TURKISH AUTOMOTIVE CLUSTER

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Executive Summary

Turkey is a middle-income country with good endowments such as strategic location, large domestic market, young population and some natural resources, but dependent on oil and natural gas imports. Turkey had sustainable economic growth after macroeconomic stabilization and structural reforms since 2001. The economy is becoming increasingly diversified and export-oriented with large FDI inflows. It has wide range of clusters in tourism, automotive, apparel, textiles, metal mining and manufacturing. Turkey's competitiveness is limited by its vulnerability to external shocks, quality of human capital and R&D capacity, constraints in national business environment resulting in a large share of informal economy.

Turkish automotive cluster was developed through alliances with foreign partners, and Turkey was included into global production planning especially after joining Customs Union with the EU. The cluster is concentrated in Marmara region, has good connections with supporting and related industries such as electronics and shipbuilding, served by technical universities and by active IFCs like Automotive Manufacturers Association. The cluster enjoys economies of scale in automobile production, whereas the production is sub-scale in auto parts. Overall, the cluster is strong across the diamond, but there are some risks like dependence on foreign partners for innovation and high value added activities such as design and marketing. Special attention must be paid to the promotion of innovations, and in this respect, the relationship of the cluster with educational and research institutions must be further reinforced.

1. Overview of Turkey

The Republic of Turkey is a transcontinental Eurasian country, strategically positioned at the intersection of Europe, Central Asia and the Middle East and surrounded by four seas. Turkey is a democratic secular state, organized in 81 provinces. It has independent executive, legislative and judicial branches, and roughly 50 political parties.

With a 2010 GDP of $958.3 billion (in PPP) and a $12,300 per capita GDP (in PPP), Turkey is the 17th largest economy in the world and the 6th largest economy in Europe. Its population was over 73.5 million people in 2010. (CIA Factbook) It is likely to become a major regional power, the largest and fastest growing economy in Central and Eastern European region.

The country is active on the international arena and well integrated with the West. It is a member of the UN, NATO, OECD, Council of Europe, OSCE, the G-20 major economies, and has begun official full-membership talks with the EU in 2005.

Historical context: Turkey was born on October 29, 1923, from the ashes of Ottoman Empire following a strenuous Independence War after World War I. A single party republic until 1945, it transitioned to multiparty democracy with a few military coups in 1960, 1971, 1980, and 1997.

2. Economic Performance of Turkey

GDP growth. Turkey's economic performance over the last decades has been volatile with periods of high growth and economic slowdowns due to financial and economic crises. Over the last twenty years, the country had an average annual economic growth of 3.9%, but during the 2002-2007 period, it grew on average by 6.8%. The economy was severely hit again by the

world economic crisis and declined by 4.7% in 2009. In 2010, the growth has recovered at 1.7%, GDP in nominal terms reached $741.8 billion and GDP per capita reached $10,399. In terms of income per capita, Turkey is below the average for twelve new EU member countries and majority of Eastern European countries. (World Data Bank)

Figure 1. Turkey's Economic Performance Has Been Volatile

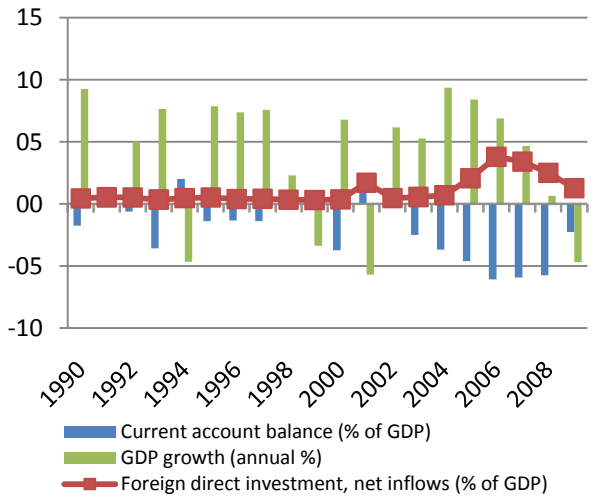
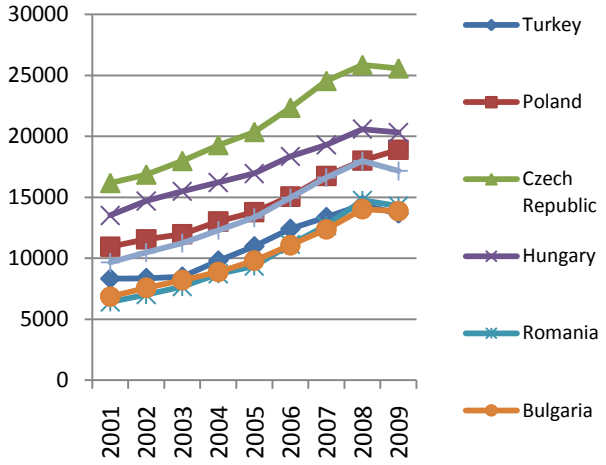


Figure 2. GDP per Capita, PPP (current intl dollars)



Source: WB World Development Indicators 2010

Since 1990s, Turkey has experienced economic declines after three major crises in 1994, 1999 and 2001. The common denominators of these crises were macroeconomic imbalances and external shocks. Specifically, the 2001 currency crisis was triggered by capital market liberalization and speculative attacks under the fixed exchange rate regime.

Structure of the Economy. Turkey's economy is a mix of modern industry and services, along with a traditional agriculture sector. From 1960 to 2009, the economy has been drastically modernized and transformed. The contribution of agricultural sector to GDP has declined from 55% to 9.3%; industry's share grew from 17% to 26% of GDP; share of services in GDP increased from 26% to 65%. (Trade Economics). The distinct feature of Turkey's economy is

the huge size of informal economy. According to different estimates, the informal economy accounts for 40-45% of national economy. (Prime-Minister's Speech, 2011)

Economic reforms. Between 1923 and 1983, the economy was characterized by strong government involvement, with many restrictions on trade and capital flows. The country has begun moving towards open, market-based economy in 1983. Goods and capital markets were liberalized with focus on private sector development. However, the lack of fiscal reforms, high public sector deficits and loose macroeconomic policies resulted in a series of crises with high inflation, exchange rate volatility and unemployment. In 1996, Turkey joined the Customs Union with the EU and started effectively pursuing an *export-oriented strategy*. Since 2001, the country has pursued fiscal austerity, price stability and structural reforms that allowed for increased macroeconomic stability, restored investors' confidence and inflow of FDI.

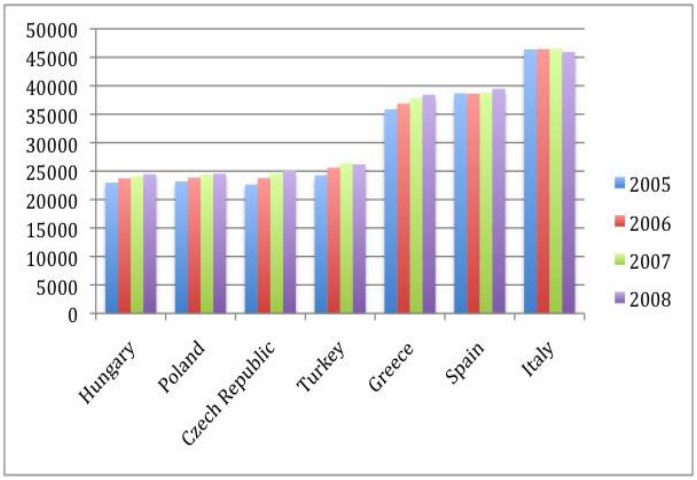
Current account. Country has persisting current account deficits, which equaled, on average, 3.9% of GDP between 2002 and 2009. Despite the fast growing exports (from 13% to 23% of GDP), trade deficits have persisted due to high demand for imports. Turkey's major exports include textiles and clothing, automotive, iron and steel, home appliances, chemicals and pharmaceuticals. Turkey imports mainly machinery, chemicals, semi-finished goods, fuels and transportation equipment. Its principal trading partners are European Union countries (Germany, U.K., Italy, France), Russia, China and U.S. (Trade Economics)

Foreign Direct Investment. Growth has become increasingly dependent on capital inflows. Since 2001 Turkey has attracted $87.3 billion of FDI, primarily coming from EU countries (France, Netherlands, Germany). By 2011, more than 25,800 companies with foreign capital were operating in Turkey. Two-thirds of them were established in the last 7 years. (Investment

Promotion Agency) The majority of the companies with international capital are in the wholesale and retail trade sectors, followed by manufacturing, real estate and renting.

Productivity. According to the study by the Turkey's Central Bank, the contribution of total factor productivity to the economic growth has increased from 5% to 30% after structural reforms of 2001. There are huge productivity gaps between formal and informal economies. McKinsey find a productivity gap of 30-40 percent between formal and informal businesses in Turkey. The World Bank find TFP gap between formal and informal firms is about 150 percent for manufacturing and 140 percent for services.

Figure 3. Labor Productivity Measured as GDP per Person Employed Constant 1990 PPP $



Source: WB World Development Indicators 2010

Labor productivity in Turkey, measured as GDP per person employed, is comparable to other Eastern European countries, but much lower compared to developed EU countries. Low labor productivity is also partly due to the large share of the informal economy.

3. National Competitiveness Analysis

Turkey ranks below its potential in New Global Competitiveness Index (73 out of 139 countries in 2010). Its competitiveness has been held back mostly by macroeconomic conditions, quality of human capital and constraints in national business environment. (Institute for Strategy and Competitiveness, 2011)

Endowments. Turkey is blessed with many endowments. *First*, it is strategically located at the crossroads of the Europe and Asia. Surrounded by four seas, it serves as a natural hub for movement of goods, services, capital and people. It lies in a good neighborhood of either wealthy or fast developing economies to the North and West, but potentially less stable environment in the South-East. *Second*, it has a population of 73.5 million people and a large domestic market. More importantly, Turkey is currently in demographic window of opportunity with 67% of population between ages 15-64. *Third*, Turkey is rich in certain natural resources like coal, iron ore and arable land, but dependent on imports of oil and gas.

3.1 Macroeconomic Competitiveness

A) Social Infrastructure and Political Institutions

Turkey's level of social infrastructure does not fully support the potential of its human capital. With UN's Human Development ranking of 83, it is still below average for Europe and Central Asia. Access to education has improved over the last years, but the quality of education seems to be the key issue. There is need to improve technical and vocational education system. Out of 167 universities and academies in Turkey, four are technical universities, two institutes of technology. There are 4,443 technical high schools, but their reputation is not stellar and young people prefer university education. While primary school enrollment is 99.3% of population, secondary school enrollment is 82%, and tertiary is only 39%. (WB) Low enrollment in tertiary education can be explained by perceived low returns to education in rural communities, especially among women, and constrained access to higher education.

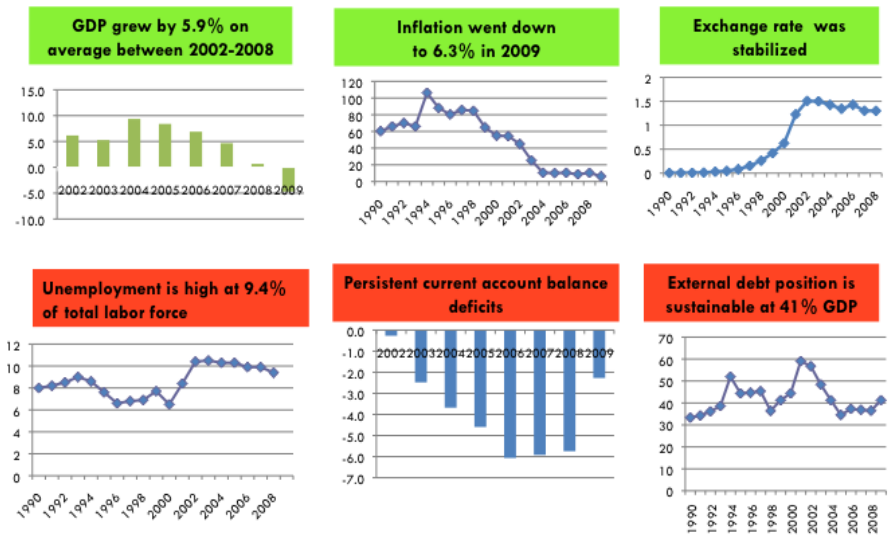
Turkey has made big leaps in its governance indicators and institutional characteristics. It is now more politically stable, with free political competition among 50 parties. Moreover,

Turkish politics is oriented towards the EU accession process, which has improved the rule of law and civil liberties. However, human rights record including women's rights and press freedom remain an issue. According to the World Bank Country Memorandum 2010, low effectiveness of government sector and corruption are contributing to high share of informal relations in the economy.

B) Macroeconomic Policy

Macroeconomic stability is crucial for Turkey to sustain high economic growth rates. After three financial crises in the 1990s, Turkey has adopted a new **monetary policy framework** in 2001. The Central Bank gained independence, and price stability was declared as its primary objective. Exchange rate was set to float, with full-fledged inflation targeting framework adopted in January 2006. As a result the inflation was brought down to single digits, exchange rate has stabilized, and economic growth rebounded. Nevertheless, it is important to highlight that inflation targeting regime in the presence of flexible exchange rates and volatile capital flows can be hard to sustain due to pass-through effects. While inflation targeting was successful so far, unemployment rates are still high, especially among youth. Prudent **fiscal policy** after 2001 led to reduction of fiscal deficits and less dependence on external borrowing.

Figure 4. Current Macroeconomic Trends



Source: Turkstat, WB

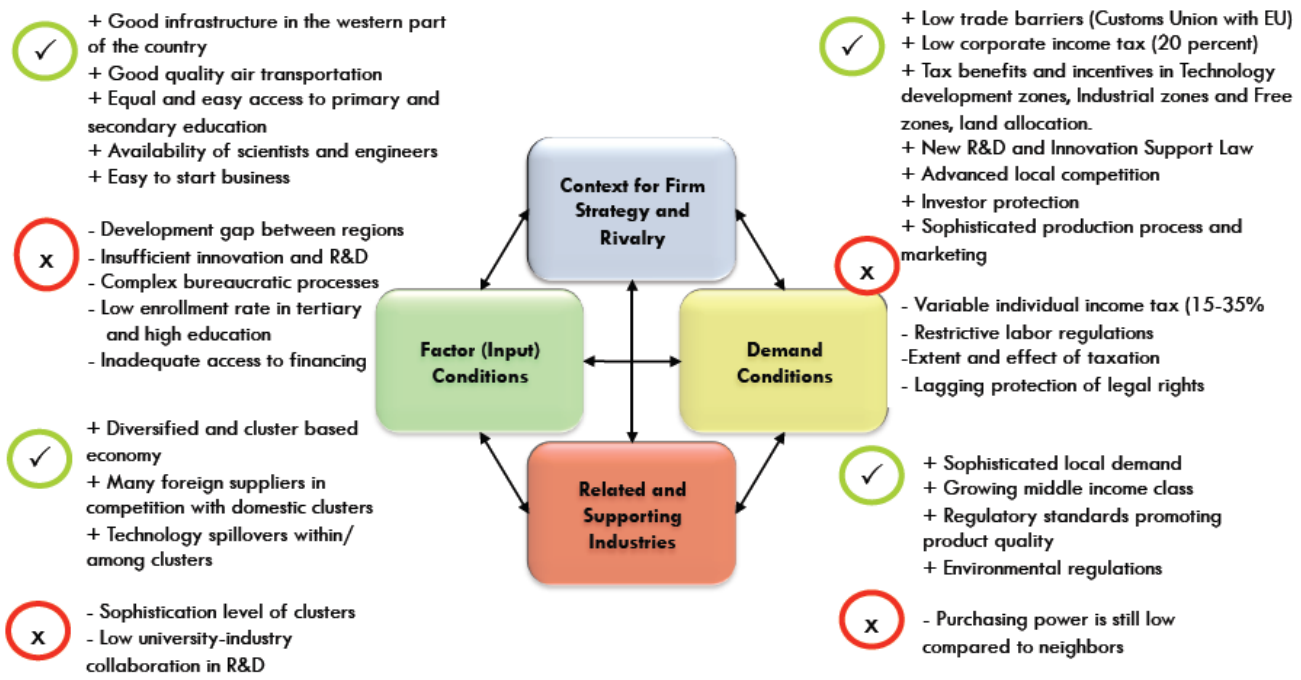
Economic growth is becoming increasingly dependent on capital inflows. On one hand, FDI is used to decrease external debt position. On the other hand, large capital inflows to

the Turkish economy over the last years have created pressure on exchange rate appreciation, and might hurt the competitiveness of domestic exports. Turkey has been running persistent current account deficits, which can be explained to a large extent by the decline in saving rates and the recent surge in investment.

3.2 Microeconomic Competitiveness

3.2.1. Quality of the National Business Environment - National Diamond

Figure 5. National Diamond



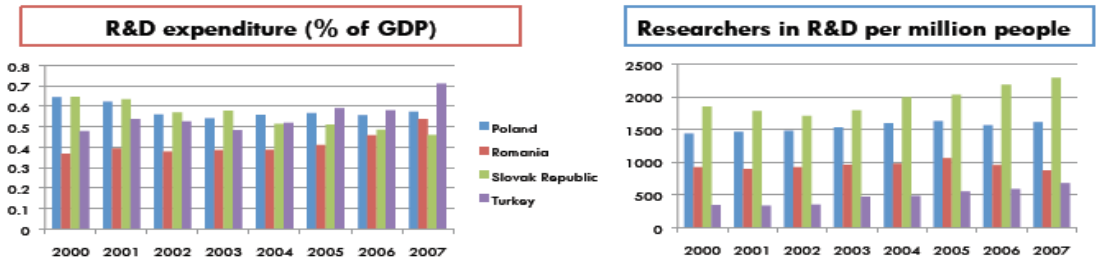
Source: CIA World Factsbook. Turkstat, World Bank Governance Indicators

A) Factor/Input Conditions. Turkey has relatively good infrastructure in the western part of the country, with roads, airports and seaports. However, there are major development gaps between regions and great disparities in the quality of infrastructure between the western and eastern parts of the country. Specifically, transport infrastructure is particularly

underdeveloped in the Eastern Turkey, which constitutes a significant bottleneck in terms of accessing markets. (Mersin Chamber of Trade and Industry 2011, OECD 2011) Moreover, these regional disparities also affect cluster development, with most clusters being located in the western part of the country, as shown in Section 4.5 of this report.

Primary and secondary education is virtually universal in Turkey, with enrollment rates of 99% and 82% respectively. (World Bank, 2010) Nevertheless, enrollment in tertiary education is relatively low at 39% and although Turkey has qualified engineers and scientists, it needs considerably more, especially if a cluster such as the automotive is to prosper and develop further up the value chain. Indeed, although Turkey has been increasing investments in R&D over the last decade, it lags behind Hungary or Poland when it comes to the number of researchers per million people, as indicated in Figure 5. (U.S. Patent and Trademark Office, World Bank, 2010)

Figure 6. R&D Expenditure in Turkey



Source: The World Bank, http://databank.worldbank.org/ddp/home.do?Step=3&id=4#

Patents: Turkey is not doing well in number of patents in comparison with peer countries. Nevertheless, the trend is improving in relative shares.

Origin/year	00	01	02	03	04	05	06	07	08	09	10	Total
HUNGARY	36	60	48	72	48	46	49	47	66	46	91	609
POLAND	13	16	11	17	16	23	29	32	54	35	39	285
ROMANIA	4	10	3	7	9	7	9	11	12	8	16	96
TURKEY	4	11	15	27	13	7	16	19	16	19	29	176

Source: U.S. PATENT AND TRADEMARK OFFICE, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.htm

With 25.9 million people, Turkey has the 4th largest labor force compared to the EU, of whom 50% are employed in services, 24.7% in agriculture, 19.4% in industry, and 5.9% in construction. However, labor force participation is low at 49% compared to 60% in Eastern Europe, especially with low employment of young people and females.

Turkey is also a place where it is relatively easy to start a business, as indicated by its ranking in the World Bank's Doing Business Report 2010. Yet, complex bureaucratic processes are still present and need to be simplified in order to facilitate the ease of doing business even further, and access to financing is still a major problem for many firms.

B) Context for Firm Strategy and Rivalry (CSR). Turkey has many strengths that enhance its competitiveness when it comes to CSR. It has relatively low trade barriers due to its customs union with the EU, a low corporate income tax of 20%, which makes it very attractive to foreign companies and is an important driver of FDI. Moreover, Turkey has provided foreign firms, particularly in the technology sector, with land and tax benefits and incentives by establishing several technology development zones, industrial zones and free economic zones (Turkish Ministry of Industry and Trade, Turkish Under-secretariat of Foreign Trade). This, coupled with the fact that the R&D and Innovation Support Law has been recently passed, only confirms the Turkish government's support for and commitment to technology, R&D and innovation development. Finally, the country benefits from advanced local competition, fairly sophisticated production processes and marketing, and a relatively high degree of investor protection, better than in countries such as Austria, the Czech Republic or China. (World Bank Doing Business Report 2010)

Conversely, Turkey's variable personal income tax, ranging from 15% to 35%, makes it quite uncompetitive relative to other countries in the region – such as Bulgaria, Romania,

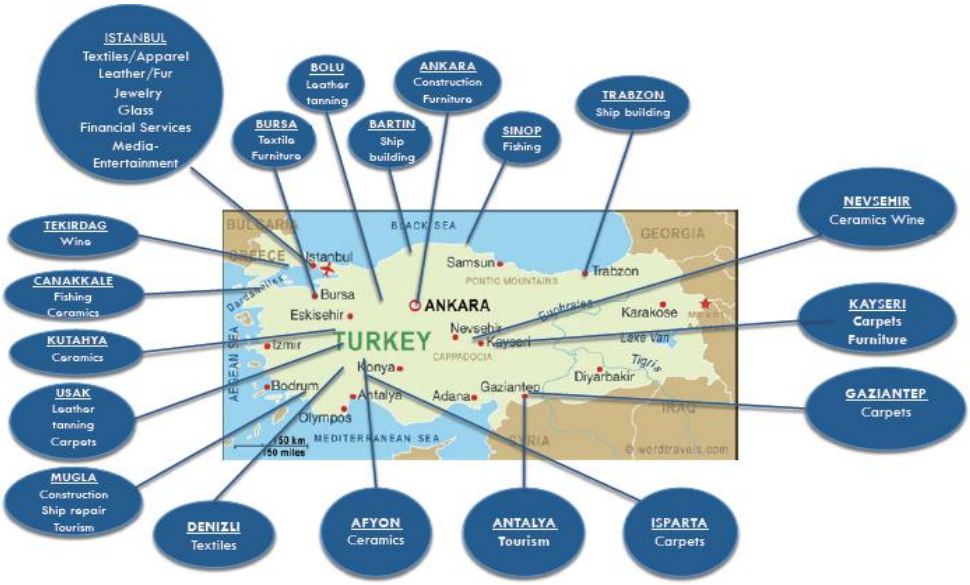
Hungary or the Czech Republic – which have personal income tax rates hovering around 15-16%. Moreover, restrictive labor regulations result into major labor market rigidities, which negatively impact Turkey's competitiveness as a country. For instance, according to the Doing Business Report 2010, Turkey fares poorly on the Redundancy Cost Index, with up to 90 weeks of salary paid in case of redundancy. Naturally, having to pay almost two years of severance pay can be a major disincentive for any foreign company to invest in Turkey or for domestic companies to hire workers. Last, but not least, Turkey is behind all of its main competitors in terms of legal rights protection.

C) Demand Conditions. With a population of 73.5 million, Turkey has a large domestic market and sophisticated local demand. Moreover, its growing middle-income class will be an important source of local demand for both automotive cluster and other clusters, especially since currently only 25% of Turkey's population owns a car. (Investment Support and Promotion Agency, 2010) As incomes rise, this percent is expected to increase dramatically. Finally, regulatory standards for product quality and strong environmental regulations are also significant in honing local demand conditions in the country. On the downside, the vast majority of population in Turkey still has a relatively low purchasing power compared to its western neighbors, which in the short run might make Turkey somewhat less competitive.

D) Related and Supporting Industries. The country benefits from a diversified and cluster-based economy, which has been growing steadily over the past decade. There is a strong emphasis on competition, and foreign suppliers are actually in direct competition with domestic ones. Moreover, there are considerable technology spillovers across clusters. For instance, the automotive cluster is closely related to the shipbuilding and agriculture clusters. (Interview with Automotive Manufacturers Association)

3.2.2. State of Cluster Development Turkey has a diverse set of clusters, ranging from textiles and tourism to automotive and construction. Geographically, most clusters are located in the West, due to a better-developed transport, social and financial infrastructure.

Figure 7. Turkey's Clusters Are Largely Concentrated in the Western Part of the Country



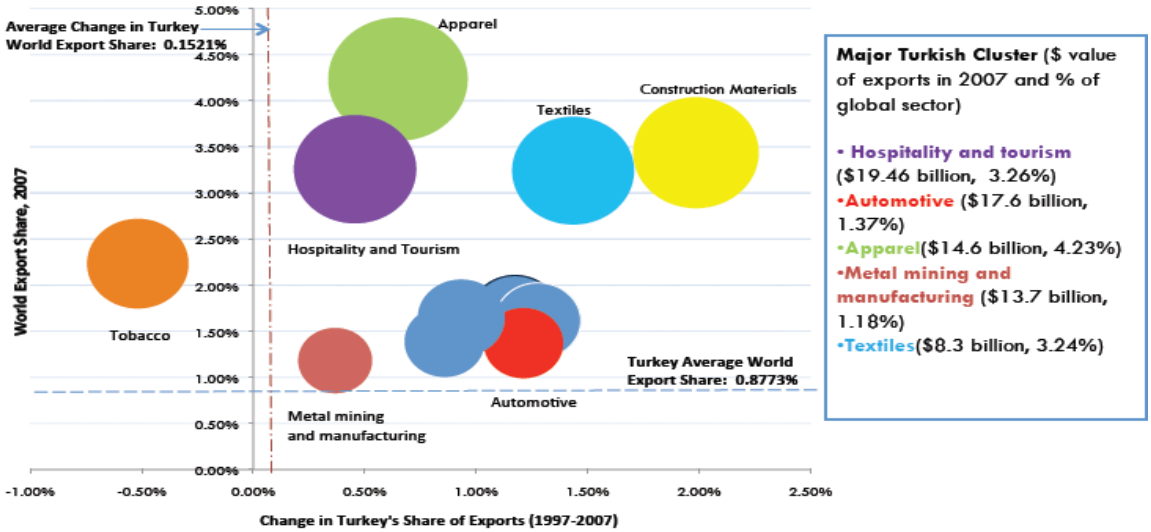
Source: Turkish Under-secretariat of Foreign Trade, 2010.

Turkey's cluster export portfolio is quite impressive. As illustrated by Figure 7, 14 of the its top 15 largest clusters have gained in both world export share and in Turkey's share of exports during the 1997-2007 period. With an export value of $19.47 billion in 2007, the hospitality and tourism cluster remains the largest cluster in Turkey, followed by the automotive cluster at $17.6 billion, apparel with $14.6 billion, metal mining and manufacturing at $13.7 billion and textiles at $8.3 billion. One encouraging aspect is that our interviews with Automotive Manufacturers Association (OSD) reveal that the automotive cluster is likely to surpass tourism and hospitality to become the largest cluster in Turkey.

On the downside, Turkey's clusters are still characterized by a relatively low level of sophistication, and the automotive cluster in particular has room to improve. Moreover, while

the importance and benefits associated with cluster development are widely acknowledged by the government, the country does not have a broad cluster-based national development strategy. This often means government does not maximize its enabling role in Turkey's cluster development.

Figure 8. Turkey's Cluster Export Portfolio



Source: Prof. Michael E. Porter, International Cluster Competitiveness Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director. Underlying data drawn from the UN Commodity Trade Statistics Database and the IMF BOP statistics.

3.3 Risks and Recommendations for Macro and Micro Competitiveness

We have identified seven main categories of challenges that pose considerable threats to Turkey's competitiveness, and we recommend several policies that the government should undertake in order to mitigate these risks.

1. Macroeconomic vulnerability to external shocks, dependence on capital flows

We believe that macroeconomic stability is key for economic growth and further attraction of foreign investment and mobilizing domestic investment. ocus on three main aspects. *First*, it should continue to pursue macroeconomic policies aimed at maintaining a low inflation and a stable currency, by controlling the fiscal and current account deficits. To

prevent exchange rate volatility from external shocks, the country may need to introduce safeguard mechanisms such as Sovereign Wealth Fund and actively manage its international reserves. *Second*, to reduce the dependence on foreign capital, the government should promote the further development of the domestic capital market by broadening the institutional investor base, deepening the secondary bond market, and enhancing the rating mechanism. (TIBA[1], 2005) In addition, it should encourage businesses to use more long-term domestic currency denominated equity capital, rather than external debt, which can prove disastrous in case of a crisis and devaluation of the Turkish lira. *Third,* financial sector stability and soundness should be a priority. The transparency of the financial sector should be improved by strengthening reporting and prudential requirements to provide adequate information for effective management in the sector and by harmonizing the fragmented accounting requirements.

2. Constraining business environment

While the quality of the business environment in Turkey has improved considerably over the last decade, there are still many constraints to the country's competitiveness. *First*, the government should minimize barriers to entry and especially operation of businesses, by using, for instance, electronic services and one-stop windows that reduce both corruption and the cost needed to start a business. Moreover, the government could improve efficiency by reducing the number of permits and procedures and costs required to operate a business. For example, the cost of obtaining construction permits is 4 times higher than OECD average. *Second*, given Turkey's geostrategic location, its transport infrastructure needs considerable

[1] Turkish Industry and Business Association

improvement by constantly investing in building or upgrading roads, railways, ports and airports. The Government should specifically focus on Public-Private Partnership mechanisms and provide guarantees to upgrade its infrastructure. *Finally*, if Turkey is to attract more investment, legal rights of businesses must be protected and thus, the government should adopt laws which ensure this protection is not only there, but also enforced.

3. Tax evasion, rigid tax regulation, excessive and unequal taxation

Due to the complex tax system with many exemptions and loopholes, as well as the high share of the informal economy, the extent of tax evasion in Turkey has been high. Moreover, preferential tax treatment for companies operating within Free and Industrial Zones should be gradually eliminated to ensure a level-playing field for all companies. Moreover, at individual level, a competitive flat personal income tax should replace the current system in order to bring Turkey more on par with regional competitors such as Hungary, the Czech Republic or Romania, all of which have flat income taxes around 16%.

4. Enforce more flexible labor laws

The inflexible labor laws are a considerable constraint to the country's competitiveness and can be a major detractor for foreign investors. This should be addressed in three main ways. *First*, restrictions in the legislation on part-time and short-term contracts should be removed in order to weaken existing incentives to hire short-term or part-time workers informally. *Second*, the severance pay and the unemployment insurance system should be redesigned in tandem in order to reduce the burden of severance payments on firms and the ensure unemployment benefits insurance is more generous in protecting workers. *Third*, the targeted labor tax cuts implemented in 2008 should be extended to encourage the development of the formal sector. Moreover, the government should offer state

co-financing for training programs to increase the skill level of labor force, which would make it more competitive.

5. Lagging quality of human capital

The government should increase the quality of human capital in three main ways. *First*, is should increase state investment in access to higher education, health, social services. For instance, the academic curriculum has to be more in line with the economic realities and the process of higher education reform should emphasize vocational and technical training. Specifically, we suggest the creation of Specialized Vocational Training Centers in all of the main clusters, in close collaborations with academic institutions. *Second*, it should implement a life-learning approach to education, by making constant training and specialization available beyond the formal academic programs at university level. For instance, teaching staff at Turkish universities should have access to permanent training both in Turkey and abroad, and should be encouraged to collaborate more closely with foreign universities. *Third*, the government should promote greater gender equality by making education more easily accessible to girls; this could be accomplished through coordinated informational campaigns that would communicate more effectively to the general public of the benefits associated with education.

6. Low R&D and innovation

This major constraint could be addressed by pursuing a three-pronged approach. *First*, the curriculum of universities and research institutions should be made much more relevant by linking it to industry needs. *Second*, the government should encourage a much closer collaboration among universities, research institutions and clusters by establishing tailored

educational programs, joint R&D projects and on-site training. *Finally*, it should provide financial incentives for investing in R&D such as tax deductions, tax credits, loan guarantees.

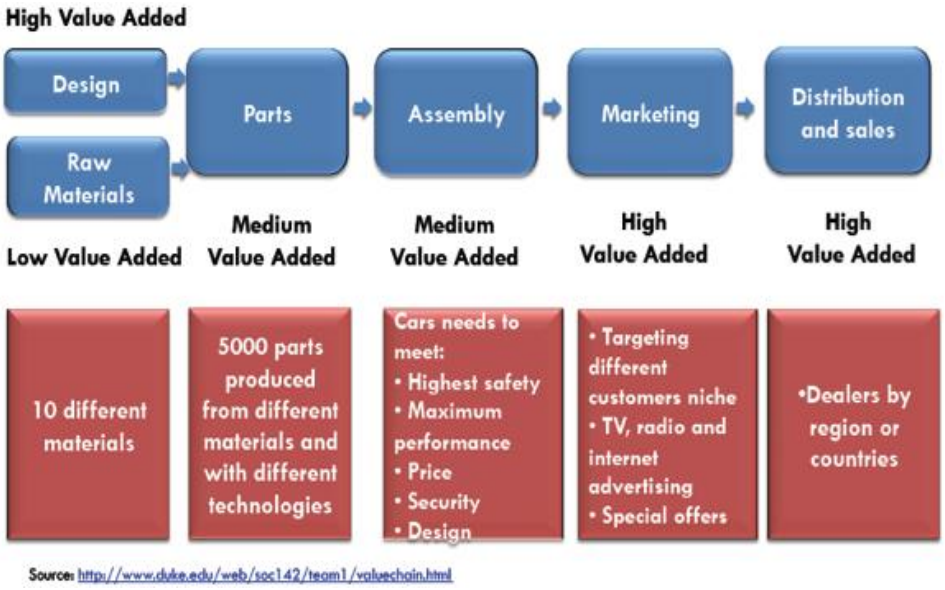
7. Cluster sophistication and strategy are not a priority

A greater degree of top government involvement is needed to push for a cluster development approach. The government should work together with the private sector and the IFCs to develop a comprehensive cluster development strategy. In this direction, the responsible government institutions should have more mandates to promote interaction with the IFCs representing the private sector and also provide support for missing linkages both within and across clusters.

All these measures are important in increasing the productivity of the economy, fostering its structural transformation and decreasing the size of the informal economy.

4. Global Automotive Industry

Figure 9: Supply Chain in Automotive Industry



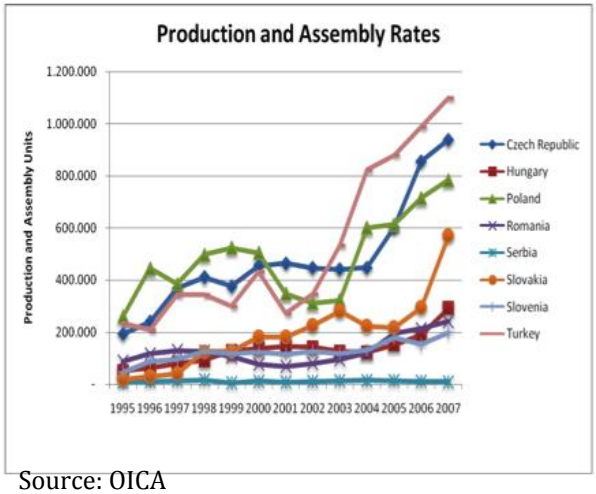
Value Chain. Global auto industry consists of smaller industry groups and organized in 6 major value chain components. Production starts with low value-added input of 10 raw materials. Production of approximately 5000 different auto parts has medium value

added. This phase is followed by assembly, another medium value added industry. Assembly process should ensure maximum safety and security, design and competitive price of the final product. Most developing countries concentrate in these low and medium value added industry. The highest value added phases are design, marketing, distribution and sales. These phases are the most sophisticated with highest intellectual inputs and R&D expenditures, therefore with the leading presence of Germany, France, Italy, Japan, South Korea and USA. Targeting of different market niches is important because of increasing customer differentiation and sophistication: buyers of SUV-s, luxury cars, sport cars, small city cars, energy efficiency concerns, etc. Distribution and sales requires wide network of dealerships by countries and regions. (Duke University, Global Value Chain) Turkey's comparative advantage in the global value chain lies in the raw materials, parts and assembly stages, but has to improve in the design, marketing and distribution and sales in order to become competitive along the entire value chain.

World's auto production is concentrated as follows: 32% Europe, 25% North America, 37% Asia, 4% South America, 2% other. The major trend in the European automotive industry is the outsourcing to Eastern Europe of the production of low and medium value added activities mainly because of cheaper and skilled workforce. Furthermore, following the collapse of communism and opening of economies, the Eastern Europe has developed high domestic demand for cars. (Automotive News Europe, 2005).

Most Central and Eastern European countries have attracted FDI to set up assembly plants of major automobile producing companies. Turkey, who started modestly, has surpassed two major car producers Poland and Czech Republic in 2003. Since then, it has

the highest production and assembly growth rates and the highest absolute number of produced vehicles in the region.



Source: OICA

Figure 10: Production and Assembly Units between 1995-2007 in Europe

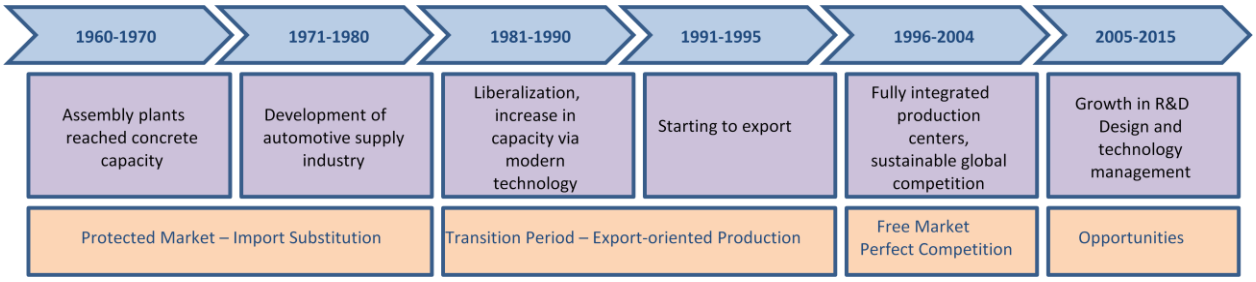
Turkey's major competitors in the region are Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia and Slovenia with similar GDP level and within medium end of value chain. For example, major competitive advantages of Poland, Czech Republic and Hungary compared to Turkey are higher income and more sophisticated domestic demand, more qualified labor force and extensive own R&D base and technical expertise. These countries have also highly relied on FDI, but have developed a bigger domestic R&D capacity. They have also well-established export markets and distribution channels in EU.

5. Turkish Automotive Cluster

5.1 Brief History

In 1950s, 1960s and 1970s, the cluster was protected from foreign competition along with import substitution policy. In 1980s, the liberalization took place and export-oriented policies were implemented. Along with the introduction of modern technology, the cluster started to export in the 1990s. After joining the EU Customs Union in 1996, Turkish plants were transformed into fully-integrated production centers. R&D activities were prioritized, particularly after 2005. (Automotive Manufacturers Association-OSD, 2010)

Figure 11. Brief Timeline[2] of Turkish Automotive Cluster

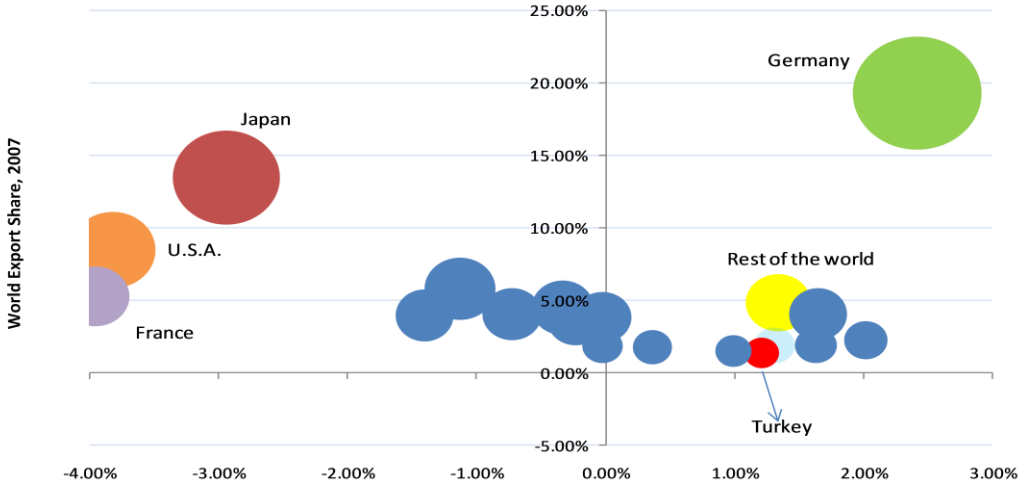


Source: OSD

5.2 Performance

Turkish Automotive cluster was the 18th largest in the world with an export value of $17.6 billion in 2007. Its export share grew by 1.37% from 1997 to 2007, with Turkey becoming the 16th largest automotive manufacturer in the world by 2010. (Institute for Strategy & Competitiveness, 2010)

Figure 12. Change in Turkey's Share of Exports (1997-2007)



Source: Prof. Michael E. Porter, International Cluster Competitiveness Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director. Underlying data drawn from the UN Commodity Trade Statistics Database and the IMF BOP statistics.

[2] First, TürkWillys Overland Ltd Company started to assemble jeep & truck for Turkish army in 1954. Second, Otosan started truck production in 1955. In 1961, Turkish State Railways produced the first Turkish passenger car, Devrim. In 1962, Istanbul Otobus started to manufacture Magirus bus. Otosan started to manufacture a passenger car, 'Anadol', and MAN Turkey and Karsan were founded in 1966. Mercedes-Benz Turk, Tofas and Oyak-Renault were established successively in 1967, 1968 and 1969. Toyota, Hyundai Assan and Honda successively opened plants in Sakarya, Izmit and Gebze in 1994, 1997 and 1998. (Undersecretariat for Foreign Trade, 2010)

In vehicle production, the compound annual growth rate (CAGR) was around 22% in the last decade. Except for the economic downturns of 2001 and 2008, there was an upward trend in production. Early comers such as Ford, Renault and Fiat make almost 75% of total production. (OSD, 2010)

Figure 13. Main Producers

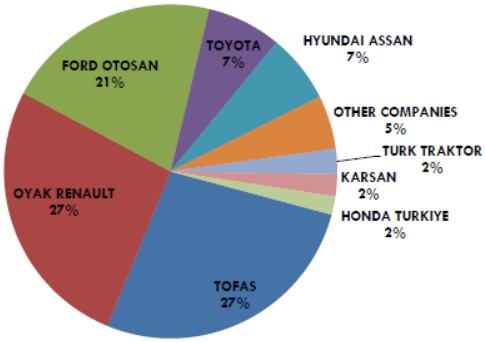
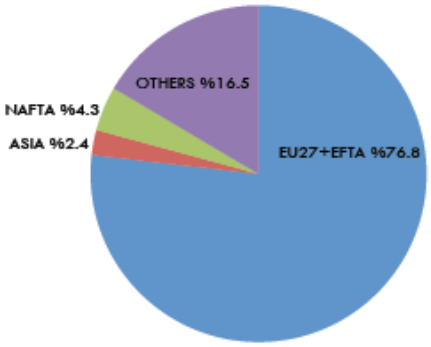


Figure 14. Export Destinations



Source: OSD, 2010

The domestic market CAGR was around 15% annually in the last decade, and is likely to grow more in the future because almost three quarters of the population do not own a car yet. 57% of domestic consumption comes from imports. (OSD, 2010)

Almost 70% of domestic production is exported primarily to European countries, and today Turkey is Europe's leading bus manufacturer, 3rd-largest light commercial vehicle manufacturer, 6th-largest truck manufacturer, 3rd-largest truck market and 7th-largest car manufacturer. (European Automotive Manufacturing Association, 2010) Not surprisingly, the primary producers in the cluster are also the main exporters. Today, Toyota, Ford- Otosan, Tofas-Fiat and Oyak-Renault rank among Turkey's top ten exporting companies. (OSD, 2010)

The export share of auto parts sub-cluster reached almost 30%. There are about 1,120 local auto parts manufacturers, 70% of which are small and medium enterprises. Also, around 192 foreign companies operate in the Turkish auto-parts sub-cluster. (TAYSAD, 2010)

Location of the Cluster. The cluster is mainly concentrated in the Marmara region, around Istanbul, Bursa and Adapazari, due to good technical, transportation, logistical and educational infrastructure.

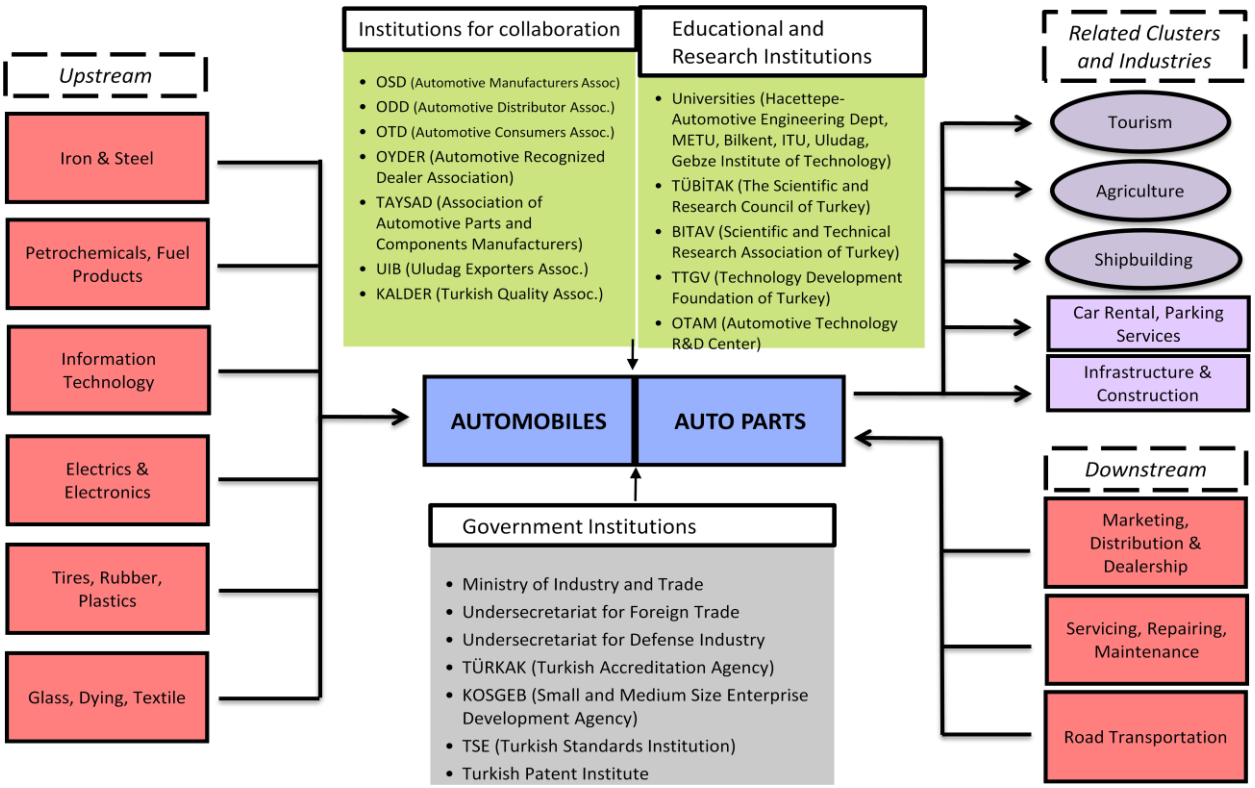
Ownership forms. Most car producers in Turkey are joint ventures. For instance, Oyak of Turkey holds 49% and Renault of France holds 51% shares of Oyak-Renault. Koc Holding of Turkey and Fiat Group Automobiles of Italy equally own 37.8% of Tofas, with the remaining 24.3% owned by other companies. Ford Motor Company of the USA and Koc Holding of Turkey equally own 41% of shares of Otosan. Toyota Turkey and Honda Turkey are foreign direct investments from Japan, and Temsa and Karsan are local manufacturers in partnership with foreign companies. (OSD, 2010)

5.3 Cluster map

Turkish automotive cluster has become increasingly sophisticated since its inception in the 1950s. It is mainly composed of automobile sub-cluster and auto parts sub-cluster.

Both automobile sub-cluster and auto parts sub-cluster are buttressed by upstream supporting industries such as iron & steel, petrochemicals, information technology, electronics, tires, rubber, plastics, glass, dying, textile and downstream supporting industries like marketing, distribution, dealership, servicing, repairing, maintenance and road transportation. Also, the cluster has strong linkages with certain related industries such as infrastructure, construction, car rental and parking services, and with some related clusters like tourism, agriculture, and shipbuilding.

Figure 15. Turkish Automotive Cluster Map



The cluster has connections with various IFCs such as Automotive Manufacturers Association (OSD), Automotive Distributors Association (ODD), Automotive Consumers Association (OTD), Automotive Recognized Dealer Association (OYDER), Association of Automotive Parts and Components Manufacturers (TAYSAD), Uludag Exporters Association (UIB), and Turkish Quality Association (KALDER).

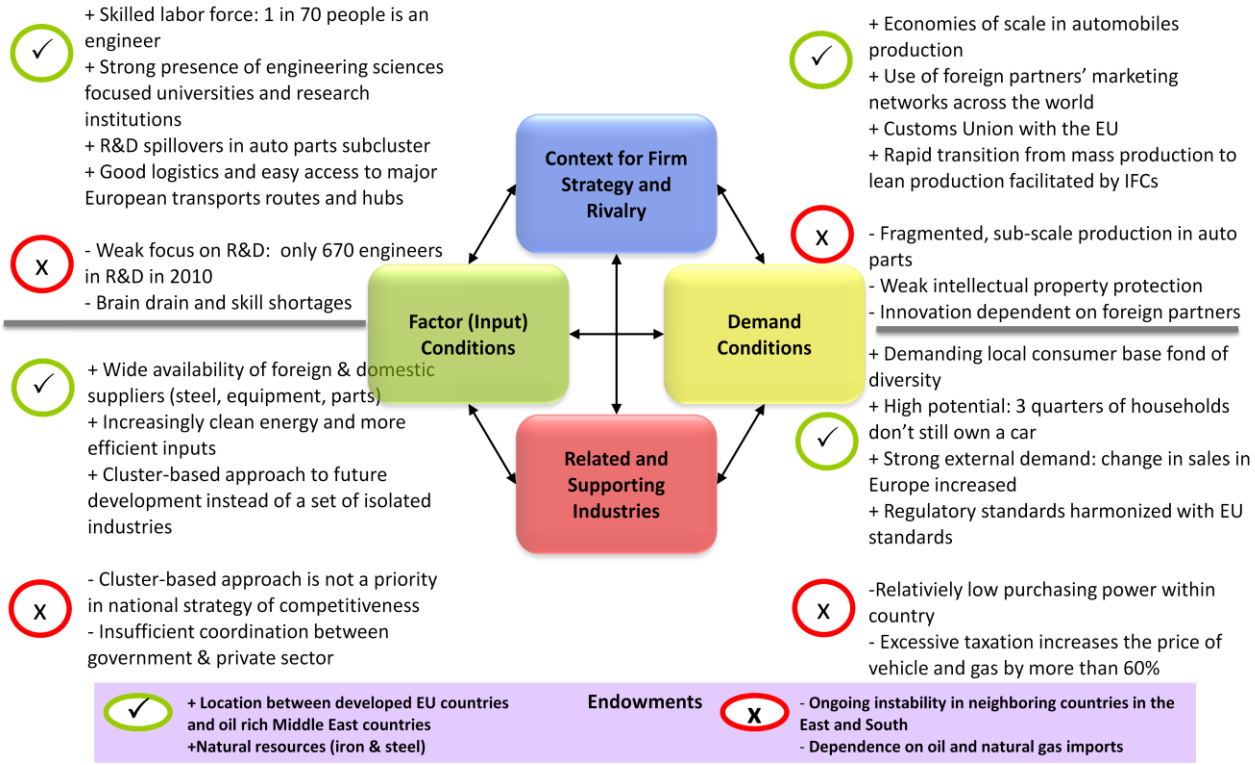
It has linkages with educational and research institutions such as Bilkent University, Middle East Technical University, Hacettepe University (Automotive Engineering Dept), Istanbul Technical University, Uludag University, Gebze Institute of Technology, The Scientific and Research Council of Turkey (TÜBİTAK), Scientific and Technical Research Association of Turkey (BITAV), Technology Development Foundation of Turkey (TTGV), and Automotive Technology R&D Center (OTAM).

Besides, the cluster has relationships with government institutions such as the Ministry of Industry and Trade, Under-secretariat for Foreign Trade, Under-secretariat for Defense Industry, Turkish Accreditation Agency (TÜRKAK), Small and Medium Size Enterprise Development Agency (KOSGEB), Turkish Standards Institution (TSE), Turkish Patent Institute.

5.4 Cluster Diamond

The Turkish automotive cluster has the potential to meet growing domestic demand and develop further along the value chain. However, it is constrained by weak intellectual property protection, dependency on foreign companies for innovation, marketing and distribution networks. On the other hand, foreign partnerships played an essential role in the cluster's transformation to become part of the global car market. (OSD, 2010)

Figure 16. Turkish Automotive Cluster Diamond



A. Factor/Input Conditions. The cluster has strong factor conditions such as skilled labor force, focus on engineering sciences, and well-developed logistics servicing the cluster. (OSD, 2010) Relative to automobile sub-cluster, where only 670 engineers were involved in R&D as of 2010, the level of R&D activities is good in auto parts sub-cluster, which is dominated by a large number of small companies. (OSD, TAYSAD, 2010). The companies involved in auto parts production are facing more competition than automobile producers. Entry barriers into auto parts production are lower than in automobile production. However, as suppliers, parts producers have to meet the needs of large car producers and compete with big automobile manufacturers also producing auto parts and enjoying economies of scale. Therefore, small auto parts producers are forced to invest in R&D activities and employ high-skilled labor force. (Interview with TAYSAD, 2011)

B. Context for Firm Strategy and Rivalry. *First,* the cluster, enjoying the foreign partners' marketing networks across the world, is very well integrated into the world market, and in particular has good connections with European market due to the Customs Union. *Second*, with the help of IFCs, the cluster was transformed from mass production to lean production focused on increasing efficiency, and using empirical methods to decide what matters, rather than uncritically accepting pre-existing ideas. *Third*, in the automobile production largely dominated by large global companies, the cluster is able to reduce production costs by enjoying economies of scale. On the other hand, in the auto parts sub-cluster dominated by small companies, production is fragmented and has yet to achieve economies of scale. *Finally*, small companies suffer from weak intellectual property protection due to the relatively high

cost of lawsuits. In automobile production, the cluster is primarily dependent on foreign partners for innovations. (OSD, 2010)

C. Demand Conditions. Although there is a potential in domestic market, where 75 percent of the population does not own a car, the purchasing power of Turkish consumers is lowest in Europe. (Alba, Park, 2005) Also, because of excessive taxation, vehicle and gas price have recently increased by 60%, reducing domestic demand. The cluster has very strong connections with the European market, since regulatory standards are harmonized with EU.

D. Related and Supporting Industries. The cluster has easy access to both domestic and foreign suppliers, and is served by strong linkages with related and supporting industries. These provide both knowledge and skill transfers and create demand for its goods and services. In this respect, information technology, electronics and shipbuilding offer skill transfers, whereas road transportation, tourism, infrastructure, construction, agriculture, car rental and parking services create demand for car and auto parts producers. (Interviews with OSD and TAYSAD, 2011)

5.5. Challenges and Recommendations

1. Low level of collaboration between government and private sector

The policy-making process needs to be improved to include the inputs from the private sector. For instance, when developing a new regulation that will impact the business environment, the government should initiate an official working group that includes all relevant stakeholders. In addition, to strengthen the relationship between government and private sector, the IFCs should be empowered by giving them a larger role in the decision-making process. For instance, if Automotive Manufacturers Association, together with Association of Automotive Parts and Components Manufacturers, are well-recognized by the

government as the coordination bodies with the private sector, they can contribute more effectively to address private sector needs regarding the quality of infrastructure, skilled labor force and R&D projects.

2. Weak relationship with educational institutions

Companies in the automotive cluster should exploit the innovation and R&D capacity of large educational and research institutions to a much greater extent. In this endeavor, the government should encourage the cooperation between cluster and these institutions by providing grants for joint applied-research projects, by subsidizing the use of state-of-the-art laboratories by private sector entities, and by providing tax breaks to companies that collaborate with educational institutions. For instance, there are already successful examples of collaboration between Renault, Tofas and Ford, and Gebze Institute of Technology located near large industrial cities of Istanbul, Bursa and Adapazari. (Interviews with OSD and TAYSAD, 2011)

Also, if these linkages are improved, the educational institutions will know better what the cluster expects from new graduates, and develop their curricula accordingly. Since the automotive cluster is a major employer of mechanical engineers, it is essential to have specialization in automotive engineering as part of university curricula, and provide practical training for students in automotive companies. For example, in response to industry needs, a specialized automotive engineering department was established in Hacettepe University in 2005. Such efforts should be replicated elsewhere.

Moreover, automotive cluster employees need to have access to constant, on-the-job training programs, which can be done in tandem with IFCs and educational institutions. For instance, the Automotive Manufacturers Association and the Association of Automotive Parts

and Components Manufacturers can convey the needs of private sector to develop training programs, and pool resources of their members to buy this service from educational resources. The main responsibility here resides with the IFCs. (Interviews with OSD and TAYSAD, 2011)

3. Sustaining Productivity

Labor unions in EU countries oppose the transfer of production to Turkey, and some car producers plan to move to other emerging economies such as China and India which experience rapid productivity growth. Therefore, in order to secure sustainable productivity growth, the cluster should first offer training programs to increase the skill level of labor force employed in R&D departments. Second, the government should extend cheaper long-term loans so that car producers can have easy access to modern machinery. The car assembly and parts manufacturing are capital intensive production processes, where the use of modern machinery can contribute to productivity growth in the cluster. In this respect, the responsibility lies with educational institutions and the government. (Interviews with OSD and TAYSAD, 2011)

4. Brain drain

The priority of the labor unions is to minimize the unemployment rate in the cluster, especially during the global financial crisis. Thus, they are not primarily concerned with making their members earn higher wages. Rather, their concern is to prevent their members from losing job. However, due to wage levels below productivity, skilled engineers indispensable for innovations prefer to move to Europe where they are offered considerably higher wages. In this respect, labor unions should play an active role in persuading the companies to provide more competitive wages, company stock options and non-pecuniary

incentives to high-skilled employees. Maintaining high-skilled engineers in the cluster with competitive wages, especially in R&D departments, is essential for bringing about more innovations in the cluster. In this regard, the labor unions are mainly responsible for solving this problem. (Interviews with OSD, 2011)

5. Mergers and acquisitions

Mergers and acquisitions of small companies with foreign companies will open the cluster further to the world market and expand the customer base. Together with having a larger customer base, small auto parts manufacturers will especially benefit from economies of scale. (Interviews with TAYSAD, 2011)

However, the unused capacity has increased in automobile production due to global financial crisis, and only 42% of actual capacity was used in 2009. (OSD, 2010) Therefore, the cluster should look for new foreign partners, as well as European partners to expand its market share in the world. Moreover, during the current global recession, the cluster should prioritize enhancing its R&D capacity instead of increasing production capacity. (Interview with OSD, 2011)

Moreover, the mergers with more advanced foreign companies is likely to have positive technology spillovers for the cluster, and the inclusion of technologically advanced foreign companies will allow the cluster to produce higher value-added goods. For instance, after Toyota and Honda opened plants in Turkey, the cluster, and in particular the auto parts sub-cluster, was transformed from mass production to lean production, and began to create more value added. In parallel, due to mergers and acquisitions, the local companies became more subject to competition, and small firms in auto parts are becoming increasingly competitive.

6. Weak protection of intellectual property rights

Even if small companies invest in R&D activities, other competitors in the cluster sometimes imitate their products. Even big automobile producers are faced with this problem, but it is less pressing as they can financially afford to prosecute legally intellectual property violations. Therefore, IFCs such as the Automotive Manufacturers Association and Association of Automotive Parts and Components Manufacturers should employ lawyers and provide legal assistance especially to small companies against intellectual property violations. This is the field, where IFCs should take major responsibility, and can generate big impact.

7. Excessive Taxation

Special Consumption Tax and VAT raise the domestic purchase price of a vehicle to 60-100 percent above the pre-tax price. For instance, the price of Ford Focus 1.6 Trend without tax is €15,259 in Germany, whereas it is €11,000 in Turkey and 11,850 in Finland. The German government imposes 16% tax, making the final price of car €17,700 and Turkish government puts 64.6%, making the price €18,132. Moreover, a German citizen can buy this car in Finland and make the final price €13,746 in Germany by paying only 16% tax.

If, in this context, Turkey becomes a full member of the EU, it will likely acquire a larger share of the European market because of lower price before taxation. Turkey also has higher tax in luxury cars when compared to EU area. Tax on gas is also high in Turkey. Therefore, the government should pursue a smart tax regulation in order not to discourage consumer's propensity to purchase new car. In this respect, the government should design a taxation system based on potential gas emissions instead of a system based on the engine size of vehicles, and should extend tax incentives to the buyers of vehicles with less gas emissions.

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