

## DESCRIPTION AND EXTENT OF THE MANUFACTURING INDUSTRY OF ELECTRONIC PRODUCTS

Electronic industry constitutes a corner stone for creating a strong economy in information-oriented and global competition. Being the largest sector in high technology intensive sectors in the manufacturing industry, both increases the development and affluence of countries with its information and technology based nature and contributes to increase of efficiency and added value in all other sectors.

Manufacturing industry of electronic products is categorized under the heading of "Production of Computers, Electronic and Optical Products" with the code number of 26 under the NACE 2 sector categorization. The extent of the industry of electronic products is detailed as follows:

- Manufacture of Electronic Components and Circuit Boards
- Manufacture of Computers and Computer Peripheral Units
- Manufacture of Communication Equipment
- Manufacture of Consumer Electronic Products
- Manufacture of Devices, Gadgets and Gauges for Measurement, Test and Navigation
- Manufacture of Devices for Irradiation, Electro-Medical and Electro-Therapy
- Manufacture of Optic Devices and Photographic Equipment
- Magnetic and Optic Cassettes, Bands, CDs etc. The Manufacturing of Media

## THE DEVELOPMENT OF THE SECTOR AND MAIN INDICATORS

The number of enterprises in the industry of manufacturing electronic products in 2011 is 600. 613 in 2009, the number of enterprises in 2010 was 557. The number of wagers in 2009 was 23,942 while the number increased to 27,023 in 2011. The production value of the industry bounced in 2011 and was measured to be 9.1 billion TL. The value added also increased in line with the increase in the production value and reached to 2 billion TL in 2011. The total of investments in 2011 was 372 million TL.

In the manufacturing industry of electronic products, consumer electronics manufacturing group has the biggest share in the distribution of sub-sectors of production values in 2010 with a production value of 3.3 billion TL. The second is the manufacturing group of devices and gadgets for measurement, test and navigation with a production value of 1.7 billion TL and the third is the manufacturing group of computers and computer peripheral units.

The share of the manufacturing industry of electronic products in the general manufacturing industry is an important indicator for the scale and development stage of the industry. Accordingly, the share rendered by the number of enterprises has nearly been the same for the last three years and got relatively lower with a rate of 0.18 percent. Despite the increase in the number of wagers, the share decreased to 0.94 percent in 2011. Although the production value made a significant bounce in 2011, the share decreased under the level of 2009 and realized as 1.34. The indicator which renders the highest share in the manufacturing industry, the value added was 1.57 percent in 2011.

The manufacturing industry production of electronic products significantly diminished for four years between 2006 and 2009. Measured as 100 in 2005 in the sector, the production value has decreased to 51.7 with this decline in 2009. In the following three years, the production in the industry had a tendency to increase. With this increasing tendency in the industrial production, the production value in 2012 increased to 80.7. Hence, the decline until 2009 has been partly compensated. However, it fell behind the average increase in the manufacturing industry by 47 points.

In the manufacturing industry of electronic products, the employment has tendency parallel with the change in the production. Employment decreased by 21.1 percent from 2005 to 2009 in parallel with the decline in the production. In the following years, it showed a trend of increase again. Measured as 100 in 2005, the employment was 91.0 in 2012.

In the manufacturing industry of electronic products, per capita production, which was 100 in 2005, declined to 88.5 in 2012. Accordingly, the labour efficiency decreased by 11.5 points. In the same period, per capita production in the manufacturing industry increased by 15.6 points and reached to 115.6 in 2012.

Export of electronic products reached its peak point with 3.39 billion dollars in 2005, after which it showed a tendency to decline and decreased to

2.36 billion dollars. In the following years, the export showed a tendency to increase again and reached to 3.25 billion dollars again in 2012. The export of electronic products has a share of 4.57 percent in 2005 while it declined to 2.08 percent in 2012.

Turkey is an important exporter in nearly all subgroups of electronic products. The highest export was in the subgroup of communication, voice recording and playback devices including mobile phones and televisions with 5.8 billion dollars according to the data of 2012. The export of office machines and automatic data processing machines including computers and office machines was 3.42 billion dollars in 2012. The export of occupational and scientific control devices and gadgets was 2.93 billion dollars in 2012.

Especially the embedded software in the products in the manufacturing industry of electronic products has become an indispensable part of the industry of electronic products. Turkish Informatics Industry Association declared the size of the software and services market as 5.64 billion TL in 2012. According to the data of Software Industry Association about the software sector, the market size of informatics technologies comprising of Hardware, Services and Software sublevels was envisaged as 8.7 billion dollars in 2012. 2 billion dollars of it was evaluated as the software market (3.8 billion dollars of hardware and 2.9 billion dollars of services). According to the data given by Software Industry Association, a substantial part of 2,316 software and services companies in the sector operate in the scale of SME.

## **WORLD ELECTRONIC PRODUCTS INDUSTRY AND POSITION OF TURKEY**

World export of electronic products has maintained its increase for years and supports the growth in the world goods trade. World export of electronic products reached to 2.43 trillion dollars. The share of the export of electronic products out of world goods trade is 13.6 and it constitutes the second sub sector where the largest trade is made.

When the sub sector groups of the export of world electronic products, the biggest export is carried out in the group of communication, voice recording and playback devices with 690 billion dollars. Office machines and automatic information processing machines are at the second rank with an export of 620 billion dollars. Export of semiconductors and electronic circuits is 562 billion dollars; export of occupational and scientific control devices and gadgets is 383 billion dollars and the export of devices, gadgets and optic pieces used in photography and cinematography is 180 billion dollars.

The share of Turkey in the electronic products of the world is fairly small. The decline in the recent years caused this share to shrink even more. The main reason for this decline is the loss of market in the export of TV. Turkey has share of 5.15 percent in 2005 from the global scale TV export market, while this rate fell to 2.28 percent in 2012.

Due to the possession of very small shares in all other product groups, the main determiner is the TV export and its share. Turkey needs to increase its export and export share in also other product groups.

Electronic products have become the product group which has the biggest share and enlarges it in consumption expenses of the household and companies at the global scale. As a result of the increasing dependency on electronic and digital life and informatics and communication Technologies in all spheres of life, the market of electronic products expands rapidly.

World market of electronic products keeps on growing in terms of value. In 2012, market size of chosen products in the areas of data processing, communication, office hardware and consumer electronics reached to 878.8 billion dollars. The market of semi-conductors was 291.6 billion dollars in 2012.

In the manufacturing industry of electronic products, leader countries in the area of global-scale production, technology and export take places as the following: South Korea, Japan, Singapore and Taiwan with their own production technologies; China with its production capacity, cheap production costs, foreign capital investments and its technology in the stage of development; USA and Germany with their traditional technological knowledge and high-tech production infrastructure; Mexico, Malaysia, Thailand, Hungary and Ireland with their foreign capital investments, Switzerland with its technology and brands in niche products (clocks and measurement devices); Finland with its production infrastructure in special areas based on its own technology; France and England with their traditional technological infrastructure; Brazil and India with their domestic market and local market brands based on local engineering and research activities.

## **MAIN COMPETITIVE FACTORS AND DEVELOPMENTS IN THE MANUFACTURING INDUSTRY OF ELECTRONIC PRODUCTS**

Main competitive factors in the manufacturing industry of electronic products are determined under the categories of value chain and assessments are being made for Turkey.

The production of intermediate inputs in the Turkish electronic industry is quite limited. An important and large supply chain in the global scale was formed in the electronic industry. Turkey and its electronic industrial companies have not been able to take place in such natural supply chain.

Turkey does have its own production technology in the electronic industry. Scales of the companies in Turkey are relatively small when compared to the competitors and larger scale companies are needed for intensive competition at the global scale.

While principal technological knowledge and infrastructure of Turkey are limited, its development capacity gets stronger. In Turkey, budgets and expenses of companies in these areas are fairly limited. Turkey has the position of a country which tries to follow and comply with these standards significantly.

Branding is a very important factor for electronic products and the end users make preferences among the brands. Turkey at least has the potential to create local brands.

The fact that technological innovations for competition in the industry and continuous investment for new productions are needed requires a certain technology and investment budget. Only companies in some certain scales can meet these technology and investment budgets and there are so few large-scale companies in Turkey.

In the manufacturing of electronic products, the main factor of competition is technological development. Who ensures that development is the human resources, which carry out technological activities. Engineering education, intermediate staff-technician training, R&D engineering and expertise education and their existence and experience are important in the education of these human resources.

Even though there are quality universities in that matter, the number cannot meet the demands of the market and there are troubles in terms of intermediate staff.

Non-standard, poor quality, imitation, off the book and under the counter products produced without complying with the labour requirement can easily create unfair competition in both domestic and foreign markets. Domestic companies face unfair competition. Protection of the intellectual property rights is also an important matter of competition. Foreign capital investments prefer only the countries where protection is high. There is a legal framework in Turkey; however, improvements in the application are necessary.

In the manufacturing industry of electronic products, public supports focus especially on technological activities. The public undertakes principal scientific

research, carries out research activities and technological activities of companies are supported in certain stages. The public has new supports on technological activities, investments and export in Turkey.

## **SWOT ANALYSIS OF THE MANUFACTURING INDUSTRY OF ELECTRONIC PRODUCTS AND ASSESSMENTS**

When the current strong and weak sides of the industry, faced threats and opportunities within the scope of SWOT analysis of the manufacturing industry of Turkish electronic products are evaluated;

### **Strong Sides of the Sector**

The most significant factors of the strong sides of the sector are the qualification of productiveness, production power and capacity. Quality standards are closely followed in the area of production and high standards of quality are maintained by continuously updating. The industry has a quality and sustainable production capacity. Additionally, the awareness of quality in the industry has been primarily settled. The manufacturing industry of electronic products has the advantage of being close to the EU countries, which is the biggest market for it. Apart from the closeness to the largest market, the sector has the capability to fast loading and distribution. Despite the need for qualified engineers and intermediate/technical staff, there has been an increase in human resources in this area in the recent years (though not in a sufficient level).

### **Weak Sides of the Sector**

There is no component technology and production in Turkey. That's why, intermediate inputs are 80-85 percent imported. The manufacturing industry of electronic products is foreign-dependent in production technology. The relation and cooperation between the main industry and side industries are limited. Public burdens over the production costs also negatively affect the competitive power. Substantial and large-scale foreign capital investments are also observed to be lacking in the production area. Mainly assembled products are manufactured instead of original design products, which limit the created added value. Sources allocated to R&D and P&D activities are insufficient in international scale. In the area of technology, supracompetitive cooperation between companies is also at a very low level.

Branding in the manufacturing industry in Turkish electronic products are yet limited. The manufacturing industry of Turkish electronic products has strong dealer's network structure in the domestic market; however, it has not sufficiently gained a place in the retail channels yet. In the domestic market, which is the biggest market for the sector, purchasing policies of the public, which is again one of the biggest purchasers, limits the domestic manufacturers from gaining competitive power. Besides, the lack of long-term purchaser loans in domestic sales also constitutes a weak side against the rivals. B2B marketing and sales infrastructure and supports for it has not developed sufficiently yet.

For companies except a few large-scale companies, there is a lack of capital and trouble in reaching sufficient long-term financing opportunities in proper conditions. And also the costs for financing opportunities are high. The manufacturing industry of electronic products has a lack of experienced engineers and qualified and sufficient intermediate staff.

In the imports, the products are taken into the country with different GTIP numbers and high customs tax is avoided in this way. Hence, unfair competition emerges in the domestic market and local manufacturers cannot compete. There are troubles in product standards and current accreditation system in the manufacturing system of electronic products.

The fact that intellectual and industrial property rights are not sufficiently protected in the manufacturing industry of electronic products both leads to unfair competition and foreign capital investments cannot be attracted. Because of the lack of specialized courts, especially controversies about intellectual and industrial property rights cannot be settled duly or solved very late.

### **Opportunities in the Sector**

The target for Turkey to be the local production center of medium and high intensity industries in the industrial strategy document and 10. Five-Year Development Plan poses an opportunity for it to be the local production center in the manufacturing industry of electronic products. Opportunities like purchasing European companies, founding partnerships, moving the production centers to Turkey have emerged. For foreign capital investments, not only Turkey but also rapidly-growing local market also provides prominent opportunities. The ability to operate with the

manufacturing industry of electronic products through the capacity of innovativeness and creativeness with the development level of the software sector also provides an important opportunity.

Machinery and equipment used in the production can be adapted and necessary production equipment is developed. There are development opportunities in this area with the cooperation of machinery sector.

In the manufacturing industry of electronic products, awareness about R&D and P&D is raised and companies have started technologic activities within the frame of opportunities. Thus, an important threshold is left out in the sector. Besides, technological developments in the sector in the international arena give way to the opening of new business areas continuously and enlarge the market potential.

The increase in the near and neighbor countries and the enlargement in the manufacturing industry of electronic products market provide an important market potential for Turkey. The amelioration of the perception of Turkish brand is also another significant advantage.

In the domestic market, the fact that saturation is not reached in many products and the adaptation of the market to new products and the desire to have are substantial opportunities. Furthermore, electronic marketing possibilities on the internet create B2B sales opportunities. International private investment funds, enterprise capital companies and angel investors are especially interested in Turkish technology companies and this will go on for another period. However, the ones which found short-term and financial partnerships just to benefit from the value increase are exception to that.

New investments, new R&D and export promotions of the economy management should also be regarded as potential opportunities for the manufacturing industry of electronic products. However, sector-specific ameliorations are required for all of these. Technology-based large investments by the public, great projects like FATİH and public tenders also create opportunities for the industry.

### **The Threats to the Sector**

To be mainly and continuously foreign-dependent in the intermediate goods and inputs supply makes the development and competitive power of the sector also foreign-dependent and it is impossible to maintain this structure. The industry should absolutely be able to diminish its foreign-dependency.

The manufacturing industry of electronic products is primarily foreign dependent in also product and production technologies. This dependency makes the sector to follow developments and limits its competitive power. This structure cannot be sustainable for long-term either.

Low production costs in China and some other Asian countries cause a sharp competition of prices and costs. Competition made by continuously discounting the prices eliminates the profits and is not sustainable.

For producers settled in the centers of big cities in the country, it has gone beyond being possible to maintain the production with the cost levels.

In the city centers, the production has become scattered, disconnected and costly and gone beyond being sustainable.

The fact that companies in the sector persist in the small-scale poses a threat for the international competition. Without envisaging the future technologies and developing technologies relating to them, one can just be the follower of the developments. In these conditions, sufficient competitive power, value added and profitability cannot be rendered. Technological developments are too fast and their lives are getting more and more shorter every passing day. The possibility to catch up with this pace is decreasing. Delay in branding about electronic products causes trouble. At least, local brands should be issued.

New generation trade and investment agreements which will be done by our biggest market, the EU with the third countries equal the advantages of Turkey rendered by customs union with other countries.

This tendency poses a major threat. Foreign brand-oriented supply policies of domestic technology markets limit the growth in domestic market. Again, the global supply and purchasing policies of large-scale international companies decrease the purchasing prices and make the competition even harder. The lack of a specialized international fair special for electronic products also poses a threat.

The fact that company scales are low in the industry causes activities like new investments and marketing to be limited and sufficient competitive power cannot be acquired.

The fact that sufficient capital and financing opportunities are not provided will also limit the growth of the companies. The fact that sufficiently qualified engineers and technical staff are not raised will pose an important threat. With the delay of necessary improvements in export and domestic

market observations, if the unfair competition continues, domestic companies cannot possibly compete for a long time.

If the tender conditions in public affairs that constitute a very important opportunity for the development of the sector continue, domestic producers will have limited development opportunities. In compliance with the approach "electronic industry develops where there are knowledge and qualified human resources", appetite for new investments will be quite limited in the big cities and unless special promotions are given.

## SECTOR STRATEGIES

14 strategic targets have been defined for the manufacturing industry of electronic products.

1. To decrease the foreign-dependency in intermediate inputs and to make investments and production in chosen intermediate inputs.
2. To gather the manufacturing industry of electronic products in new generation specialized industrial area and support the gathering
3. Diminishing the burden on production and operation costs
4. To cooperate for the supply of intermediate inputs of the other manufacturing industry sectors and increasing them.
5. To develop the software sector
6. To enhance the design technology with original design and production To promote technological activities
7. Close follow-up in technology for envisaging and developing the future technologies
8. To carry out an export of 15.4 billion dollars for electronic products and 5 billion dollars of software in 2023
9. For the public to apply supply, purchase and tender policies that support the sector
10. To meet the capital and financing needs under appropriate conditions
11. To raise qualified human resources and develop the cooperation of industry-university
12. To enhance the capacity of standards, test, measurement and accreditation
13. To activate the observance in exports and domestic market
14. To diminish the additional burden brought about by the current regulations

## **SUGGESTIONS FOR BUSINESSES**

Here are suggestions for increasing the competitive powers among companies operation in the manufacturing industry of electronic products

1. To strengthen the capital structures
2. To enlarge the company scales
3. To enhance cooperation between SMEs
4. To improve supracompetitive cooperation between companies
5. To improve the relation between the main industry and side industries (vertical integration)
6. Access to international sales and marketing channels and partnerships
7. To build up electronic marketing and sales media and partnerships
8. To define the referential successes of companies better
9. To ensure the standard compatibility in software
10. For companies to increase enterprise capital and partnerships with angel investors

