DEFINITION AND SCOPE

Mineral products manufacturing industry is placed as a sector, which produces the products consumed in almost all fields of our lives with the utilization of stone and soil-based raw materials. Mineral products manufacturing industry carries out the production of many products such as glass, ceramic, concrete, ready mixed plaster, lie, brick, fire brick, marble made of natural stones, travertine and granite. A great portion of mineral products manufacturing industry products is used as an input for construction sector. Accordingly; a great portion of mineral products are defined as construction and building materials. In this respect; there is a close relation between mineral products and development of construction sector. The level of house, non-house building and infrastructure investments in construction sector is the determinant for the demand for mineral products manufacturing industry.

Mineral products manufacturing industry constitutes the group number 23 in NACE.2 sector classifications. This section covers the manufacturing activities related with the mineral-based single substance. This section also covers end-product production from raw materials such as glass and glass products (e.g. flat glass, hollowed glass, fibre, technical glass goods, etc.), ceramic products, brick and kiln-dried clay products, and glue and plaster products.

DEVELOPMENT AND MAIN INDICATORS OF THE SECTOR

In mineral products manufacturing industry; the number of initiatives, which was 11,216 in 2004, reached 12,990 in 2011. The number of paid workers reached 197,232 in the same period with an increase by 42 percent. While nominal production value was 14.4 billion tons in 2004, it reached 38.4 billion tons in 2011. The value added, created by mineral products manufacturing industry, reached 10.15 billion TL in 2011 with nominal values, while it was 4.73 billion TL in 2004. Mineral products manufacturing industry has been carrying out a significant investment. 4.92 billion TL investment was made in 2011.

Natural stone and marble sub-sector has the greatest share with 62.4 percent in terms of number of initiatives in mineral products manufacturing industry. The sub-sector of commodities, made of concrete, cement and plaster, has the highest share as production value with 29.7 percent. The highest value added in mineral products manufacturing industry is created by cement, lime and plaster products sub-group with 28.6 percent.

The development of share of mineral products manufacturing industry in general manufacturing industry is as follows; the share of numbers of initiative almost remained the same in the manufacturing industry. While its share in employment was 6.12 percent in 2004, it reached 6.94 percent in 2011 through limited and gradual increases. While its share as production value was 5.05 percent in 2004, it reached up to 6.04 percent in 2007 and then reduced to 5.52 percent in 2011. While its share in created value added was 7.07 percent in 2004, it reached up to 9.43 percent in 2007 and then reduced to 7.87 percent in 2011. Mineral products manufacturing industry has quite high share in investments and constitutes 8 to 10 percent of the total investments in manufacturing industry by itself every year.

The production in mineral products manufacturing industry increased by 15.9 between 2005 and 2012 and fell below the manufacturing industry production growth which increased by 27.3. The efficiency, measured in mineral products manufacturing industry via per capita production, increased by 11.0 in 2005-2012. In the same period, efficiency or production per capita in manufacturing industry increased by 15.6. Efficiency increase was 4.67 points below the manufacturing industry average efficiency increase.

While the export of mineral products manufacturing industry was 2.39 billion dollar in 2005, it reached to 3.76 billion dollars in 2012. Furthermore, the share of mineral products in Turkey's total export reduced from 3.25 in 205 down to 2.73 in 2012. While mineral products import, which was 969 million dollars in 2005, reached 1.56 billion dollars in 2012, its share in total import reduced from 0.83 to 0.66.

Amount values and export products' average unit values increased in 2003-2012 period in mineral products manufacturing industry. When export unit value is calculated with 2003=100, it reached up to 158 in 2008, then recessed and realized as 137 in the year 2012. The export amount showed a gradual and significant increase between 2003 and 2012. The export quantum index, based as 100 in 2003, reached 170 in 2012.

Turkey's export markets in mineral products manufacturing industry vary a lot. Iraq, Russia, Azerbaijan, Georgia and Bulgaria, where the borders are located, are important markets for the sector. Germany, England, France and Italy and European Union countries are principal markets of the sector. U.S.A. and Canada are important markets in marble products. Middle Eastern countries such as Saudi Arabia, Libya, United Arab Emirates and Israel and African countries such as Gulf and North Africa are crucially important markets. In addition to them, Central and Sahara Africa countries are developing as new markets.

The number of people who are employed for research and development activities in mineral products manufacturing industry was 882 in the years 2011. Increasing by years, the expenditures undertaken for research and development activities were measured as 64 million TL in 2011. While the number of patents, taken in mineral products industry, was 46 in the year 2000 it gradually and steadily increased in the following years and reached to 328 in 2012. The number domestic registry was 342 in 2000, this figure raised to 3,648 in 2012. While industrial design registration number, which is taken as the total of two separate groups, household furniture and construction materials, was 238 in 2000, it reached 976 in 2012.

Due to the fact that mineral products manufacturing industry consists mainly of heavy products, its transportation to far markets is relatively expensive. Export is limited to closer and neighbor countries mainly. Accordingly; the level of production in mineral products manufacturing industry is determinant for production capacity and production. Population and demographic structure, ongoing urbanization, urban transformation, new house constructions, expansion in non-house building construction and high-scale infrastructure investments in Turkey increases the domestic market potential for mineral products industry.

While production in glass sector in Turkey was 1.54 million tons in 2002, it reached 3.68 million tons in 2012. Ceramic sector is divided into two product groups; ceramic coating materials and ceramic health tools. While the production capacity of ceramic coating materials was 225.1 million m^2 in 2002, it reached 432 million m^2 in 2012. The production increased from 162 million m^2 to 280 million m^2. Production capacity of ceramic health tools rose from 194,500 tons in 2002 to 330,000 tons in 2012. The production reached from 123,980 tons in 2002 to 260,000 tons in 2012. The world cement production, which was 32.8 million tons in 2002, reached 60.3 million tons in 2012. While domestic consumption was 26.8 million tons in 2002, it increased to 58.9 million tons in 2012. Ready mixed concrete sector production capacity rose to 170 million m^3 in 2012. In 2012, a total 93 million m^3 ready mixed concrete was produced. Natural stone production is around 11.5 million tons annually in Turkey while total plate production capacity of processing facilities is around 6.5 million m^2. In 2012, marble production occurred as 4.15 million m^3 while travertine production was 1.71 million m^3. Insulation sector has shown serious developments in the past 10 years. In insulation sector, in which grew up by 22 percent in 2012, approximately 14.2 million cubic meter material was used in heat insulation while 118 million cubic meter material was used in water insulation.

WORLD MINERAL PRODUCTS INDUSTRY AND TURKEY'S STATUS

World glass sector annually grows around 2 to 4 percent in average based on the developments in economy. Rather than producer countries, the big producer company groups are dominant in glass sector. The investments are focused on fast developing Middle and Eastern Europe, Far East and South eastern Asia countries. World annual glass production capacity is estimated to be approximately 180 million tons while its value is estimated to be 130-140 billion dollars. China unilaterally carries out 38 percent of the world production in ceramic coating materials production with its 4.8 billion m^2 production. Brazil is on the second rank with 844 million m^2 production. In Asia Pacific region; India, Vietnam, Indonesia and Thailand are sorted as the big and significant producer countries. Italy and Spain from Europe continent are the world's fifth and sixth biggest producers respectively with their high value added, quality and branded products. China has the fourth place among consumers of ceramic coating materials with 4 billion m^2 and constitutes 36 percent of the consumption in the world. In ceramic health tools sector, 325 million parts and 345 million parts were produced respectively in 2011 and 2012. 52.6 percent of the production of ceramic health devices was carried out in Asia Pacific Region, 17.9 percent in Europe, 12.6 percent in South America, 9.2 percent in North America and 7.7 percent in the remaining countries. International investments in ceramic health devices production, the countries and great global brand producers' are determinant. The world cement and ready mixed concrete consumption and accordingly their production are in an upward

trend with construction and infrastructure investment activities focused particularly on developing countries. The world cement production, which was 1.83 billion tons in 2002, reached to 3.78 billion tons in 2012. Particularly China led this increase in terms of consumption and production. China was the biggest producer in 2012 with 2.14 billion tons and it widely covers its own consumption. Ready mixed concrete production is consumed in the same place. China takes the first rank in world ready mixed concrete production with 1.12 billion m^3. India has the second place with 302.6 million m^3 while U.S.A has the third place with 225 million m^3. Natural stone and marble production is related to reserve opportunities of the countries while their consumption is related to their culture and traditions. In natural stone production, consisting of marble, travertine and granite, China has the first place with 36 million tons while India has the second place with14.1 million tons, as two great consumers.

World export of mineral products was 163 billion dollars in 2012 while its share in the world export was 0.91 percent. When distribution of export of mineral products is evaluated in terms of sub-sectors; the highest export belongs to flat glasses with 79 billion dollars. The export of ceramic health devices and porcelain household goods and ornaments reached to 36 billion dollars. The export of cement, ready mixed concrete, plaster and commodities made of these was 27 billion dollars while the export of ceramic coating materials, brick, tile etc. and export of glass goods were over 26 billion dollars. China generates the highest export with 38.6 billion dollars in 2012. Germany is on the second place while Italy has the third place with 14.6 and 11.2 billion dollars respectively. China, Italy and Turkey take the first three places in natural stones and cement export. China, Italy, Spain, Germany and Turkey are included in the first five places in ceramic tile export. Germany and China are ranked as the first two in ceramic health devices and porcelain household goods and ornaments. China, Japan, U.S.A., Germany and Taiwan are included in the first five places in flat glass export. China, Germany, France, Italy and U.S.A. constitute the first five places in glass commodities. U.S.A. has the first rank in the world mineral products import with 17.3 billion dollars. Germany is the second and China is the third greatest importers. France, South Korea, Japan and Canada are the other great markets of import with over 5 billion dollar. These countries are followed by England, Italy, Russia, Belgium, Taiwan, Holland, Hong Kong and Mexico respectively.

Turkey has significant greatness and ranks in production and export in Europe and in the world in terms of sub-sectors of mineral products manufacturing industry. When evaluated in terms of production, Trakya Cam is on the fourth place in Europe and sixth in the world in flat glass production. Paşabahçe is on the second rank in Europe and third in the world in glass commodity production. Turkey is on the fourth rank in Europe and fifth in the world in glass packaging production. Turkey is the third biggest producer in Europe and the ninth biggest producer of the world in ceramic coating materials. Turkey is the biggest producer in ceramic health tools, cement, ready mixed concrete and natural stones. While Turkey takes 2.3 percent share from world mineral products export with its 3.76 billion dollar in 2012, it is on the ninth place. When shares of sub-sectors in world export are evaluated, natural stones and cement have a significant share with 6.73 percent. Export share is 2.79 percent in ceramic tile while share of export is 2.04 percent in glass goods.

MAIN COMPETITION ELEMENTS AND DEVELOPMENTS IN THE SECTOR

Main competitive elements of mineral products manufacturing industry are evaluated as raw material and input supply, production, technology activities, marketing-sales, financing and financial infrastructure, human resources and market and sector conditions, which constitute their chains of value.

Turkey possesses rich and high quality reserves as mineral sources. It provides a significant portion of need of mineral products' raw material domestically through the existence and use of these reserves. Nevertheless, important problems are encountered in management of mine and quarry. Closure of mineral, clay, sand (quartz) and stone pits, located near the production facilities, makes accessing to raw material more expensive.

In mineral products manufacturing industry, the capacity mainly consists of main industry and end-products. Due to the fact that no adequate vertical integration is available in the industry, it can be seen that it is foreign-dependent in terms of significant intermediate inputs, primarily the chemicals.

Turkish mineral products manufacturing industry has formed a significant accumulation of knowledge and experience in production field thanks to the activities that have been carrying out for long years. Production capacities in world and European scale are available in all sub-sectors. Domestic production

is partially used in machine and equipment of mineral products manufacturing industry while machine and equipment issue is generally depending on overseas.

When electric, natural gas and fuel oil prices in Turkey are compared to the opponents, they seem relatively high and constitute a significant disadvantage. Energy quality and energy cuts may cause a significant problem source. High price difference among the regions negatively affects the domestic competition as well. Labor cost in Turkey is below countries such as Italy and Spain and above other developing countries, in mineral products industry.

Turkey tries to develop its technological infrastructure and capacity between technology and design-oriented advanced countries and price-cost-oriented developing countries. Technological facilities are quire new in the sector, corporate structures are newly established and time is needed for expertise, accumulation and outputs. Individual technology activities of high-scale and leading companies are carried out in a denser way. Expenses on research - development and product development are not on the desired level yet.

Turkey, initially, gained advantage by accessing to the EU market. Nevertheless, trade diplomacy is started to be limited in the new period with the condition of compliance with EU foreign trade policy, pursuant to customs union agreement. Due to the fact that Turkey unilaterally undertakes the new agreements made by EU while it has to make agreement to enter into other countries, it makes itself an open market and its entrance into prioritized markets is prevented. Turkish mineral products industry is also negatively affected from these conditions, just like all other manufacturing industries.

Turkish mineral products manufacturing industry is led by glass sector in foreign markets in terms of investment. Glass sector has 8 production facilities abroad. Ceramic coating materials sector increases its competitive power through acquisitions and establishing marketing networks while ceramic health tools increase their competitive powers by through production in markets.

Railway infrastructure in Turkey for transporting raw materials to production facilities, and end-products to the sea ports is inadequate. Thus a great portion of freight transportation is carried out via highways which in turn cause high costs due to high fuel oil prices.

Glass, ceramic, natural stone product brands are available in Turkish mineral products industry in global scale. Nevertheless, their numbers are quite low compared to the production level and capacity of the sector. Industrial design capacity is needed to be developed.

Investment and production scales are large in mineral products industry and there are high investment requirements in the sector. Although the companies above a specific scale in Turkey have sufficient capital accumulation in this sense, their capital opportunities to become an international player in global scale are limited. Turkish financial system and public supports are inadequate in generating loans available and the companies adopt to use investment credits mainly from international financial corporations.

Mineral products manufacturing industry has experienced and expert labor, which has been grown within the sector. This labor force has been mainly grown and specialized in the sector. Problems are encountered in issues such as knowledge, implementation experience, and expertise in new human resources. Qualified intermediate personnel problem continues as well. Expert qualified personnel supply is considered to be difficult upon investments made in Anatolia.

The products, produced with low input costs in mineral products manufacturing industry besides being cheap and low quality and copies of Turkish designs, are imported and cause unfair competition. This market abuse import negatively affects the competitive power of the domestic producers. Due to these factors, import protection is not adequate in this phase.

Domestic informal productions, which are below the minimum standards, cause unfair competition in domestic market. Furthermore, although registered production is carried out, the domestic and foreign sales prices in the market sometimes negatively affects competition in sectors. Turkish Standards Institute is functionless in test, measuring, calibration and standard registration processes for products produced in mineral products manufacturing industry, while TURKAK is weak in global scale. When current production capacity in mineral products manufacturing industry is considered, it is required to support more intermediate input than end-product investments. No intermediate input is available, taken into the scope of GITES within this framework.

Mineral products manufacturing industry is one of the sectors, which is affected most from environment planning in global scale. Planning and compliance with these planning processes may cause limiting effect on the competitive power of the sector.

SWOT ANALYSIS OF THE SECTOR AND ASSESSMENTS

SWOT analysis in mineral products manufacturing industry and assessment are carried out separately for glass and glass goods, ceramic products, cement and ready mixed concrete, natural stones and marble sub-sectors, and presented collectively. Accordingly, the issues which become prominent as strong sides, weak sides, opportunities and threats of the mineral products manufacturing industry are as follow;

Strong Sides

Production knowledge and expertise obtained through the activities which have been conducted for long years, qualified human resources which have been grown in the sector, high company scales and created production capacity, rich raw material reserves, developing image for Turkish products constitute the significant powerful sides of the sector.

Weak Sides

When compared to the competitive developing opponents, insufficient infrastructure and high transportation costs in domestic transportation, inadequate investment incentives, limited amount of research and development activities, currently being new in authentic design and branding issues, inadequacy in development of high technology products, dependency on overseas in production technologies, machine and equipment, dependency on overseas in chemicals and other intermediate inputs, price policies that cause unfair competition constitute weak points of the sector.

Opportunities

Meeting the wide demand to be formed due to urban transformation, building renewal, new building investments, fast urbanization, lack of housing, infrastructure investments and big projects, closeness to developing markets, new product demands to be received with new energy, insulation, resistance and structure standards, the demand increasing with green buildings and high buildings, changing needs and demands due to flexible and innovative production capacity of the sector constitute significant opportunities in the sector.

Threats

Import of cheap and low quality products from China, Far East, Former Eastern Bloc countries, the unfair competition created by them, regional trade agreements and exclusion of Turkey from such agreements due to customs union agreement, market abuse effect of underground production, occurrence of market losses due to regional political risks, transportation difficulties, each country's tendency on setting a separate product standard, continuity of uncertainty related with the operation of raw material pits, wrong image created in the public due to implementations and limitations, which go beyond their purposes, within the scope of environment planning constitute threats for the sector. Furthermore, new regional players such as Iran, Egypt, U.A.E. and S. Arabia constitute threat as well.

STRATEGY AND POLICY SUGGESTIONS FOR THE SECTOR

16 Strategic targets, suggested for mineral products manufacturing industry, are as follows;

1. Expansion of Utilization of Domestic Raw Material
2. Production and Utilization of Domestic Intermediate Inputs
3. Development of Domestic Production Technology
4. Reduction in Energy Costs
5. Increment of labor efficiency
6. Increment of High Value Added Production and Enhancement of Efficiency
7. Expansion and Supporting of Technology Activities
8. Making 7.3 Billion Dollar Export in 2023
9. Encouragement of Use of Innovative Products in Domestic Market
10. Increment of Opportunities of Investment Credits and Purchasing Credits
11. Covering the Qualified and Expert Human Resources Need
12. Activation of Import Protection
13. Activation of Internal Market Protection and Monitoring
14. Strengthening of Test, Measurement and Standard Infrastructure
15. Execution of Improvements, which protect the requirements of the sector, in Investment Incentives and Supporting the Foreign Investments
16. Improvement of Implementations in Environment Planning

SUGGESTIONS FOR COMPANIES

17 suggestions developed for mineral products manufacturing industry companies are as follows;

1. Utilization of more recycled raw material which decreases the raw material costs
2. Making inter-company collaborations and partnerships with foreigners for domestic intermediate input production
3. Establishment of dialogue and collaborations with machine producers for localization and development of production technology
4. Making more application for public programs such as TEYDEB, SANTEZ, ARGE, ODAK Project, etc. for production with high added value.
5. Strengthening of industrial design capacity, working with foreign and domestic design offices.
6. Providing project-oriented technical collaborations with universities
7. More participation in Turquality and brand support programs (it is also suggested that these programs are revised in compliance with the sector)
8. Making collaborations for common storage, logistics and transportation at home and abroad
9. Making production and market channel investments in foreign target markets
10. Purchase of foreign company, production facility, brand and market channel
11. Creation of possibilities for applied training within the company
12. Close monitoring and compliance of product standards studies in foreign markets
13. More utilization of renewable energy sources
14. More utilization of alternative fuels (industrial wastes, etc.)
15. Increment of energy efficiency
16. Use of improvement, efficiency increase, modernizations, and clean and green technology in all production facilities.
17. Issuance and international publication of Sustainability Reports