fiber optic cable investments in Turkey is increasing

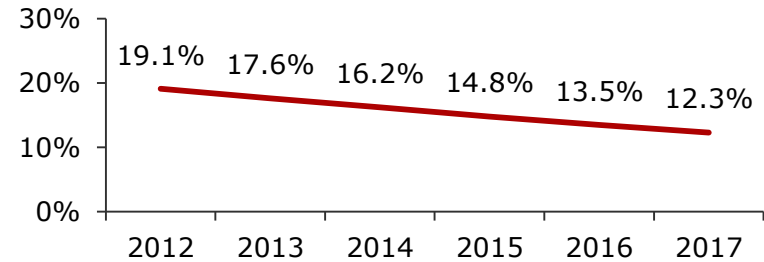
**Figure 48: Revenue Forecasts for Landline and Mobile Services**



Source: EIU, BTK  
f: forecast

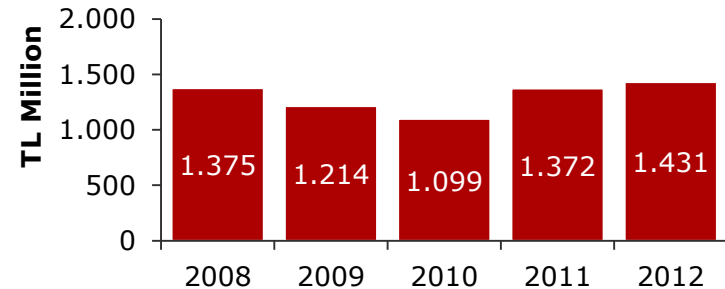
- The forecasts for the development of revenue indicate a steady decrease in total revenue from landline telecom services, whereas for in mobile telecom services the expectations demonstrate growth over the years. In total, the forecast for their combined revenue shows a CAGR of 3.6%
- With the liberalization process, 404,208 subscribers changed their landline service providers. Following Türk Telekom, the other main service providers are Superonline and Doğan İletişim.

**Figure 49: Penetration Rate Forecasts of Landline**



- As of March 2013, the landline penetration rate was 17.9%. It is expected to decrease in upcoming years.

**Figure 50: Türk Telekom Investments for Fiber Optic Infrastructure**



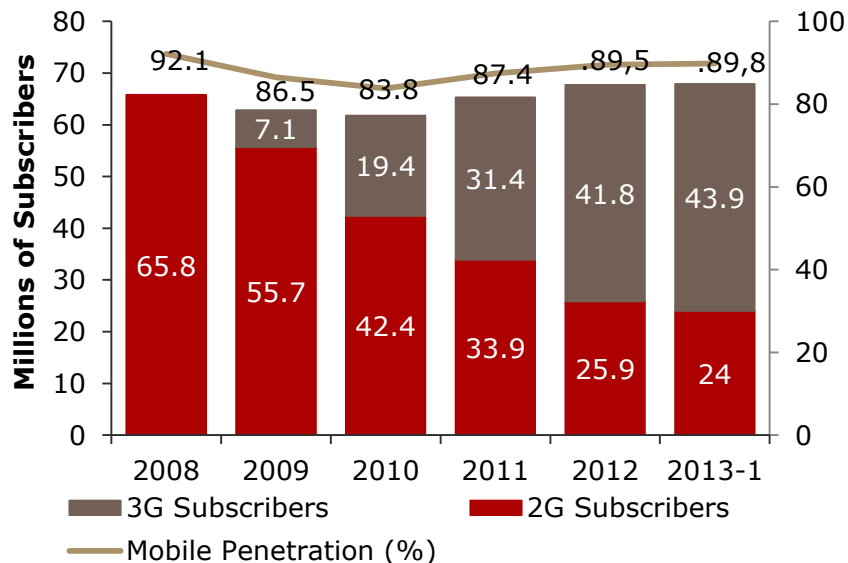
- Although the fixed landline services business is decreasing, significant investments have been made by Türk Telekom to fiber optic infrastructure in the last five years.



# Turkish consumers are very interested in mobile communication and mobile technologies

- The mobile telecommunication business has been developing rapidly over recent years. Turkish mobile phone users adapt quickly to new technologies. The number of 3G subscribers is developing and reached 43.9% of total subscribers in the first quarter of 2013.

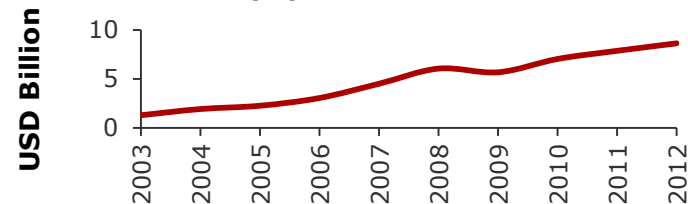
**Figure 51: Percentage of Development for 2G and 3G Subscriptions**



- The penetration rate for mobile devices in the first quarter of 2013 was 89.8%. If we exclude 0-9-year old population, the penetration rate corresponds to 107%.

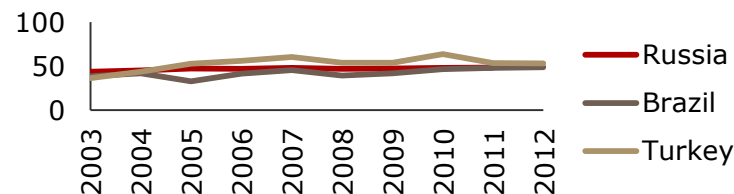
- Turkish consumers' great interest in mobile technology, particularly smartphones, has increased the product's market volume by 23.1% in the first quarter of 2013, making Turkey the most rapidly growing country for mobile technology among 20 European countries.

**Figure 52: Total Demand for Mobile Phones and Other Communication Equipment**



- Total demand for mobile phones and other communication equipment reached USD 8.6 billion and it exceeded the market demand of Poland, Belgium, the Czech Republic, the Ukraine, Portugal, Denmark and Greece.

**Figure 53: Mobile Telecommunication Revenues as a Percentage of Total Telecom Revenues**



- The percentage of mobile revenues within the telecom sector exceeds 50%. In that regard, Turkey is performing better than Brazil and Russia.

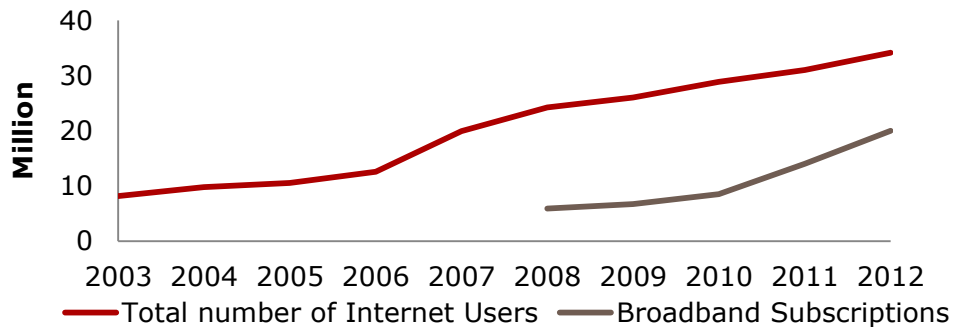


Source: BTK, Euromonitor

# Access to the internet has been increasing along with broadband subscriptions in Turkey

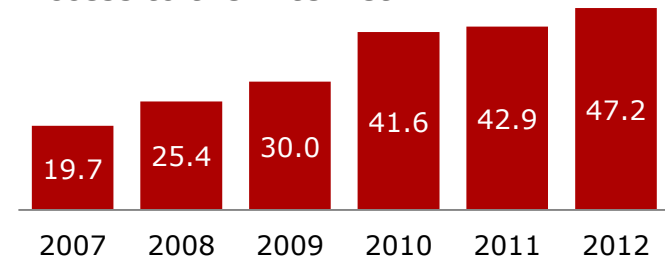
- As of April 2012, 47.6% of households were using the internet. This ratio was 42.9% in 2011. The rate of computer usage in individuals aged 16 to 74 is 48.7% and rate of the internet use in this age group is 47.4%. These rates were 46.4% and 45% in 2011.

**Figure 54: Total Number of Internet Users**



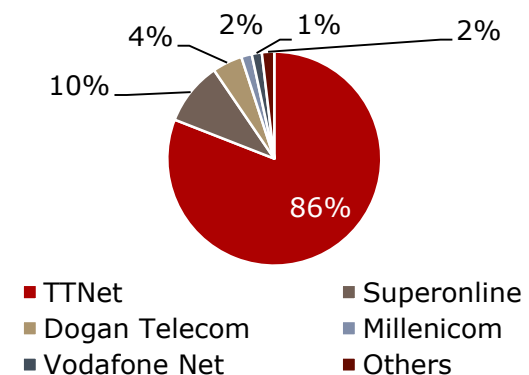
- 78.1% of fixed broadband subscribers in Turkey prefer offers providing up to 8 Mbps download speeds. 69.02% of users have mobile internet for their computer and have a data usage of 100 Mb and above. 29% of subscribers are between 0-50 Mb. The number of mobile broadband subscribers (computer and mobile handset) is around 12.3 million.
- The number of broadband subscribers, which had been 6 million in 2008, was over 20 million in the first quarter of 2013. The number of internet subscribers in Turkey increased 1.6% compared to the previous quarter thanks to the increase in number of fiber cable and especially, mobile internet subscribers. The annual growth rate for the total number of internet subscribers has reached 22.4%.

**Figure 55: Percentage of Households with Access to the Internet**



- Although other operators in Turkey are providing ADSL services, they are reliant on the Türk Telekom's ADSL infrastructure.
- TTNet has the biggest share in the internet ADSL market. Superonline, Doğan Telekom, Vodafone Net and Turknet follows. The breakdown is as follows: Vodafone Net, Turknet

**Figure 56: Market Share of Internet Service Providers**



Sources: ICTA , EIU, BTK

**Investment Support and Promotion Agency of Turkey**

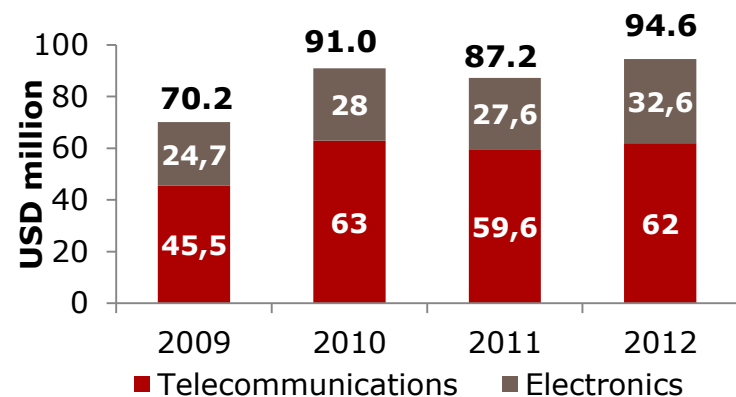
# Karel is one of the most important telecommunication equipment designer and supplier in Turkey



- KAREL established in 1986, is leading designer and supplier of telecommunication equipment and provider of electronic manufacturing services.
- The market leader in Turkey that exports products and technologies to more than **30 countries** including developed European countries
- Indicated as amongst the **top 15** manufacturers of the world by international research institutes in the recent MZA 2011 report.
- **3rd** largest PBX / IP PBX manufacturer in Europe and **2nd** biggest PBX / IP PBX brand in MEA Region.
- Over **9.5 million** people in the world communicate by using Karel systems.
- According to the reports of all international and national research institutes, more than **575,000** businesses are using Karel PBXs, so it is the market leader in PBXs in Turkey with its **50 %** market share.
- Karel operates in **8** different locations such as Istanbul headquarters, and R&D Manufacturing centers located in Ankara. **1033** employees are employed in total.

- **10%** of its consolidated sales turnover generated by the production has been reserved to R&D investments.
- While at the end of the first six months of 2012 R & D expenditures was TL 10.2 million, it reached TL 11.1 million at the end of six months of 2013.

**Figure 57: Sales Revenue**



Source: Karel Unifying Communications Financial Reports

- Sales revenue of the company reached the highest value which is **USD 94.6 million** in 2012.
- Although the share of sales revenue from telecommunication is higher than electronics for all years, it can be seen that revenue of sales from electronics is increasing over years.



# Some of the major players in the Telecommunication Equipment



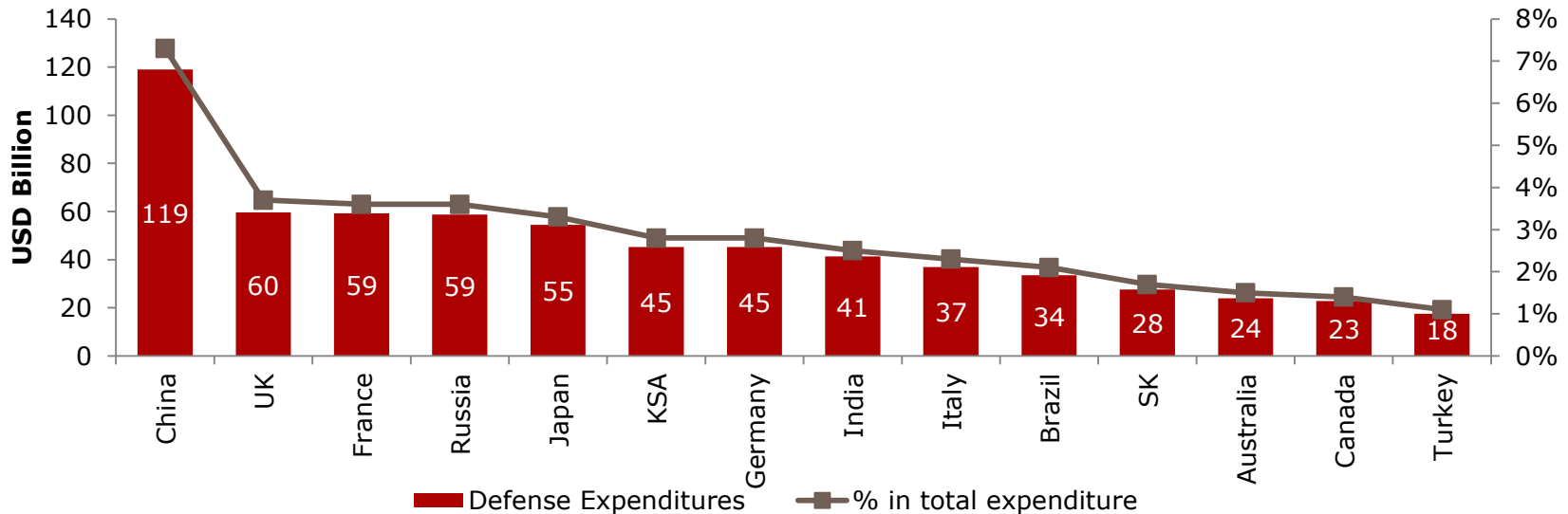
# VII.Sub-Sectors of Electronics Industry: Defense Electronics

- A. Global Outlook, Defense Industry in Turkey and 2023 Targets
- B. Research and Development, Success Stories and Major Players

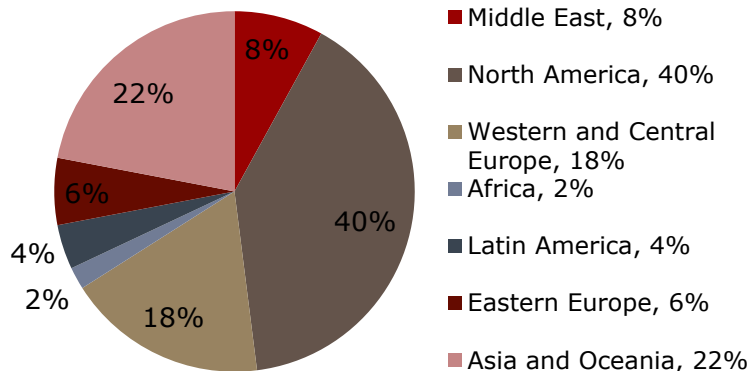


# Turkey is in top 15 countries for defense industry spending

**Figure 58: Defense Industry Expenditures 2011**



**Figure 59: World Military Expenditure by Region, 2012**



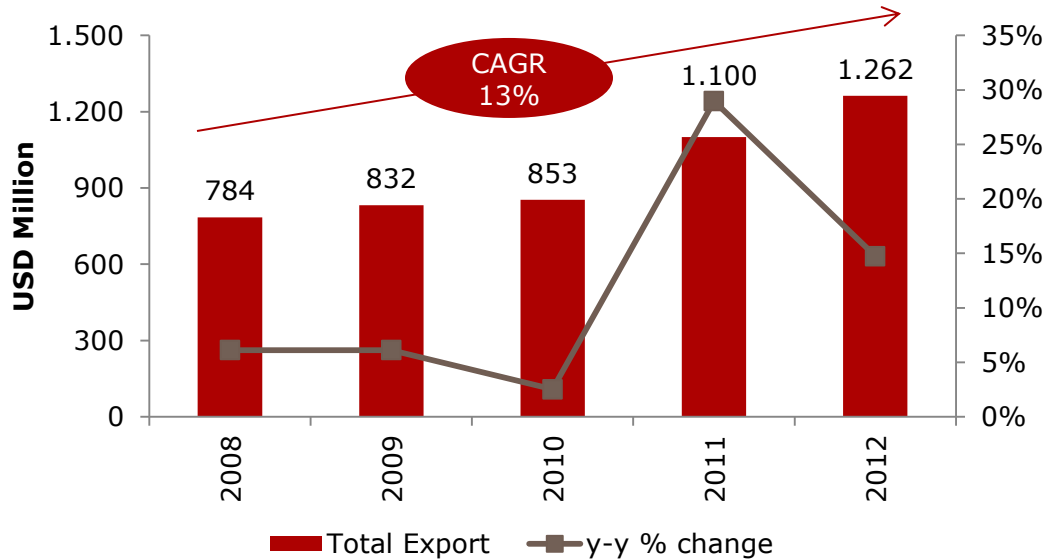
- Defense industry expenditures constitute a major part of governments' budget. According to Stockholm International Peace Research Institute (SIPRI), Turkey is in top 15 countries in defense industry expenditures. Highest defense expenditures belong to USA, China, and UK. Turkey ranks just after Canada by USD 18 billion, and has higher expenditures than some of the major European Countries such as Spain, the Netherlands and Poland.
- As it can be observed from Figure 59, Middle East and Eastern Europe Account for 8% and 18% of world's military expenditures respectively.

Source: SIPRI



# Defense Industry has grown at a CAGR as high as 13% in the last 5 years

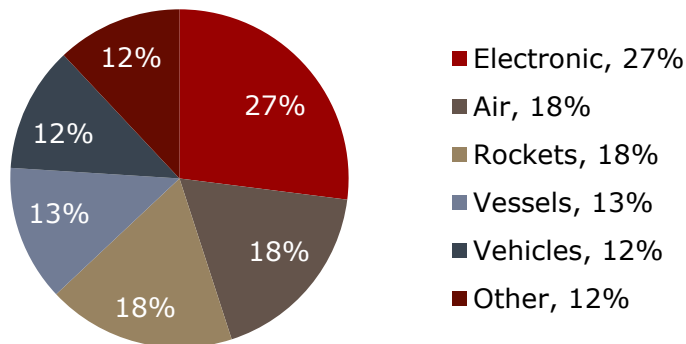
Figure 60: Defense Exports Values in Turkey, 2008-2012



Source: SASAD

- Turkey's export value has been increasing gradually since 2008. In 2012, Turkish defense exports accounted for **USD 1.2 billion** which corresponds to an increase of **14.7%** compared to the previous year. Defense electronics has the highest share in Turkish defense industry export with 27% followed by aerospace related exports.
- Turkey also has a notable place in world's rankings regarding defense exports. Between the years 2006 to 2010 Turkey was ranked 23rd consistently.
- Turkey has become capable to compete with global companies producing land platforms in terms of production and export of original land platform that is sub-sector of Defense Industry. Especially wheeled and tracked armored vehicles exported by Turkey are in great demand mostly by Asian and Oceanian countries. Turkey is not only selling these products, also focusing on co-production with countries importing these products.

Figure 61: Turkish Defense Industry, Sector Shares in Export



Source: TOBB



# Turkey has ambitious National Targets for 2023 in the Defense Electronics Industry

2023 National Targets include targets in the Defense Electronics Industry:



Strategic Plan 2012-2016: Undersecretariat of Defense Industries

1. Reducing purchases from a single firm in order to increase competitiveness and effectiveness in defense industry
2. Encouraging and supporting to increase exports in defense industry
3. Making defense industry effective in the product life cycle including all process from product design to production and logistic support
4. Creating technologic base for defense industry by carrying out projects targeting improvement of platforms and systems domestically.
5. Planning and developing infrastructure of testing and certification that support to design and development activities

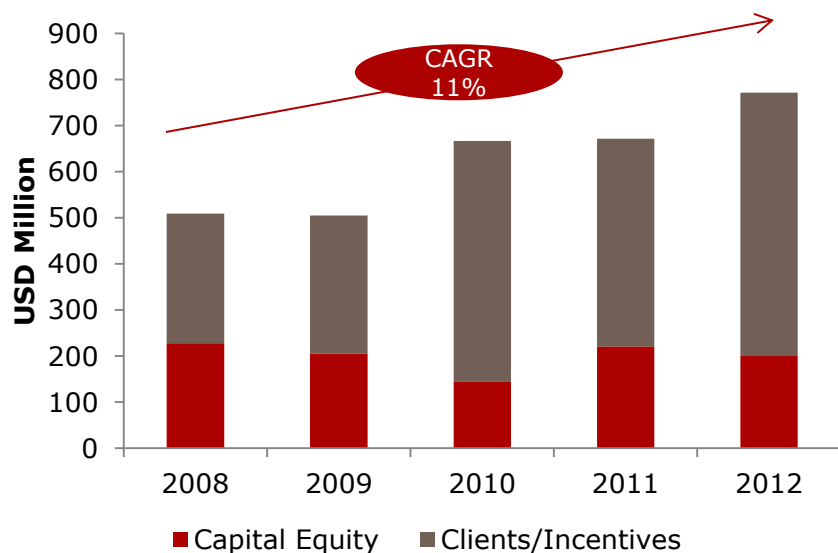


Source: Justice and Development Party Target 2023 Handbook

**Investment Support and Promotion Agency of Turkey**

# Research and Development in Defense Sector has grown at a CAGR of 11% in the last five years

**Figure 62: Research and Development Expenditure in Defense Sector**



- Defense sector in Turkey has a high level of importance and significant amount of budget is allocated for research and development activities. For instance, 16% of the total revenue is specifically given to R&D activities.
- R&D expenditures grew at a CAGR of 11% between 2008 to 2012 reaching USD 772 million in 2012. Turkey's R&D expenditure in 2012 increased approximately 15% compared to the previous year.
- According to Defense and Aerospace Industry Manufacturers Association, the need of high skilled labor is expected to increase as the need for designing and manufacturing new technologies become evident. Currently, major R&D centers are located in the capital city of Turkey, Ankara. As of September 2013 there are a total of 11 independent research and development centers in Ankara.
- Major players in defense electronics such as Aselsan, Havelsan, TAI and Ayesas allocate a significant amount of budget for research and development activities. Some of the key statistics related to these companies can be found on Table 6.

**Table 6: Major Players in Defense Electronics**

Company	No. of Employees	Year Established
Aselsan	4,297	1975
Havelsan	595	1982
TAI	4,171	1984
Ayesas	160	1990

Source: SASAD



# Achievements of ASELSAN and TAI are examples of local success stories in defense industry

## ASELSAN

**aselsan**

- **4,297** employees, with **4** R&D plants
- **36%** of the gross profit, which is around **USD 113 million**, is devoted to R&D activities
- **30%** increase in R&D expenditures, which equals to **USD 329 million**
- Cooperated with **20** universities at **167** projects, which costs around **USD 320 million**, since 2009.
- Electro-optic systems, radars, electronic warfare systems and Military Communications Systems are among the field of activities
- **USD 205 million** valued orders received from **45** different countries all around the world during 2012
- **82%** increase in net profits in 2012
- The Middle East-Gulf, the Caspian, Central Asia and the Asia-Pacific are the target regions for expanding operations.
- **125%** surge in share price listed in the Istanbul Stock Exchange (ISE) 30 index in 2012
- **USD 911 million** turnover in 2012

## TAI

**TAI**

- **4,171** employees with **5** work centres: structural, aircraft, helicopter, unmanned aircraft, space and special programs
- **Top 100** global players in aviation and space industry since 1984
- **USD 833 million** revenues in 2012
- **TL 210 million** net profit in 2012
- Over **150** auxiliary industries are involved in its operations
- Took **1<sup>st</sup> place** among the defence exporters in Turkey
- One of the limited number of 1st level subcontractors in the global aviation industry
- Among the Fortune 500 companies in Turkey
- Became Turkey's centre of technology in design, development, modernization, manufacturing, integration and life cycle support of integrated aerospace systems, from fixed and rotary wing air platforms to UAVs and satellites.



# Success Story of HUAWEI

HUAWEI



- Huawei, leading global **information and communication technology solutions provider**, has been operating in over **170 countries**.
- Huawei Turkey was established **in 2002 in Ankara**. It has its local headquarter in **Istanbul** and **three support offices** in different cities since 2007.
- Turkey office has been serving as a **management hub** for eleven countries in **Central Asia** and the **Caucasus**.
- **Huawei Turkey R&D Center** which is the second largest international R&D center was established **in 2009**. It has been developing software-based solutions to telecom operators not only for mobile operators in Turkey but all over the world **since 2010**.
- In 2008, the **New Generation Technologies Laboratory** was set up in cooperation with Istanbul Technical University.
- The **largest telecommunication operators in Turkey and the region** such as Turk Telekom, Turkcell, Vodafone, Avea, Turkcell Superonline, TeliaSonera Eurasia, Alb Telecom, KKTC Telsim, Kuzey Kibris Turkcell, and Eagle Mobile get services from this company.



# Some of the major players in defense electronics industry



# VIII.Sub-Sectors of Electronics Industry:

## Computers

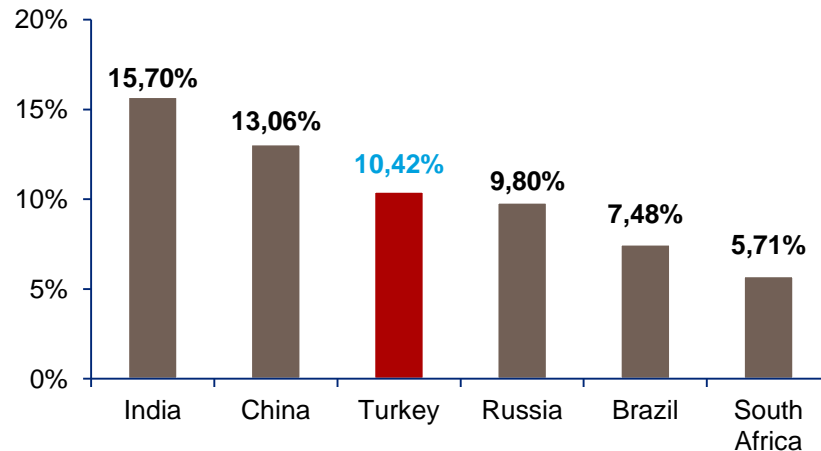
- A. Development of the Software Market, International Players and Success Stories
- B. Development of the Hardware Market, International Players and Success Stories



# The software market is expected to have solid growth from 2012-2017

- The software industry is one of the rising stars in the Turkish economy with its capacity to generate great value and create employment opportunities even with limited amounts of investment.
- The software market is increasing in size parallel with the whole IT market. The market has reached the size of USD 0.7 billion in 2010 and expected to mount USD 1.2 billion in 2017.

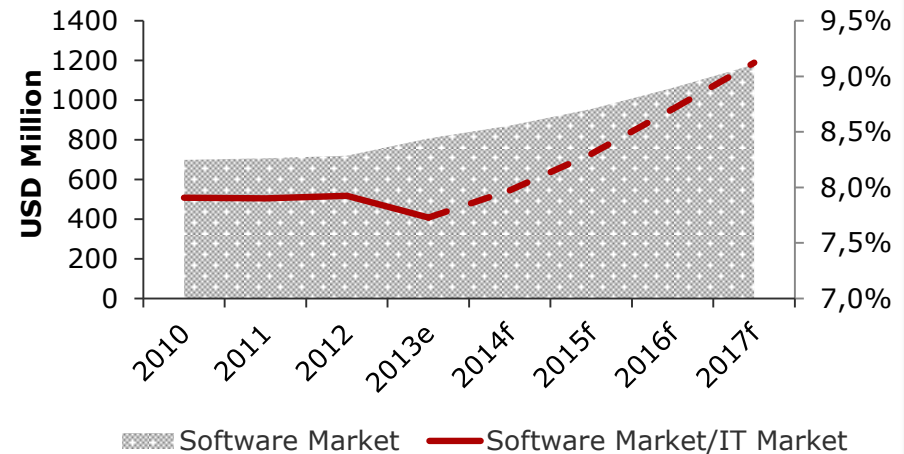
**Figure 63: Software Market 2012-2017 CAGR Comparison**



Source : Economist Intelligence Unit

- According to the forecasts of Economist, Turkey has displayed promise in its performance in the software market compared to the BRICS countries, enjoying a double digit growth rate over the period of 2012-2017 and outperforming some other flourishing economies like Russia, Brazil and South Africa.

**Figure 64: Software Market Development**



Source : ISI Emerging Markets  
f: forecast

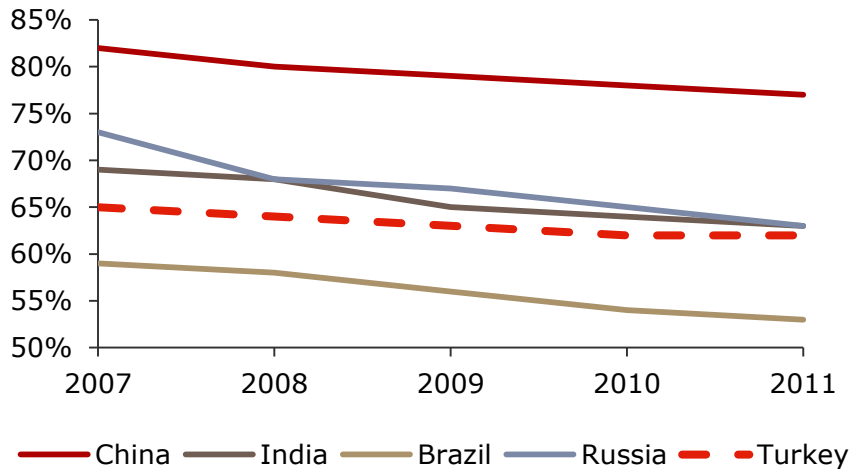
- It is important to note in the trend presented above that the software market is growing faster than the whole IT market.
- The software market is expected to grow by an annual rate of 7.7%, while the IT market is expected to grow by 5.6%. As a consequence, the share of the software industry in the IT market is projected to increase to 9.1% in 2017 compared to 7.7% in 2012.



# The number of software firms is projected to triple by 2023

- Turkey has relatively lower software piracy rates compared to those of BRIC countries.

**Figure 65: Software Piracy Rates**



- On that issue, Turkey is making an effort to reduce this rate even more. A campaign was launched by the Culture and Tourism Ministry and the Software and Information Industry Association in June 2010 founded an anti-piracy institution creating a common database to track piracy and also introduced legal enforcement against those who committed piracy, which would lead to imprisonment.
- In 2008, about 25,000 people were employed by companies operating in the software industry. According to TÜBISAD's outlook, these figures are expected to climb to 100,000 by 2023.

- Apart from the fact that this growth expectation in employment corresponds to a 10% CAGR, the outlook also expects the share of employment in the software sector as part of the total ICT market to increase to 24.1% from 17.6% in 2008.
- With regard to the number of companies in the software industry, TÜBISAD foresees 3,210 software companies in Turkey by 2023. In 2008, there were 1,081 software companies operating in the market.
- Many software sector investors choose to locate in TDZs and benefit from the tax exemptions and the other support available.



Source : TUBISAD, Report: «Atılım İçin Bilisim»

# The Turkish software market consists of large international firms and a fragmented market of local players

- There are numerous global players in the Turkish software market. Some of the notable ones are listed below.

 <b>CISCO</b>	 <b>Google</b>	 <b>IBM</b>	 <b>SAP</b>	 <b>Microsoft</b>	 <b>ORACLE</b>
USD 275 million, 5-year investment plan starting in 2006	Established in 2006	Five offices in Turkey	Established in 2011, was 65 <sup>th</sup> country office	Manages 79 countries from Turkey	3 offices in Turkey

- Apart from the international giants, local players make up a significant part of the market. In addition, 62% of the fastest growing technology firms in Turkey were software firms compared to 47% in 2010.

Deloitte Fast 50 Technology 2012 Report states the top three software companies by revenue in 2012 were:

Koçsistem: Euro 191.8 million  
Turkcell Teknoloji: Euro 52.4 million  
Innova Bilisim: Euro 51.9 million

Deloitte Fast 50 Technology 2012 Report states the top three fastest growing software companies in 2012 were:

Elkotek, Growth Rate: 13880%  
Tektronik, Growth Rate: 11368%  
FG Digital, Growth Rate: 4345%



# New requirements help sustain opportunities in enterprise applications, software-as-a-service and cloud computing

## Enterprise Application Software

- With the new Turkish Commercial Code that took effect in 2013, which requires new businesses to be globally integrated, the demand in enterprise applications has risen significantly among Turkish firms.
- There are international and local software suppliers in the Turkish market. International software providers such as SAP, Oracle, Dynamics, JD Edwards, IFS and local firms such as Logo, Netsis and Uyumsoft provide solutions for the Turkish business world.
- SAP is the leader in ERP applications. In 2011, the company stated that it would quadruple its revenues by 2015. Besides SAP, Oracle is another major player in the market. Oracle manages its Business Intelligence Operations for the region of ECEMEA (East Central Europe Middle East Africa) from their office in Istanbul.
- In 2011, 1,500 people were working in this market. It is predicted that this number will reach to 5,000 in 4 years.

## Software-as-a-Service and Cloud Computing

- Software services and products have evolved through the years so that instead of being capital intensive and having high maintenance costs, various offerings are available on the market on a pay per use basis.
- Not only software, but also platforms and infrastructure can be provided as a service rather than as a product.
- For example, BuluTT, a product offered by Türk Telekom allows enterprises to monitor their workplaces 7/24.



- As the convenience and effectiveness of these products spread throughout the business world in Turkey, there is no doubt that software-as-a-service and cloud offerings will be in demand.



# There are diverse opportunities in Turkish software market related with various sectors and mobile market

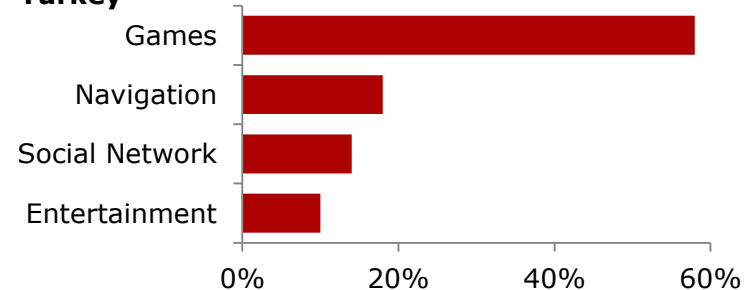
## Public Sector Opportunities

- Public sector investments in information technologies provide opportunities for software market investors.
- E-devlet project is a large transformation project depending on cutting-edge software solutions launched by the Turkish government to provide online service to its citizens. Development of new service areas for the project is a significant opportunity for the software market.
- Moreover, with FATIH Project, numerous software applications will be developed in order to provide the necessary infrastructure. The project has already drawn attention from global software giants, such as Microsoft, Google, Intel, Apple, Blackberry and many others declared their interest in participating in the project.
- Besides these mega projects, there are various high-budgeted software infrastructure development projects demanded by the public sector.
- Ministry of Labor and Social Security, Ministry of Health, Ministry of Interior, Ministry of Energy and Natural Resources are some of the main public bodies that have already completed and still plan to have software based transformation projects.

## Mobile Application Development

- Mobile application development business is expanding in Turkey.
- 4 out of 10 smartphone users in Turkey download at least one application each month.
- Almost %60 of the applications downloaded in Turkey from Apple Store are games. The rest is divided between navigation, social network and entertainment applications. Therefore major opportunities exist for investment in gaming solutions. Peak Games is a leading success story.

**Figure 66: Apple Store Downloads by Genre in Turkey**



- There is a big growth potential for mobile applications business in Turkey and the region around Turkey.
- Currently, a local company, Nexum Boğaziçi, serve in the market. Industry related applications of M-Banking and M-Health offer opportunities.



# There are various success stories in software market for development of games and applications

## Peak Games



- Peak Games is the largest and fastest-growing gaming company focused on the emerging markets of Turkey, Middle East and North Africa.
- Firm ranks as the 3<sup>rd</sup> largest social gaming company as they drew 30 million active gamers to their online games.
- Peak Games has enjoyed ten times more revenues in Q1 2012 compared with the same period in 2011.
- Apart from being a successful software company, Peak Games is an important step in Turkish entrepreneurship history as it was founded in November 2010 and came to the 3<sup>rd</sup> spot in daily active users in less than three years.

## Pozitron



- Originally founded in 2000, Pozitron transitioned its product portfolio and business model in 2005 to become the software company it is today. Since then, the company has focused on creating, integrating and securing next generation software and mobile solutions through cutting-edge technology. In 2014, the company was acquired by Monitise, a world leader in Mobile Money - banking, paying and buying with a mobile device.
- Pozitron products range from Mobile Banking and Payments to m Commerce and Mobile Sales Force solutions adopted by some of the largest institutions in the region which include ING Bank, Yapi Kredi Bank, Is Bank, Turkish Airlines, eBay Global, and Bilyoner.com.

## Nexum Boğaziçi



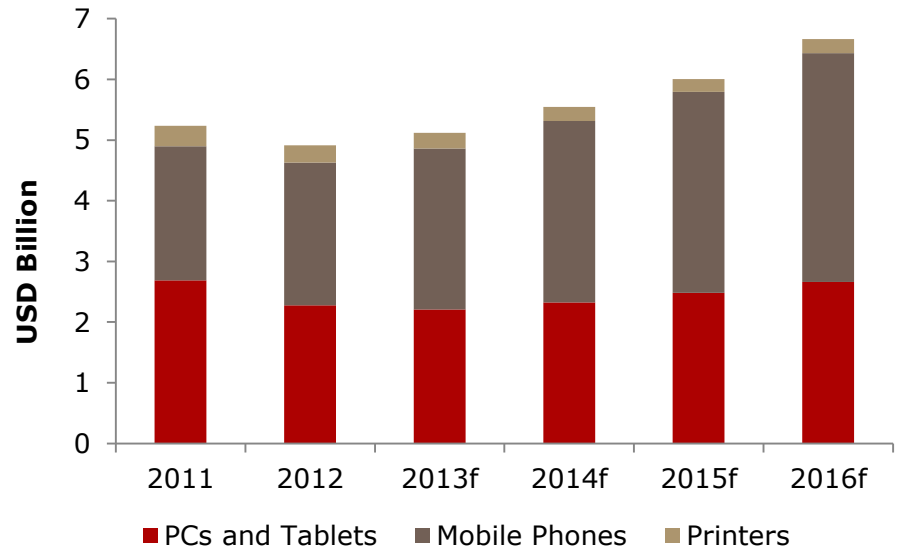
- For over 10 years, Nexum Boğaziçi is offering services in Custom Software Solutions, B2B, B2C Solutions, CMS Solutions, Website and Mobile Site Solutions, Mobile Application Solutions, Search Engine Optimization and more.
- Some of their customers in the past were Turkcell, Pfizer, Eczacıbaşı, TeknoSA, MasterCard, ASELSAN, yemeksepeti.com



# Mobile phone, tablet and PC spending is expected to grow significantly

- In 2011, portable computers accounted for 72% of the retail sales volume for computers. Turkey is one of the fastest growing markets in Europe and it is again expected to be among the best performing emerging European markets in 2013.
- Small and medium sized businesses of more than 2.5 million present a huge potential for the hardware market. The majority of these businesses do not use computers. PC use among small businesses has been estimated to be around 35% and several campaigns have been launched to drive this higher.
- Device spending in Turkey expands with the increasing population of young people and GDP growth.

Figure 67: Devices Spending Turkey



Source: IHS Global Insight and Gartner  
f: forecast

- Spending on devices like PCs and tablets, mobile phones and printers are expected to increase with a CAGR of 8% between 2012 and 2016.
- Mobile phones' growth will be a CAGR 12.5% between 2012 and 2016



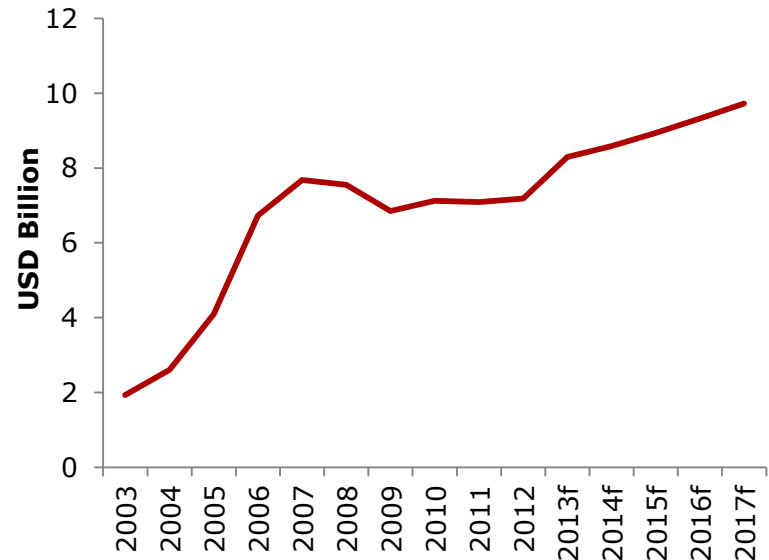
Source : Euromonitor, Gartner

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# The hardware sector is essential to IT because of its dominance in the market

- There has always been a strong correlation between population growth and the growth of industries and market sizes. The Turkish population is increasing and Turkey's emerging middle class demonstrates a high potential within the hardware market.
- IT hardware spending has drastically increased since 2003 and is forecasted to increase to about USD 10 billion in 2017. The Turkish IT market will be dominated by hardware, which accounted for more than two thirds of IT spending in 2012, with this dominance expected to continue until 2017 and beyond. Laptops are providing much of the growth in the PC category.
- In 2011, the main buyers were businesses, accounting for half of the total market share, whereas households spent 36% of the total market share. In addition, investment comprised 12% of the market share in 2011.

**Figure 68: IT Spending on Hardware**



Source: EIU, Euromonitor, Deloitte Analysis  
f: forecast

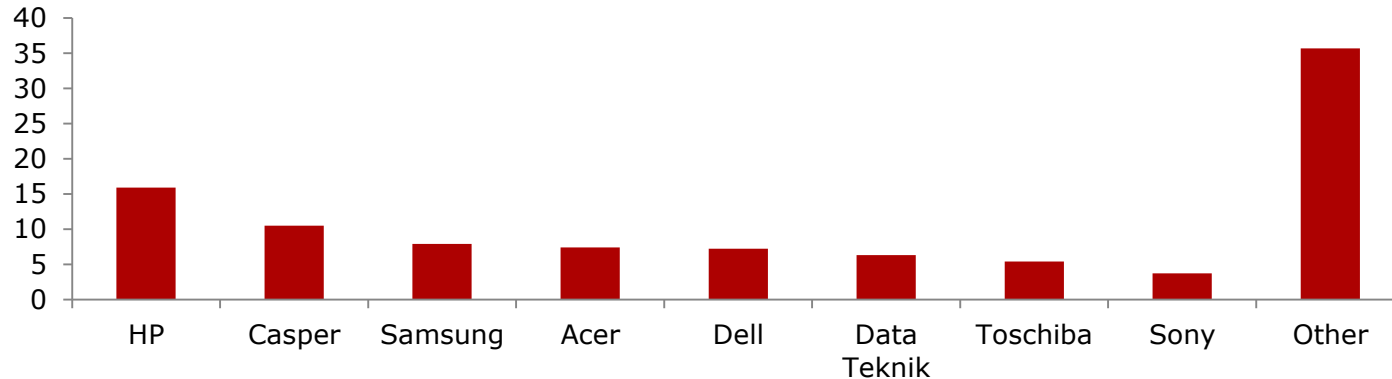
- Turkey's IT industry has met with increasing interest from foreign investors. The hardware sector is dominated by international brands, due to their strong brand identities in the market.
- However, the market is moderately fragmented with 30 brands occupying 80% of the total hardware sector in Turkey.





# Hardware Market is a fragmented market with many global and local players

Figure 69: Computers and Peripherals Market Shares, 2011 (%)



- There are many global players in the Turkish hardware market. Overall computers and peripherals market leader is HP with 15.9% retail volume in 2011.
- The sub-sector leaders of hardware industry and their % retail volumes for 2011 are:
  - Desktops: Casper (20.1%)
  - Laptops: HP (21.3%)
  - Netbooks: Acer (16.6%)
  - Tablets and other portable computers: Samsung (28.9%)
  - Monitors: LG (20.0%)
  - Printers: HP (21.1%)
  - Other computer peripherals: Casper (11.3%)



# HP and Casper are market leaders with impressive success stories in the hardware sector

## Company



## Overview

- Hewlett-Packard has been present in Turkey since 1989 with a team of more than 360 employees.
- HP has been the market leader from 2006 to 2011 in the computer and peripherals segment with an average share of 14.9%
- The world's leading manufacturer of computers and peripherals, Hewlett-Packard (HP) is establishing a plant in cooperation with the Taiwanese company Foxconn to manufacture computers in Turkey's western district of Çorlu. Having an annual production capacity of 2.4 million units, the factory will triple the amount of computers produced in Turkey.
- HP expects to achieve a USD 1 billion turnover from its new investment, and will export 90% of its "Made in Turkey" branded PCs. The site, worth USD 60 million, will employ some 2,000 people.

Casper

- Casper follows HP with the second highest market shares, 11.4% on average, from 2006 to 2011 in the computer and peripherals segment. The Turkish computer manufacturing firm Casper foresees the huge potential of the millions of Turkish small and medium-sized enterprises (SMEs) who will start using computers in their businesses for the first time and these will help the company reach its goal of selling 1 million units in 2013.
- Casper employs 400 people at their production facility, and their products are sold at more than 2,000 sales points across Turkey.



Sources: HP, Investment Support and Promotion Agency of Turkey, Today's Zaman

**Investment Support and Promotion Agency of Turkey**

# The hardware sector in Turkey offers numerous opportunities including USD billions for the FATIH Project

- The growing economy of Turkey demands hardware for business requirements. Many firms are renewing and investing in hardware infrastructure including network systems, computers and tablets. Small and medium enterprises are expected to invest in computers parallel with the new business requirements of the mobile world.
- Everyday more companies are investing in mobile solutions, where they utilize tablets for their mobilized workforce.
- Investment in new data centers will require hardware investments.
- The investment from Foxconn will develop the competency of workforce and suppliers in the industry, providing a welcoming climate for new hardware production investments.
- Public agencies will provide major tenders for IT hardware investments.
- Development of smart energy technology will require investment in the IT infrastructure. With electricity and natural gas distribution companies' privatizations modern smart grid infrastructure including SCADA and smart metering systems will be established, which will be supported by the hardware market along with software and IT services markets.

## FATIH Project

- The FATIH project in education is a mega-project that will support the hardware sector. The project requires tablets, interactive LCD panel boards and an internet network infrastructure for classrooms around Turkey.



- Major hardware components of the FATIH project for 570,000 classrooms:
  - One multi-function printer, one document camera for each school
  - One interactive board and wired internet connection for each classroom
  - One tablet PC for each teacher
  - One Tablet PC for each student



# Some of the major players in Software and Hardware Sector

**acer**®

**Adam**

**aidata**®

**arçelik**

**ARGELA**  
it's the passion

**AYDIN** ELEKTRONİK

**Casper**

**empa:::electronics**

**ESCORT**  
COMPUTER

**ETA**

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ELEKTRONİK & TELEKOMÜNİKASYON  
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**VESTEL**

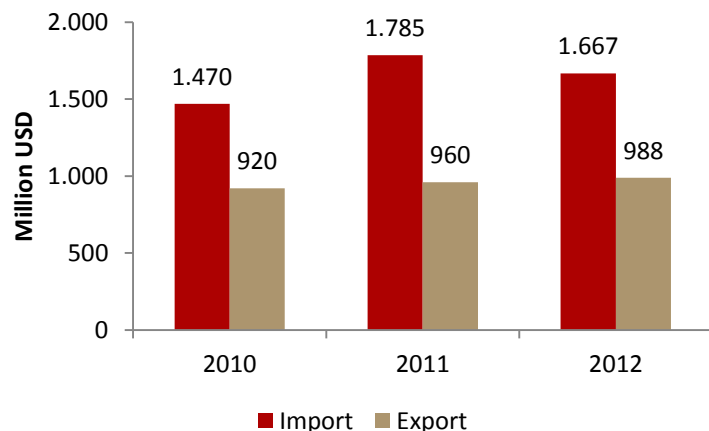


# IX. Sub-Sectors of Electronics Industry: Components & Other Professional and Industrial Equipment

- A. Development of Components Sector
- B. Success Stories
- C. Development of Other Professional and Industrial Equipment
- D. Success Stories
- E. Major Players in Components & Other Professional and Industrial Equipment Sub-sector

# Components Sub-sector Development in Turkey

**Figure 70: Components Sub-sector Export, Import**



- The imports for Circuit Components Product Group is 55.1% of total imports. Cathode Ray Tubes is 0.7%, coils and Transformers is 8.5%, Acoustical Elements is 8.9%, Printed Circuits is 5.1% and Connectors and Relays is 21.6% of total import.
- The manufacturing of the chipsets is desired but proven to be extremely difficult due to required high volume, very advanced technology and heavy investments issues. In spite of the small scale production of some defense industry needs such as the sensors and the microelectronic components categorized as critical items can be considered as relational and an opportunity to enter into the field.

**Table 7: Distribution of Components Sub-sector Export and Import by Countries, 2012**

	Import (USD)	Export (USD)
North America	64,267,000	1,477,000
EU	588,196,000	202,572,000
Non- EU European	17,826,000	176,565,000
North Africa & Middle East	8,317,000	413,122,000
Caucasus & Central Asia	15,000	83,774,000
Middle & South America	56,189,000	8,589,000
Far East	911,928,000	29,577,000
Free Trade Zones (FTZ)	3,123,000	8,625,000
Other Countries	17,472,000	64,498,000
<b>TOTAL</b>	<b>1,667,334,000</b>	<b>988,798,000</b>

**Table 8: 2012 data of Components Sub-sector**

<b>Total Production</b>	USD 686.7 million
<b>Total Export</b>	USD 988.7 million
<b>Total Import</b>	USD1,667 million

- According to the TESID 2013 data 90% of import of component Sub-sector is from EU and Far East countries and 41% export is to North Africa and Middle East countries where as EU and Non-EU European countries is following with a total market value of 38% of the total exports.



Source: TESID

# Some of the major players in the Components sub-sector

## SAR Electronics



- Since the start of its business activities in 1979, SAR Elektronik A.S., has become a globally recognized, international corporation because of its successful performance in Remote Controller production.
- In the following years, it has shown a rapid advancement and added TV Tuners, Remote Controllers, RC Receiver-Transmitter units, Electronic Control Units for Kombis, Digital Satellite Receivers, Terrestrial Satellite Receivers, Info Display Units, and Environmental and Power Control devices to production line.
- 3,000 m2 production area is located in Atatürk Organized Industrial Zone, in Izmir which houses the largest export harbor within the region.
- %90 of production is exported mainly to Europe and to nearly 30 countries all around the world.

## EMPA

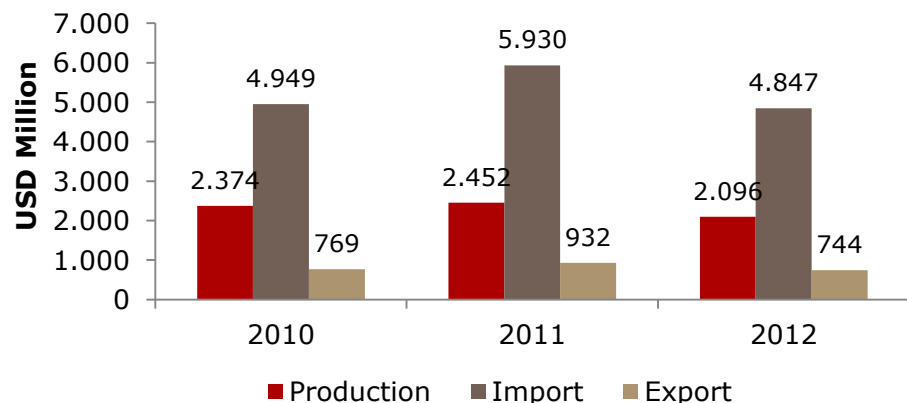


- Serving to Turkish Electronics industry with worldwide component suppliers since 1981.
- First technological workshops in Turkey had been arranged.
- First TV remote control software in Turkey was developed by R&D department of Empa.
- Developing business in global market by serving customers in the Middle East Region in addition to Empa Hong Kong organization.



# Other Professional and Industrial Equipment Sub-sector

**Figure 71: Distribution of Electronic Industry, 2010-2012**



- Other professional and industrial equipment is one of the sub-sectors of the electronics industry in Turkey.
- This sub-sector contributes greatly to the electronics sector and has an important role in the production mechanisms and in the operations, together with Information Technology products determine the technological level of the production processes. The other professional and industrial sub-sector has also a key position for the automation and flexibility of production mechanisms.
- Domestic market of the sub-sector is limited to the needs of other production facilities and the operating companies of the sub-sector are small and medium size enterprises.
- Total production of the other professional and industrial equipment sub-sector for 2012 was **USD 2.1 billion**.
- The total export of Turkey is **USD 744 million**. EU Member States and MENA received 46% of share of the export value.
- The total import for this sub-sector is USD 4.8 billion and where 41% of the import value was from the EU Member States.

**Table 9: Import and Export Values of Other Professional and Industrial Equipment, 2012**

	Import (USD)	Export (USD)
<b>1. Audio and Image Systems</b>	248,421,000	8,946,000
<b>2. Industrial Electronic Equipment</b>	2,183,299,000	453,259,000
<b>a. Static Converters</b>	475,905,000	126,073,000
<b>b. Automation Equipment</b>	520,344,000	82,005,000
<b>c. Signal and Alarm Equipment</b>	1,119,041,000	181,367,000
<b>3. Medical Equipment</b>	731,000,000	80,402,000
<b>4. Test and Instrument</b>	1,004,160,000	113,660,000
<b>5. Automotive Electronics</b>	91,599,000	15,206,000
<b>6. Electronic Watches</b>	270,843,000	18,538,000
<b>7. Other Equipment</b>	317,850,000	54,472,000
<b>Total</b>	<b>4,847,805,000</b>	<b>744,483,000</b>



Source: TESİD

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# A Success Story in Other Professional and Industrial Equipment Sector



- Inform Electronic, one of the European leading power solution specialist, is established in 1980 with the aim of designing and building industrial electronic systems.
- It diversified into the production, and marketing of standard professional electronic equipment, and special projects.
- Inform product range varies from Uninterruptible Power Supply (UPS) Systems, Voltage Regulators, to DC Power Supply, Telecom Equipment, Battery chargers , Inverters, 19' rack cabinets and other electrical products and electronic equipment.
- It has **27,500 m<sup>2</sup> closed production area**, committed to the manufacturing of electrical products and electronic equipment. Also, has capacity of assembling 300 millions components per year.
- In 2010, Inform is being acquired by Legrand Group, which is global specialist in electrical and digital building infrastructure since 1860. Then, market domination of this company has been increased domestically and overseas.
- Inform Electronic is not only a leading company in Turkey, also recognized worldwide thanks to the its **33 years experience in the sector** and innovative identity.
- Structuring of the company covers all of the cities in Turkey. Distribution of Inform Electronics network extends at five continents; from Europe to Asia, South America to Africa and Australia, demonstrating its adaptability to different markets and their conditions at around 75 countries.
- In an organization, which **Turkey's top 500 IT companies** are rewarded according to sector distribution;
  - Inform Electronic ranked first according to revenues from uninterrupted power supply (UPS).
  - It took third place in the list is formed depending on hardware export revenues of the companies.
- The company R&D team developed new generation of several UPS types controlled by Digital Signal processor DSP. The new generation, DSP controlled single phase UPS gained two rewards; `**Technology Innovation and Creativity Reward 2000` and `**Biggest Technology Contribution Reward 2002` and three phase IGBT rectifier UPS gained `Technology Innovation and Creativity Reward 2005`.****



# Some of the major players in components and other professional equipment sub-sector



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