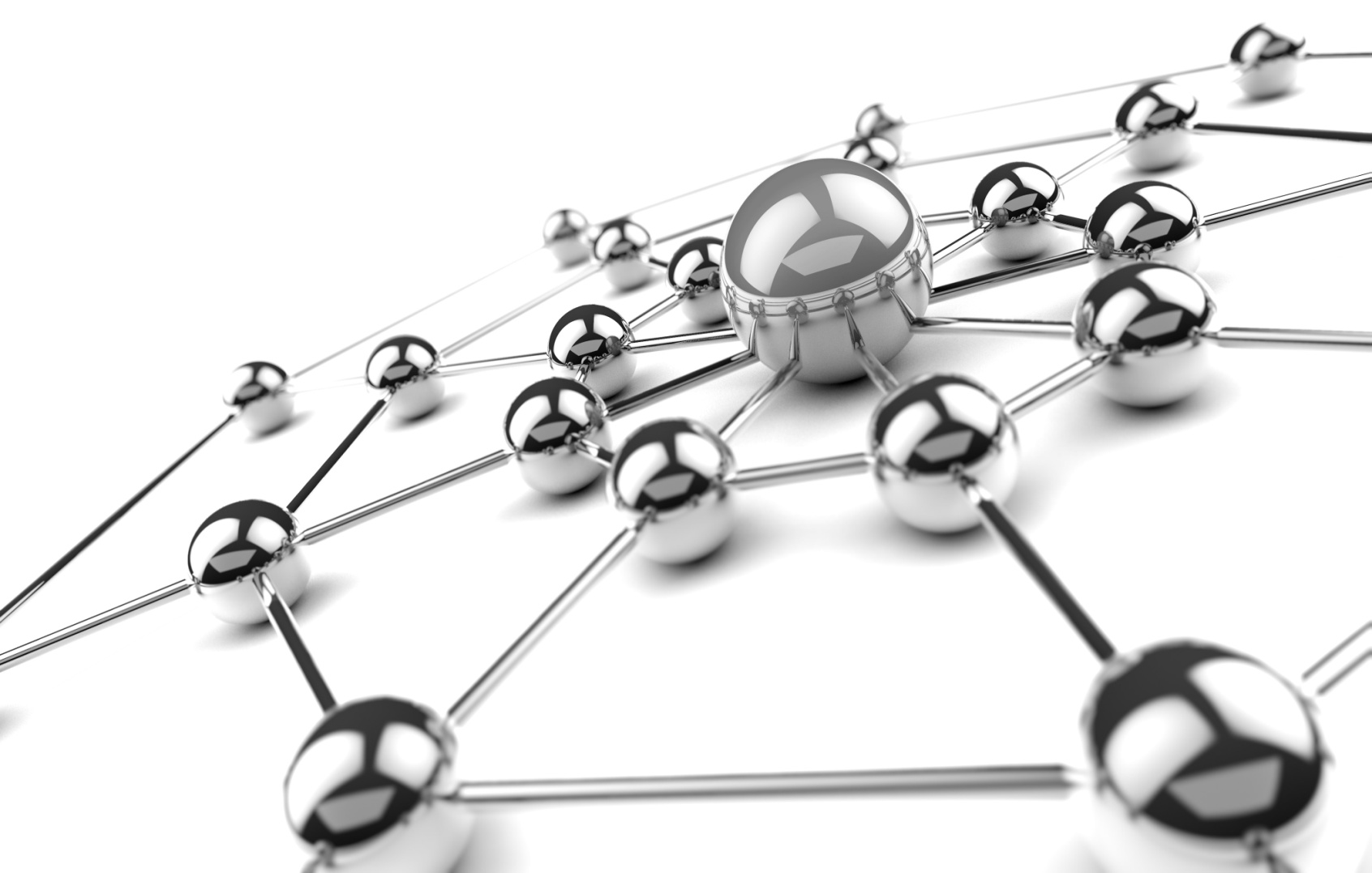


**Institute for Trade Studies and Research**

**(ITSR)**

**MANUFACTURING SECTOR DEVELOPMENT ISSUES IN IRAN: POLICY IMPLICATIONS**

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**Institute for Trade Studies and Research, Tehran**

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# 1. IRAN'S GLOBAL POSITION: COMPETITIVE FORCES AND MACROECONOMIC INDICATORS

1-1.The Islamic Republic of Iran (hereafter referred to as Iran) is considered to be an Energy Superpower, accounting for 10 and 15 percent of the world’s proven oil and gas reserves. Regarding mineral reserves, it holds 1st largest zinc reserves and 2nd largest copper reserves while possessing 10th largest Aluminum and 11th largest iron ore and lead reserves. The economy enjoys not only a good position in factor market, but also faces an advantageous demand condition including a market of 78.9 million people with an urbanization rate of 73 percent as well as a good access to 15 neighbor countries (Including CIS) with a total population of more than 420 million people.

1-2. endowed with aforementioned factor advantages, the economy is regarded as the 2nd largest economy in MENA region as well as the world's 18th largest economy in **GDP** in terms of **purchasing power parity** at $1357bn in 2015. The economy has been contributing less to the world GDP within recent years (table 1) as a result of considerable reductions in the quantity and the scale of production. More precisely, tightening economic sanctions on Iran made it hard for the economy to get through exchange rate shocks, increased transaction costs and so on, leaving little room to prevent the recessionary gap.

Table 1 Iran’s GDP and Its Global Position (2009-2015)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1388  2009/10 | 1389  2010/11 | 1390  2011/12 | 1391  2012/13 | 1392  2013/14 | 1393  2014/15 | 1394  2015/16 |
| Share of World GDP | 1.4 | 1.4 | 1.42 | 1.28 | 1.22 | 1.2 | 1.21 |
| Economic Growth | 3 | 6.5 | 4.3 | -6.8 | -1.9 | 3 | -1.5 |

Source: World Bank (row 1) and Central bank of Iran (row2)[[1]](#footnote-1)

1-2. international sanctions on Iran’s economy are blamed for contraction in GDP and the decline in number of manufacturing business units, prompting a sharp upswing in **inflation** (to 39.3 percent in 2013). More precisely, exchange rate shocks during 2010-12, caused a dramatic rise in import prices in local currency. The resulting growth in consumer prices, together with the cost push inflation induced by the implementation of subsidy targeting plan (in 2011), made Iran the country with the second highest inflation in the world in 2013 (39.3 percent in 2013 compared with 10.1 percent in 2010). However, in 2016-2017, there was little sign of inflationary pressures as the economy was suffering from recessionary condition.[[2]](#footnote-2)

**Global competitiveness index**

1-3. to get a clear picture of Iran's performance in terms of **global business indices,** it is noteworthy to go through some ranking results for Iran depicted in Figure (1).[[3]](#footnote-3) According to the figure, in none of the 5 global indices Iran stands at a competitive position.

**120 out of 190**

**155 out of 180**

**76 out of 144**

**96 out of 160**

**132 out of 136**

**04**

**Index of economic freedom**

**Global enabling index**

**Logistic performance index**

**Ease of doing business Index**

**Figure 1 Iran's global position in terms of the selected indices**

Some part of the problem can be attributed to sanction pressures (including *problems with foreign market access*) while the rest is caused by some factors *internal to the economy* such as: low level of efficiency enhancers (labor market efficiency, goods market efficiency, and financial market development), deficiencies in technology readiness, business sophistication; weak rule of law and autarkic trade and investment policies as well as rising business regulations. However, it is anticipated that loosening of economic sanctions on Iran will foster the economy in terms of mentioned global indices.

1-4. Examining the way Iran has proceeded on the way of **competitive Industrial performance** (CIP) indicates that its global position has worsened off since 2010 as a result of economic sanctions, after enjoying a dramatic improvement during 2000-2010.[[4]](#footnote-4) Statistically, ranking 89 (out of 144) in terms of competitive Industrial performance in 2000, Iran jumped 4 places to 57th in 2010; however, it began losing ground and fell to 66th place in 2014. The drop in position has, to a great extent, been affected by a decline in manufacturing investments during the last decade especially during the period of tightening economic sanctions on Iran.

1-5.Regarding the impact of Iran's economy on world **manufacturing value added**, its contribution rose from 9.4 percent in 2006 to 10.2 percent in 2014. This, compared to the share of Turkey or even Saudi Arabia (16% and 12% respectively in 2014), is rather small.

1-6. in regards to **manufactured exports**, again there had been a growing contribution from 14 percent in 2006 to 33 percent in 2010, and again a sharp fall to 19 percent in 2014. Compared with the contribution of Turkey (87%), Pakistan (81%) and Saudi-Arabia (19%) to manufactured export in 2014, Iran records a much lower performance, however, in comparison with and Kazakhstan (22%), it is somehow on a similar position.

1-7.**Other industrial performance indicators** for Iran are summarized in table 2, to gain a better understanding, a comparison with corresponding figures in Turkey and Saudi Arabia[[5]](#footnote-5) is also included.

Table 2.Selected Industrial Performance Indicators in Iran, Turkey and Saudi Arabia

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Indicators | Iran | | Turkey | Saudi Arabia |
| **2006** | **2014** | **2014** | **2014** |
| 1 | **Manufacturing Value Added per capita (2005$)** | **314** | **708** | **1834** | **2703** |
| 2 | **Manufactured Exports per capita (US$)** | **132** | **340.7** | **1823.2** | **2434.8** |
| 3 | **Share of MT and HT[[6]](#footnote-6) exports in total exports (%)** | **25.15** | **31.6** | **40.5** | **35.7** |
| 4 | **Share of MT and HT activities (%)** | **41.82** | **40.5** | **30** | **41.2** |
| 5 | **Share of Manufacturing Value Added in GDP (%)** | **10.9** | **10.2** | **16** | **12** |
| 6 | **Share of Manufactured Exports in Total Exports (%)** | **14.78** | **19.6** | **87.6** | **19** |

**Source:** UNIDO, Industrial Development Report

According to the table, Iran records an acceptable performance in terms of share of medium-and high-tech activities and manufactured exports compared with Turkey and Saudi Arabia. However, it should be noted that it is through the high contribution of medium-tech activities and medium–tech exports that the resulting indicators for Iran (included in rows 3 and 4) show good records.

# 2. IRAN'S ECONOMIC AND TRADE STRUCTURE



**Source:** Central Bank of Iran

2-1 **Iran’s economy** is characterized by a large and expanding service sector, a considerable hydrocarbon sector, medium-scale agriculture and small scale mining sectors and finally a medium-sized industry sector. For the case of oil sector, it should be noted that although it plays a key role in the economy, it is much less than other oil producing countries in the MENA region. Statistically, Iran's oil sector

**Figure 2. Percentage contribution to GDP of economic sectors in Iran (2014)**

accounts for 15 percent of Iran’s economy which compares with 30 percent in the United Arab Emirates, 50 percent in Kuwait, and 51 percent in Qatar.

2-2.To get a general picture of the long run dynamics of **Iran's economic structure**, table 4 compares sector wise growth rates in this economy within a period of two decades.

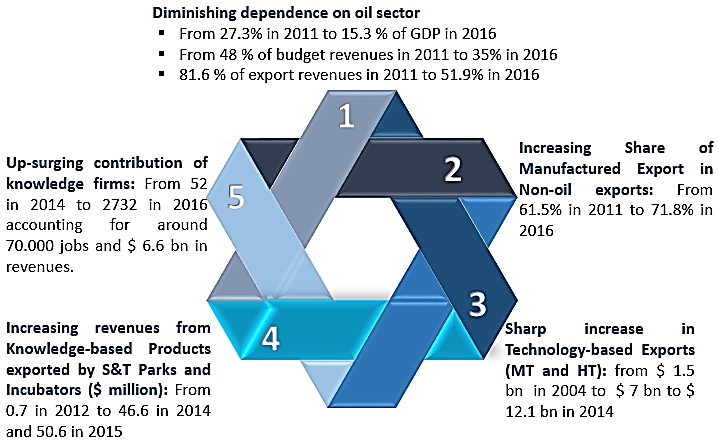
Table 3. Changes in GDP Contribution by Selected Economic Sectors, 1995-2015

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sector | | 1995-99 | 2000-2004 | 2005-2010 | 2011-2014 |
| Industry and Mining | Manufacturing | 7.4 | 10.6 | 7 | 0.3 |
| Mining | 5.7 | 6.2 | 13.4 | 7.1 |
| Construction | 2.4 | 8.2 | 5.6 | -1.2 |
| Agriculture | | 2.2 | 4 | 1.9 | 3 |
| Oil | | -1.6 | 3.5 | 0.2 | -10.6 |
| Economic Growth | | 2.6 | 5.8 | 4.8 | -0.3 |
| Economic Growth (excluding oil) | | 4.3 | 6.6 | 5.9 | 1.5 |

**Source:** Central Bank of Iran

According to the table, there was a sharp decline in the growth rate of manufacturing value added and accordingly GDP growth in Iran during 2011-2014, led by a sharp decrease in industrial capital formation (-9 percent in the aforementioned period).[[7]](#footnote-7) However, considerable contribution of both services and manufacturing sectors in 2014 triggered a rebound from recessionary condition in Iran.[[8]](#footnote-8)

2-3.There seems to be a considerable **change in the economy's structure** (Figure 3):



**Figure 3. Structural dynamics in Iran's Economy**

According to Figure 3, thanks to the economic sanctions, there has been a diminishing dependence on oil sector from 27.3 percent of GDP in 2011 to 15.3 percent in 2016. Also, the economy is experiencing a new dynamism towards growing contribution of manufacturing sector especially that of Medium- and High-tech products.

2-4. a look into **Iran's** **foreign** **trade structure** shows that Iran’s aim is to shift from monoculture economy stage through expanding non-oil exports to diversification of its export revenues. More clearly, dependence on nonoil export has increased from 19 percent in 2011 to about 48 percent in 2016. Of this amount, manufactured export has been contributing the most (70 percent in 2016). Table 3 includes nonoil export combination and its structural changes.

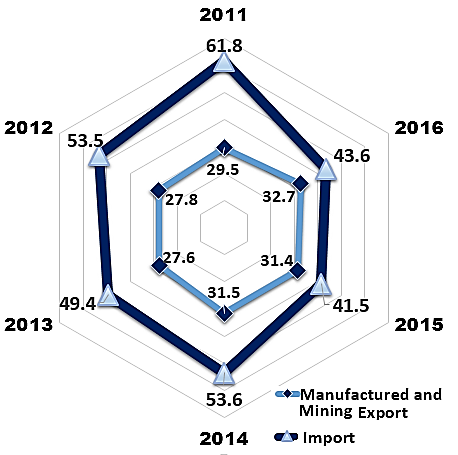
Table 4. Non-oil product export combination in Iran (2011 and 2016) Unit: billion dollar

| 2016 | 2011 | Products |
| --- | --- | --- |
| 7.4  (16.8) | **10**  (22.8) | **Liquid Gas** |
| 16.4  (33.7) | **15.1**  (34.5) | **Petrochemicals And Natural Gas** |
| 14.5  (33) | **11.9**  (27.2) | **Manufactured Products Excluding Petrochemicals** |
| 0.37  (0.8) | **0.59**  (1.3) | **Carpet And Handicrafts** |
| 3.9  (8.9) | **3.7**  (8.4) | **Agricultural Products** |
| 1.4  (3.2) | **2.5**  (5.7) | **Mining Products** |
| 43.97  (100) | **43.8**  (100) | **Total** |

**Source:** Trade Promotion Organization of Iran

\* Figure in parenthesis shows share in non-oil product export

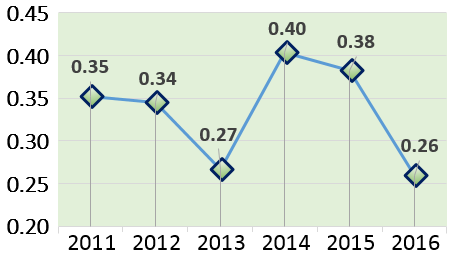
According to the table, there is an improvement in the contribution of manufactured export to Iran's non-oil product export. However, it is not still enough to cover cost of imports. Statistically, on average 61 percent of import expenses has been covered by Manufactured and Mining export revenues during 2011-2016. Figure 4 depicts detailed information on the matter.



2-5. to get the way nonoil trade is contributing to Iran's economy, it is better to go through **terms of trade** to get the following important fact:

**Figure 4. Import Expenses Coverage through Manufactured and Mining Export (2011-2016); Figures in Billion Dollars**

"Although Iran is developing on the way of *export diversification*, there still is a long way ahead in view of *terms of trade*."



Statistically, export unit prices has been to the best case less than 40 percent of the import unit prices which indicates the dominant share of low- value exported products. In this regard, little contribution of high-tech export products (equal to 0.7 percent during 2011 to 2016) as well as dominant share of low-tech and no-tech products (about 27 percent during 2011-2016) can be regarded as a good proof.

**Figure 5. Ratio of Export to Import Prices (2011-2016)**

2-6. a look into **Iran’s trade position** **and its main partners** in international markets shows high market concentration, i.e. the most part of its international transactions is made with Asian parties (contributing to approximately 90 percent of exports and 80 percent of imports in this economy). Considering the case by country shares, Iran's five top export markets in 2011-2016 included China, Iraq, United Arab Emirates, India and Afghanistan, which comprised, on average, 64 percent of Iran’s total export markets in the aforementioned period. In other words, high degree of concentration has become the inherent feature of Iran’s export markets. Putting the matter in more concrete terms, although Iran possesses an appropriate position in terms of the number of export partners (114 countries), it makes its transactions in concentrated export markets (the value of Iran's *Herfinal Hirschman Market Concentration Index* equaled 0.12 in 2011),[[9]](#footnote-9) whereas there are many other countries including Turkey (0.04%), Pakistan (0.07%) and the United Arab Emirates (0.09%) that are doing international transactions in more competitive conditions than that of Iran. The immediate impact of this issue is the increased economic vulnerability and a heavy toll on the terms of trade.

2-7. on the **import sector**, there also exists the problem of high market concentration. More precisely, United Arab Emirates and China are the main sources of Iran's total imports (47.1 percent in 2016). Regarding high share of primary goods in Iran's total import (86 percent in 2014), high degree of concentration in import markets could be a potential source of import price increases adding to severity of cost pressures in the production sector.

Finally, it should be noted that concentrated structure of trade markets is not a new issue and has been the inherent feature of Iran's trade sector, but it was tightening economic sanctions on Iran which *aggravated the matter to become a challenge*. Hence, it is anticipated that with the success of the nuclear agreements and extension of relations with European and other former trade partners, it becomes more feasible to diversify trade markets.

# 3. MANUFACTURING SECTOR IN IRAN

3-1.To get more precise on the way manufacturing sector has contributed to Iran's economy, in Figure 6 the **share of Manufacturing in GDP** is calculated in both current and constant prices. As depicted in the Figure, the two trends are totally different.

The contribution of Manufacturing to Iran's GDP in constant prices has been increasing (from 10.4 percent in 2004 to 12.4 percent in 2016). But this doesn't mean that there had been industry expansion in Iran's economy, because price controls as well as launching manufactured products with less value added than before has made price increases in this sector slower than that of some .



**Source:** Central Bank of Iran

**Figure 6. Contribution of Manufacturing to GDP in Iran (2004-2016)**

Other economic sectors. Hence, when there is no price deflation and calculations are based on current prices, it ends up with a declining industry contribution (decreasing from 16.3 percent in 2004 to 13 percent in 2016). Strictly speaking, domestic terms of trade for manufactured products is worsening off compared with that of other sectors in Iran (ratio of manufacturing price index to PPI equal to 0.95 in 2015).

3-2. worsening terms of trade in the manufacturing sector within the last decade has led to a sharp decrease in **manufacturing capital formation** as well. Statistically, manufacturing and mining sectors represented, on average, 17.5 percent of total investment in the economy in mid 2000s. However, the figure fell sharply to 10.3 percent in 2012, causing real estate sector contribution to capital formation to reach 44 percent.

This happened as a result of different factors, the most important of which was decreasing return on manufacturing projects as well as the shift in investment preferences towards those of shorter payback periods, i.e. real estate sector compensated for accelerating inflation. But the story did not end here. Less capital formation in manufacturing sector made it harder for the manufacturing production to meet domestic demand. So, it made it necessary to increase imports to keep the supply-demand balance in the economy. The increase in import, through limiting the demand for domestic production, discouraged investment in manufacturing sector to a greater extent.



**Source:** Central Bank of Iran

**Figure 7. Investment in Iran's Industry Sector, 2004-2016**

In spite of rising in 2013-2016, capital formation in Iran's manufacturing sector is still insufficient, lagging far behind where it was in 2006 in both current prices (81 percent) and real prices (52 percent).

3-3. regarding the **contribution of manufacturing to employment** in Iran's economy, similar results could be achieved: *manufacturing in Iran has rather small* contribution *to employment and the contribution has changed a little*. It used to be 6.01 percent of total employment in 2004 but ticked up to 6.1 percent in 2014 (1.279 million jobs in 2004 vs. 1.303 jobs in 2014). There is also another issue, concerned with the annual growth of manufacturing employment. It has been as low as 2.25 percent on average to meet the employment needs of the economy, which means it takes the sector 25 years to double the number of manufacturing job opportunities in Iran.

3.4. The other issue worth mentioning is **the role of manufactured exports** in Iran's economy. In this respect, the results differ from investment and employment. Clearly speaking, manufactured exports are responsible for the dramatic rise of Iran's non-oil exports (excluding gas condensates) from US$ 10.4 billion to US$ 35.5 billion during 2005-2014.

Also, regarding the matter from the viewpoint of import, it shows high level of dependence on manufactured imports (Table 4):

Table 5. Selected Indicator of Manufactured Exports and Imports in Iran (unit: percent)

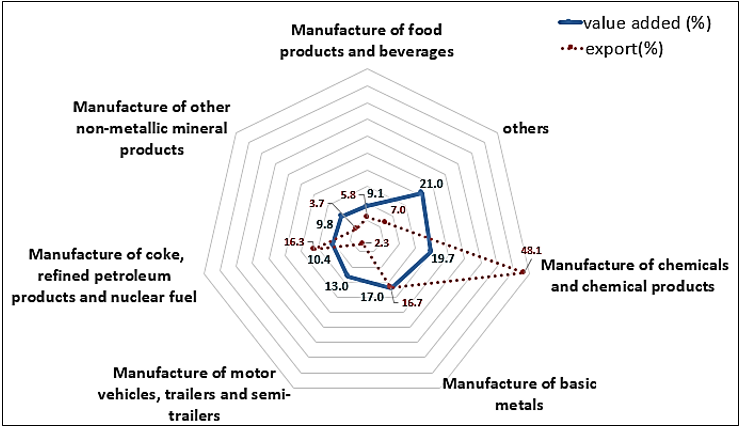
|  |  |  |  |
| --- | --- | --- | --- |
|  | 2005 | 2010 | 2016 |
| Share of Manufactured Exports to Total  Non-oil Exports | 74.7 | 79.3 | 71 |
| Share of Manufactured Exports to Total Imports | 20 | 40 | 75 |

**Source:** Central Bank of Iran

Although manufactured exports in Iran contribute considerably to the non-oil exports, it still cannot meet import expenditures but 75 percent of it.

# 4. DYNAMISM IN THE MANUFACTURING STRUCTURE

4.1. The first step to make out the way manufacturing structure has proceeded in Iran's economy is to go through the main **industrial drivers**. In this regard, there are two important factors to be considered: 1- value added; 2- export revenues. Figure 9 depicts how the key sectors contribute to either of these two factors.

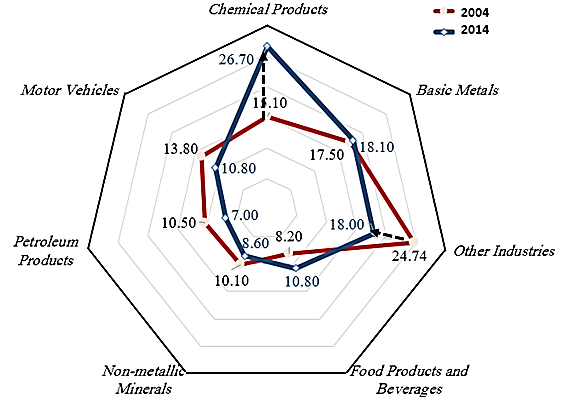


**Source:** Statistical Center of Iran

Figure 8. Top five manufacturing activities contributing to Value-added and Export

According to the figure, industrial growth and export in Iran are mainly nurtured by the resource-based industries; however, for the case of job creation, most of them have little contribution. This brings about a dilemma to select among industries, while trying to enforce industry targeting policies.

4.2. What was mentioned in 4.1 is just a snapshot of current situation of **key manufacturing activities** in the Iran's economy. However, better understanding could be gain if related structural changes is examined in this respect (Figure 10).



**Source:** Statistical Center of Iran

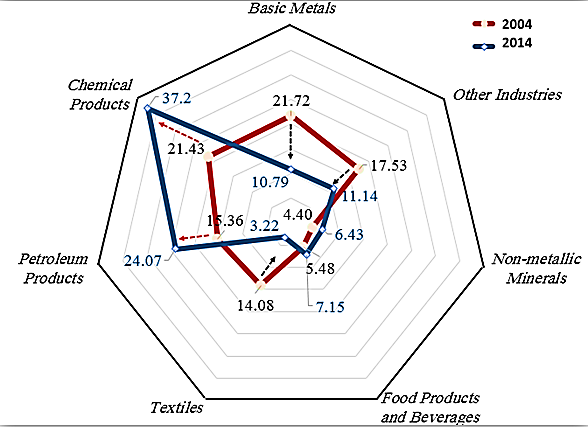
As depicted in the figure, in 2004 there were just 6 manufacturing activities as chemical products, basic metals, food products and beverage, non- metallic

**Figure 9. Structural changes in manufacturing value added; 2004, 2014**

minerals, petroleum products as well as motor vehicles which accounted for about 75 percent of manufacturing value added in Iran. In other words, the economy was heavily reliant on just 6 manufacturing activities which made little room for diversification in the economy in 2004. Within a period of 10 years, i.e. in 2014, the records got worse with the figure rising to 82 percent.

4.3. There is more to get from figure 10 than just *increased concentration of Iran's manufacturing structure*. In fact, as depicted in the figure, dependence on 4 resource-based activities (chemical products, basic metals, non-metallic minerals as well as petroleum products) has crawled up to 63 percent in 2014 from 47 percent in 2004, leaving just 37 percent of contribution for other 19 manufacturing activities.

4.4. On the **manufactured export** side, similar pattern could be observed. Statistically, in 2004, 65 percent of manufactured export revenues was generated by just 4 resource-based activities as depicted in figure 11. The record soared to 82.5 percent in 2014 precipitating higher dependence on resource-based activities in export basket.



**Source:** Statistical Center of Iran

**Figure 10. Structural Changes in top manufactured export; 2004, 2014**

4.5. The case requires more attention when it comes to the **employment generation** records. On the one hand, resource-based industries are considered as major sources of revenue generation in the manufacturing sector; however, they have little to do with job creation (less than 31.6 percent and 30.5 percent in 2004 and 2014, respectively). On the other hand, notwithstanding their large contribution to manufacturing employment of about 53 percent, labor-intensive manufacturing activities including food and beverage, non-metallic mineral products, motor vehicle, textile and wearing apparel, as well as machinery and equipment accounted for just 14.5 percent of manufactured export revenues in 2014.

4.6. There is another issue related to the performance of manufacturing sector which concerns **Industry structure**. In this regard, the first step is to review firm sizes (Table 6). According to the statistics, SME's in Iran account for 96.5 percent of total enterprises (with 10 employees or more); however, they contribute little to key industrial indicators (figure 11):

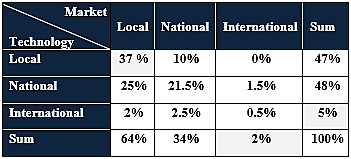
According to the figure, except for the *number of firms* (92 percent) and to some extent *employment* (17 percent),small and medium enterprises have little contribution to export revenues and production value*, etc.* This is to a great extent resulted from high dependence of SME's on local market, small scale of production and low productivity.

Figure 11. Contribution of SME’s vs. large enterprises to the Manufacturing Sector

4.7. Regarding the importance of SME's in an economy, it is needed to go into more details about the weak performance of SME's in Iran. There are different factors which are mentioned below:

* Low bargaining power in the factor market;

**Table 6. SME’s Economic Performance: Technology vs. Market penetration (2016)**

 **Source**: Iran Small Industries and Industrial Parks Organization

* Weak positioning in the sales market;
* Little access to export market;
* Low technology absorption at the firm level;
* Little access to financial resources.

Given the above-mentioned reasons, it is not surprising that just 0.5 percent of SME's in Iran have access to international technologies and are selling at the international markets (table 6).

4.8. Regarding Technology level, there are some points worth noting. Firstly, it is needed to examine **technology capabilities regarding manufacturing value added**. According to UNIDO, 0.6 percent of manufactured exports in Iran are categorized as high-tech (table 7)

4.9. For the case of **technology level in trade structure,** same results are achieved. Statistics report Hi-tech commodities low contribution to manufactured exports compared with that of manufactured imports (table 7).

Table 7. Composition of manufactured export and import regarding the level of technology (2011-2016) unit: percent

|  |  |  |
| --- | --- | --- |
| **Import** | **Export** |  |
| 11.83 | 14.5 | **No tech** |
| 19.26 | 13.1 | **Low tech** |
| 16.97 | 38.8 | **Low-medium tech** |
| 39.11 | 33 | **High-medium tech** |
| 12.83 | 0.6 | **High-tech** |

Source: Institute for Trade Studies and Research (2017)

According to the table, products with low level of technology represent more than 65 percent of manufactured export in Iran.

However, on the import side, it is the high and high-medium tech products that account for more than 50 percent of import.

4.10. The other issue to be noted while analyzing manufacturing performance is the **local content of technology**. In this respect, manufacturing activities are divided into four groups according to the Pavitt's taxonomy (1984). The results suggest that:

* **Supplier-dominated (traditional) industries**[[10]](#footnote-10)**:** traditional activities in Iran are highly dependent on imported technology and machineries except for food products and beverage.
* **Specialized suppliers**[[11]](#footnote-11): high level of local content regarding powerhouse industries while relatively high local content regarding machineries (machinery for metallurgy, agricultural and forestry machinery as well as machinery for mining, quarrying and construction) as a result of foreign technological cooperation.

* **Scale-intensive industries**[[12]](#footnote-12): Relatively high local content though lower than that of specialized supplier industries.
* **Science-based activities**[[13]](#footnote-13): low level of local content of technologies except for some products such as medical products as well as battery in which there are relatively high level of self-dependency.

# 5. History of National Development Plans in Iran

5.1. The record of enforcing **national development plans** in Iran goes back to 1948. Although not strategically formulated, these plans have ended up in the development of manufacturing sector, especially the resource-based ones. To go into more details of the development plans implemented in the economy, table 5 summarizes the main characteristic of each development plan.

Table 8. The History of Development plans implemented in Iran

|  |  |  |  |
| --- | --- | --- | --- |
| Plans before Islamic revolution | Main strategy | Plans after Islamic revolution | Main strategy |
| First  (1948-54) | Balanced growth (infrastructures and constructions) | First  (1989-92) | Reconstruction of war, economic liberalization |
| Second (1955-1961) | Governmental investment in transportation, textile, cement, sugar and oil industries | Second (1993-1999) | Economic stabilization, implementing basic free- market principles.(unsuccessful-partially implemented) |
| Third  (1962-1966) | Establishment of 250 thousands firms, 25% of which were large firms (petrochemicals and metal casting) | Third  (2000-2004) | Structural reform: removing governmental monopolies, export promotion, +developing social security system and private banks |
| Forth  (1967-1971) | Establishment of large factories (steel, machines, petrochemicals, oil refinery) and import substitution | Forth  (2005-2010) | sustainable development through global interactions, formulation and implementation of competition law, new FDI law |
| Fifth  (1972-1977) | Governmental investment in heavy industries (capital intensive) | Fifth  (2011-2015) | Economic justice, establishment of National Development Fund, establishment of Communication Council of Government and Private Sector |

**Source:** Iran's Economic Development Plan Documents

5.2. Along with the implementation of 4th development plan, the **general amendments to article 44 of the Constitution** was issued (2008), prepared the ground for government to transfer up to 80 percent of ownership of key industries including road, rail, power generation, communication and banks to the private sector. Furthermore, [the legislature](https://en.wikipedia.org/wiki/Majlis_of_Iran) in late 2009 passed [the Subsidy Reform Plan](https://en.wikipedia.org/wiki/Iranian_targeted_subsidy_plan). This was the [most extensive economic reform](https://en.wikipedia.org/wiki/Iranian_Economic_Reform_Plan) since the government implemented [gasoline rationing in 2007](https://en.wikipedia.org/wiki/2007_Gasoline_Rationing_Plan_in_Iran).

Finally, according to the **strategic plan of Ministry of Industry, Mines and Trade** (2015), 10 manufacturing activities including petrochemistry, steel, auto, ceramic tile, etc. are prioritized in order to make a big push towards higher levels of industrial development in Iran.

# 6. Advantages and Challenges for Sustainable Industrial Development in Iran

6-1.Strength points associated with industrial growth in Iran are expressed as follows:

* **Gas and Oil Reserves:**
* accounting for 18.2 percent of global gas reserves (1st global rank); Therefore low burden of gas expenditure (0.63 percent) in Iran's manufacturing (2004-2014)
* endowed with 9.3 percent of global oil reserves (4th global rank)
* **Metallic Mineral Resources:**
* endowed with 15 percent of world proven mineral reserves and over 55 billion tons of proven reserves
* Enjoying as diverse as 64 types of mineral reserves
* Ranking 2nd in terms of copper reserves (6 percent)
* Ranking 9th in terms of iron ore reserves (2 percent)
* World 11th ranking of lead reserves (3.5 percent)
* World 10th ranking of aluminum reserves
* **Nonmetallic Mineral Resources:**
* World largest turquoise reserves
* 2nd largest gypsum reserves (9 percent)
* 6th largest barite reserves (4 percent)
* 12th largest feldspar reserves (3 percent)
* Reaching a 75 million ton production capacity of world cement production (world 4th rank and accounting for 1.8 percent of global production during 2010-14)
* **Agricultural Resources:**
* Renewable resources accounting for 82.8 percent of country's soil
* Cultivability of more than 20 percent of land
* Ranking 4th globally in terms of variety of agricultural product
* **Human Resources**
* A 120 percent rise in the number of graduates of engineering majors during 2004-2015 and achieving 2nd global rank in terms of science engineering resources in 2015 (UNCTAD 2016)
* Accomplishing gender equality in higher education (female 47 percent share in 2016)
* **Road:**
* having a road network of 350 thousand kilometers
* having a highway network of 11 thousand kilometers within Asian highway network
* some exporting provinces (such as Azerbaijan Gharbi, Kermanshah, Khorasan Razavi and Hormozgan) adjacency to the Asian highway network
* **Rail:**
* having a 13 thousand kilometers of rail network
* Having 4376 wagons for container transport: ratio of number of carrier wagons to length of rail lines being 1.34 times as great as the global one.
* **Marine:**
* Enjoying 209 and 85.4 million tons of port capacity (in nominal and container terms)
* Enjoying 5 million tons of container transport in ports (80 percent in Imam Khomeini and Rajaie ports)
* **Aerial:**
* enjoying 54 active airports (9 international and 25 airports of air border type)
* establishing 80 flight destinations to 21 countries within direct lines flight (2015)
* **Logistic Hobs:**
* Iran signs the SCAP intergovernmental agreement for land ports (2013) and development of 3 land ports (Aprin, Isfahan and Pishgaman Yazd)
* Approval of the establishment of a logistic park in Zanjan rural areas
* Approval of the establishment of 24 export terminals
* **Technology Development**
* number of science and technology parks rising from 1 to 39 during 2002-2016
* an increase in the number of active growth centers from 136 in 2013 to 170 in mid-2015
* A rise in the number of labs attributed to ministry of science and technology from 3500 in 2013 to 12594 in 2016.
* **Industrial Clusters and Towns:**
* Enjoying 388 industrial clusters as well as 952 approved industrial towns.
* **Demand Size Advantages**
* Urban areas accounting for 74 percent of population
* Having 8 cities each accommodating more than one million people
* High marginal propensity to consumption
* Ranking 19th in terms of domestic market size (among 144 nations)
* Ranking 28th (among 144 nations) in terms of foreign market size (2016)
* Access to a market of about 400 million people within neighboring countries

6-2.Challenges associated with industrial growth in Iran are expressed as follows[[14]](#footnote-14):

* **Challenges associated with manufacturing performance:**
* Higher dependence on natural resources in value added creation and manufactured export
* Considerable share of Low tech industries in manufacturing value added and manufactured export
* Diminishing level of manufacturing value added
* Diminishing returns on industrial production compared to other economic sectors
* Declining competitiveness of Iran's manufactured products
* Decline in job creation within industry sector
* Environmental challenges of manufactured product
* **Challenges associated with Factor Conditions:**
* Deficiencies in the Intermediary industries to organize industrial supply network
* Firms failure to fully utilize natural energy advantages
* Weak technological infrastructure within industry sector
* High dependence on technology import
* High reliance on foreign-exchange reserves for production facilities imports
* Low productivity of manufacturing labor
* Industry's limited capacity to hire educated labor
* Strategic problems of manufacturing firms
* domestic research and development low contribution to manufactured products
* Low share of innovative product and processes in developmental programs of industries
* Instability of development plans for manufactured products in terms of secure access to water and energy resources
* Limited facilities and capacities for developmental investment within the sector
* Declined export competitiveness due to inefficient trade and logistics infrastructure
* **Challenges associated with Demand Conditions:**
* Manufactured products reliance on domestic market
* Worsening domestic terms of trade for manufactured products
* Manufactured export dependence on a few number of countries and production plants
* Manufactured products low durability in export markets
* Worsened manufactured products terms of trade in export markets
* **Challenges associated with Manufacturing Market structure:**
* Bipolar structure of the industry: aggressive competition between small enterprises and the monopolistic behavior of large firms
* Sub-governmental and also unspecialized organizations dominance over industry
* Imbalances in manufacturing value chain in terms of profit distribution
* Balanced distribution of firms in terms of spatial criteria
* Unbalanced development of consumption, capital and intermediate goods industries

# 7. Priority Manufacturing Activities

Selection of Priority Industrial Sectors builds on the model proposed by International Trade Center and it's conducted in 2 stages. We have used Export Potential Index[[15]](#footnote-15) as the criteria for selection of sectors as export strength and firms competitiveness play a pivotal role in identification of priority sectors. First, industrial sectors are classified by EPI level. Sectors with EPI varying between 0.491 and 0.609 are classified as high EPI group while sectors with EPI ranging from 0.354 to 0.490 and EPI ranging from 0.202 to 0.353 are respectively classified as middle and low EPI groups. Next, for better identification of industrial sectors with high export potential (strength), we make use of supply condition[[16]](#footnote-16) and socio-economic condition[[17]](#footnote-17) indicators and ranking of industrial sectors is carries out based on the following 3 scenarios:

Scenario one: assigning equal weights to all indexes

Scenario two: assigning weights to indexes based on experts views

Scenario three: assigning weights to industries by experts

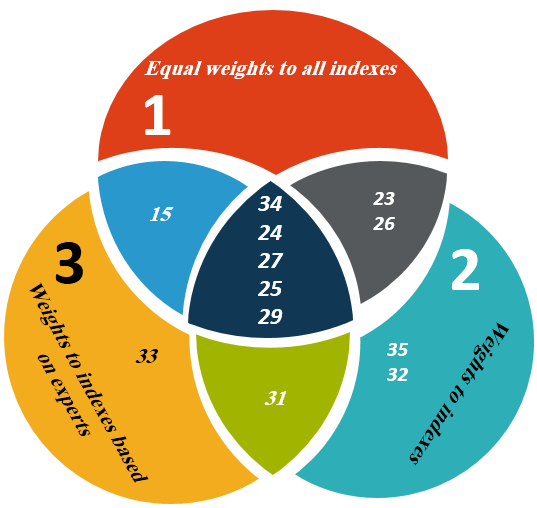


Figure 12. Priority industrial sectors in terms of ISIC codes

Priority sectors in the above 3 scenarios

* Chemical products
* Motor vehicles
* Base metals
* Rubber and plastics
* Machinery, not classified elsewhere

Priority sectors in scenarios one and two

* Oil products
* Non-metal

Priority sectors in scenarios one and three

* Foodstuff and Beverages
* Priority sectors in scenarios two and three
* Power generating machinery

# 8. Strategies and Policies

8-1- strategic challenges of manufactured export promotion

In view of the SWOT table of chapter 7 and in regards to upstream documents and obligations of Ministry of Industry, Mines and Trade, we have enumerated and discussed the strategic challenges of manufactured export promotion in table 8-4.

Table 9. Strategic challenges of manufactured export promotion

| **Strategic issue** | **component** |
| --- | --- |
| **Deficiencies associated with the structure of industries** | Small scale deterring enterprises entry into global markets |
| Deficiencies associated with competitive structure of the industry |
| **Costs resulting from inefficient and poor infrastructure** | Poor industrial-trade and energy infrastructure |
| **Limited opportunity for market development** | Low competitiveness of domestically produced manufactured products in global markets |
| Limited access to export markets |
| **Deficiencies associated with factor market** | High dependence on imports of capital and intermediate goods |
| Dual nature of manufacturing labor supply |
| Fragile technological base |
| **Industries domestic markets performance** | low capability of manufacturing value added creation |
| Low responsiveness to developmental goals and objectives |
| Falling investment returns |

8-2- macro strategies

Macro strategies for manufacturing sector can be enumerated considering the aforementioned strategic issues:

Table 10. Development strategies for competitive and export-oriented industries

| **Strategic issues** | **Components** | **Macro strategies** |
| --- | --- | --- |
| **Deficiencies associated with the structure of industries** | Small scale deterring enterprises entry into global markets | Facilitating enterprises entry into export markets by organizing the minimum scale of industrial licenses and also reinforcing collective structures |
| Deficiencies associated with competitive structure of the industry | Facilitating inflow of foreign capital and strengthening competition |
| Cutting sub-governmental and unspecialized groups dominance over industry by conducting an overview of ownership and management structure |
| **Costs resulting from inefficient and poor infrastructure** | Poor supporting infrastructure | Enhancing logistic and trade infrastructure for manufacturing production and export |
| ensuring ease of access to energy and water infrastructure to maintain the stability of development plans of industries |
| **Limited opportunity for market development** | Low competitiveness of domestically produced manufactured products in global markets | Building a global brand for domestic products |
| Restructuring protective tariffs to effectively protect national industries |
| highlighting consumer rights and protection in policymaking involved with manufacturing production and export |
| Limited access to export markets | Diversifying export targets |
| Further integration into global and regional value chains |
| **Deficiencies associated with factor market** | High dependence on imports of capital and intermediate goods | Launching domestic supply network |
| Dual nature of manufacturing labor supply | Training specialized workforce to match skills provision to the needs of enterprises |
| Fragile technological base | * Upgrading technology of production * achieving self-sufficiency of equipment and strategic technologies production |
| **Industries domestic markets performance** | low capability of manufacturing value added creation | Restructuring the industry sector by shifting towards manufactured products with higher technology content  Promoting the share of production-related services within value chains |
| Low responsiveness to developmental goals and objectives | Optimizing the consumption pattern of non-renewable resources |
| Expanding services connected to manufacturing activities involved in value chains  Balancing the disposition structure of supply chain in manufacturing |
| Falling investment returns | Reforming the pricing system in factors market |

8-3- sectoral strategies

After classifying industries into homogenous categories, strategies are designed in view of each industry group characteristics.

Table 11. Industrial sub-groups and their characteristics

| **Industry groups** | **Major classification codes** | **Characteristics** |
| --- | --- | --- |
| Traditional industries (base agriculture) | food products and beverage (15), textiles (17,18), leather products (19), cellulose industries (20, 21), tobacco products (16) | * Dependence on capacities of agricultural resources * High technological dependence except for food industries * Subject to pricing controls and protective tariffs * Low outflow of foreign exchange reserves and suffering from smuggling * Bipolar structure: large share of SMEs with low value added and considerable role of a limited number of big industrial holdings * Small size of export markets (amounting to 10 percent) |
| durable consumer goods | motor vehicles (34), domestic appliances (293) | * Important role of technology and trademark in production * Complicated nature of production process mostly involved with assembling processes in cooperation with foreign investors * Subject to price controls and severe tariffs protection * High outflow of foreign exchange reserves and mostly in cooperation with foreign investors * Importance of scale and major role played by industrial complexes * Limited export markets (less than 5 percent) |
| Intermediate (base mining) | refined petroleum products (23), chemicals and chemical products (24), rubber and plastics products (25), non-metallic mineral products (26) and basic metals (27) | * Dependent on natural resources and cheap gas * Technological dependence in spite of joint venture agreements * Subject to pricing schedules of commodity exchange and market regulation requirements * Supplying major portion of domestic market * Predominantly owned by sub-governmental organizations * Accounting for a large share of export revenues (about 80 percent) |
| Capital | general and special purpose machinery (291,292), electrical machinery and apparatus (31) and tools (283) | * Enjoying comparative advantage in resource-based industries and educated workforce * Localizing technology by receiving required license and establishing technological cooperation * Market pricing subject to severe tariff protection * Supplying a portion of domestic market while facing tools smuggling * Significant share of big industrial complexes except for tools * Small export market (less than 5 percent) |
| Science-based industries | medical instruments (33), aircraft and spacecraft (353), pharmaceuticals (2423), radio, television and communication equipment (32), office, accounting and computing machinery (30) | * Dependent on educated workforce and R&D * production mostly involved with assembling processes except for medical instruments and some pharmaceuticals * Subject to price controls and high tariffs * Large outflow of foreign exchange reserves while supplying a small portion of domestic market (except for medical instruments and some pharmaceuticals) * Dominant role of SMEs * Low share in export revenues (less than one percent of manufacturing export revenues) |

Table 12. Proposed strategies for trade, technology and manufacturing structure by industry groups

| Commodity group strategic field | Traditional industries (base agriculture) | | durable consumer goods | | Capital | | Intermediate (base mining) | | Science-based industries | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Short term | long term | Short term | long term | Short term | long term | Short term | long term | Short term | long term |
| commerce: foreign trade | Export promotion together with import substitution | Export promotion | Building specialization within global value chains | Export under national brand | Export promotion | Export promotion together with import substitution | 1- free trade (except for raw materials)  2- export restrictions on raw materials | | import substitution | Export promotion based on import substitution |
| commerce: domestic trade (pricing schedule) | Pricing schedules | Market mechanism | Pricing schedules | Market mechanism | Market mechanism | | Market mechanism | | Pricing schedules | Free trade |
| technology | Import promotion of equipment/technological partnership | Localizing equipment | Technological cooperation with foreign investors | Promoting self-sufficiency in building technology | Import promotion of equipment | Producing licensed equipment | Technological cooperation with foreign investors | Localizing equipment | Import promotion of equipment/technological partnership | Promoting self-sufficiency in building technology |
| Manufacturing structure | 1- Reinforcing collective structures  2- Strengthening industrial holdings | | 1- Strengthening industrial holdings  2- launching common brand | | Strengthening industrial holdings | | 1- Reinforcing collective structures  2- improving the minimum scale of licenses | | building collective structures | |
| Priority sub-categories | Food industry | | Motor vehicles | | Mechanical machinery | | Chemical, plastic and rubber, basic metals, non-metallic mineral | | medical instruments, pharmaceuticals | |

# Appendix

Strength points associated with industrial growth in Iran are expressed in tables 8 to 11. Furthermore, to get a clear understanding of the functions of advantages mentioned, any deficiency associated is also included.

Table 1. Key advantages of industry sector in terms of factors of production and corresponding challenges of the enumerated advantages

| **components** | | **advantages of factors of production** | **Channels of interaction with manufacturing sector** | **Functional deficiencies associated with advantages of production factor** |
| --- | --- | --- | --- | --- |
| **Energy (hydrocarbon reserves)** | **Gas** | * Endowed with 18.2 percent of global gas reserves (1st global rank) * Low burden of gas expenditure (0.63 percent) in Iran's manufacturing (2004-2014) | * High dependence of Iran's manufacturing sector on natural gas (from 50.5 percent in 2004 to nearly 75 percent in 2014) * High reliance of major exporting industries on gas resources: chemical industries with the contribution of 39.5 percent; basic metal (22.4%); Non-metallic minerals (24.1) to exports revenues in 2014 * Significant role of gas in power sector accounting for 34.1 percent of gas consumption in 2014: the sector is responsible to supply manufacturing sector with 13.4 percent of energy needs) | * Diminishing energy productivity in the manufacturing sector (from 124 in 2009 to 86 in 2014) offsets gas advantages * Considerable gas consumption: ranking 4th globally |
| **Oil** | * Endowed with 9.3 percent of global oil reserves (4th global rank) | * Oil products accounting for 11 percent of manufacturing energy needs (in 2014) * Rising importance of petroleum products in manufactured export during 2004-2014 (from 3.9 to 21.5 percent) | * Technological dependence of petroleum products (and even oil extraction) * Fading role of petroleum products in manufacturing valued added creation (from 10.5 percent to 7 percent during 2004-2014) |
| Metallic mineral resources | | * endowed with 15 percent of world proven mineral reserves: * over 55 billion tons of proven reserves * enjoying as diverse as 64 types of mineral reserves * ranking 2nd in terms of copper reserves (6 percent) * ranking 9th in terms of iron ore reserves (2 percent) * world 11th ranking of lead reserves (3.5 percent) * world 10th ranking of aluminum reserves | Strong forward linkages of basic metals with industries supplying capital and intermediate goods: per 100 Rials worth of basic metals production growth as the production factor equals to:   * 42 Rials worth of factor for fabricated metal products * 41 Rials worth of factor for electric facilities and machinery * 21 Rials worth of factor for mechanical machinery (according to Iran's input-output table for 2011) | * Weakening backward linkages between manufacturing and mining sectors (from 0.08 in 2001 to 0.04 in 2011) * Mines sector low capability of value added creation: mining industries share of manufactured export in 2015 in terms of weight and value was 21 and less than percent respectively. * weak support of Logistic infrastructures (despite 22 percent of roads being located in 4 major metal producing provinces) and a resultant falling comparative advantage of mining products in global markets |
| Nonmetallic mineral resources | | * Enjoying world largest turquoise reserves, 2nd largest gypsum reserves (9 percent), 6th largest barite reserves (4 percent), 12th largest feldspar reserves (3 percent) * Reaching a 75 million ton production capacity of world cement production (world 4th rank accounting for 1.8 percent of global production during 2010-14 | * Nonmetallic mineral high share of industrial employment (accounting for about 14 percent of employment within industry sector during 2004-2014 | * Considerably low value added creation within manufacturing sector: lowest terms of trade of 0.84 in 2014 * Low share of mining output value (about 28 percent and mining labor of 40 percent) In spite of 96 percent share of mines |
| Agricultural resources | | * renewable resources accounting for 82.8 percent share of country's soil * Cultivability of more than 20 percent of land * Ranking 4 globally in terms of variety of agricultural product | * 17.5 percent contribution of farming products to manufacturing sector * Upstream sector of several industrial activities including food industries, textile, pharmaceutical industry, cosmetics, tanning leather (5th largest light leather producer, producing 20 million tons annually) | * High level of dependence on imported machinery except in food industries * Basic agricultural industries low contribution to manufactured export (2004-2014) * High level of water consumption (over 92 percent of national water resources) causing water shortage in industry sector (despite its 1.9 percent share of water consumption) |
| Human resources | | * A 120 percent rise in the number of graduates of engineering majors during 2004-94 and achieving 2nd global rank in terms of science engineering resources in 2015 (UNCTAD 2016) * Accomplishing gender equality in higher education (female 47 percent share in 2016) * Larger proportion of young generation in comparison with Turkey: 5.7 percent above 65 against 7.7 percent in Turkey | * 8 percent contribution to Iran's economic growth during 2000-14 * educated human labor as a driver of productivity growth within industry can alleviate diminishing productivity trend (from 124 in 2006 to 92 in 2011) * enhancing innovation capacity within industry sector: Iran ranked 108th (among 144 countries) in terms of innovation capacity | * technicians and engineers low share of industrial employment (12.16 percent) despite their share rising from 9.89% in 2004 to 14.5% in in 2014 * masters and doctorate graduates 1.4 percent share of employment compared to 36 percent share of those with high school diploma or lower * low responsiveness of higher education to industry needs |

Table 2. Key advantages of industry sector in terms of Supporting Industries and corresponding challenges of the enumerated advantages

| components | | advantages associated with Supporting Industries | Channels of interaction with manufacturing sector | Functional deficiencies associated with advantages of Supporting Industries |
| --- | --- | --- | --- | --- |
| Logistics | Road | * having a road network of 350 thousand kilometers * having a highway network of 11 thousand kilometers within Asian highway network * some exporting provinces (such as Azerbaijan Gharbi, Kermanshah, Khorasan Razavi and Hormozgan) adjacency to the Asian highway network | * road transport accounting for nearly 98 percent of manufactured products transportation with the corresponding figure for rail transport being just 2 percent * the importance of access to highways in exporting zones (in terms of speed and cost of road access to export markets) | * low productivity of road freight transport (average annual distance driven by each truck in 2015 was 26447 kilometers, compared to the international standards of 100 thousand kilometers) * road transport covering for 58 percent of about 70 million tons of rail freight: cement and cement products(46%), metals (19%), chemicals (23%) and minerals (12%) which can be reduced by 20-30 percent in case of railway system improvement * transportation costs high share of export goods prices: semi-processed products (18%-25%), raw materials (30%-35%) as compared to the global average of 18 percent) * highways accounting for 21 percent of about 86 thousand kilometers of non-rural roads (compared to 52 percent in Turkey) * lacking a widespread road and rail network to have a better access to export markets (especially Iraq and Afghanistan) except the cases of Turkey and Turkmenistan |
| Rail | * having a 13 thousand kilometers of rail network * ratio of number of carrier wagons to length of rail lines being 1.34 times as great as the global one * having 4376 wagons for container transport | * railway transport accounting for 16 percent of total freight transport of 384 million tons * importance of railway system in mineral materials transportation (66 percent for railway transport) | * low ratio of rail line length to the country area as 20 provincial centers, 5 major commercial ports (Anzali, Noshahr, Boushehr, Lenge and Chabahar) and 5 land borders (Astara, Lotf'abad, Do'aroon, Milek and Khosravi) are not connected to the railway network * low railway network productivity (in terms of tonnage to length of rail lines ratio) equivalent to 58 percent of world average * railway low speed (60 km) as compared to the standard of 90-100 km * railway diminishing share of freight transport up to 2013 (average 3.8 percent per year) * rail freight transport 19 percent contribution to container transport |
|  | Marine | * enjoying 209 and 85.4 million tons of port capacity (in nominal and container terms) * enjoying 5 million tons of container transport in ports (80 percent in Imam Khomeini and Rajaie ports) | * marine transport … contribution to total export goods transport | * owning 43 and 63 percent of nominal and container port capacity (2015) * high cost of running a port per container (43 dollars in Rajaie compared to 7 and 13 dollars in Salase and Fajire ports * longer loading and unloading times in ports on average (4 days in Rajaie port compared to 5. 3 and 4 hours in Taiwan, Malaysia and Jebel Ali ports * exploitation of just 43 percent of container capacity of ports |
| Aerial | * enjoying 54 active airports (9 international and 25 airports of air border type) * establishing 80 flight destinations to 21 countries within direct lines flight (2015) | * importance of air transport in manufactured export (such as drugs) transport | * lacking specific cargo terminal as one of the major requirements for air export development (except Imam Khomeini and Isfahan airports) * small performance index as compared to Turkish airlines to 291 airports in 115 countries in 2015 * 65 railway stations being deprived from special facilities and require space for container loading and unloading |
| Logistic hubs | | * Iran signs the SCAP intergovernmental agreement for land ports (2013) and development of 3 land ports (Aprin, Isfahan and Pishgaman Yazd) * Approval of the establishment of a logistic park in Zanjan rural areas * Approval of the establishment of 24 export terminals | * 3 decades of using logistic hubs to facilitate domestic and international trade | * Small number of domestic logistic parks (Turkey expects to set up 18 logistic parks while opening 7 parks within 2023 perspective * Starting and running just 7 export terminals (for plants, agricultural products, stone or general terminals) |
| Warehousing infrastructure | | * … thousand square meters of warehouses and refrigerators | * The effect of refrigerating and warehousing cost on export goods prices | * Warehousing 66 percent share of products prices as compared to global averages of 3.3 and 3.8 percent |
| Energy | Gas | * Enjoying a 300 thousand kilometer gas distribution network (world first rank) * gas plants share rising to about 100 million cubic meters | * safer access to the most important energy resource within Industry sector (accounting for 75 percent of expenditures in the sector) * extending the required capacities of power generation | * gas distribution network failure to cover industries located in Sistan province * gas supply fluctuations during peak demand |
| Power | Power generation capacity of 72 thousand MW | * second energy supplier of the industry sector (13.4 percent share) | * problems of electricity distribution to some industrial towns |
| Technology development | | * number of science and technology parks rising from 1 to 39 during 2002-2016 * an increase in the number of active growth centers from 136 in 2013 to 170 in mid-2015 * a rise in the number of labs attributed to ministry of science and technology from 3500 in 2013 to 12594 in 2016 | * significant role of science and technology parks in high tech industries development | * weak linkages and collaboration between companies located within technology parks and industry (ranking 102 among 140 nations) * industry's weak access to modern technologies (ranking 111 among 140 nations) |
| Industrial towns | | * enjoying 952 approved industrial towns | * decline in production costs especially overheads * preparing the ground for mass production and taking advantage of economies of scale * better chance of organizing SMEs | * of 952 approved towns, just 82 percent are operating, 81 percent have access to water, 85 percent have access to electricity, 57 percent covered by gas distribution system while 73 and 31 percent have phone network and optical fiber * failure to provide amenities and general services to all towns |
| Industrial clusters | | * Enjoying 388 industrial clusters | * Clusters low level of development (65 percent of clusters are immature and have as low as 5 percent in terms of specialization index * Only 2 percent of clusters have entered export markets * Clusters 5 percent share of access to modern technologies and high dependence of those equipped with modern technologies on domestic markets * Absence of a relationship between geography of cluster formation and export performance * Clusters weak performance regarding procurement of raw materials (less than 30 percent of clusters can meet 80 percent of their needs to raw materials within the cluster) * Industrial clusters high concentration on four activities which account for less than 10 percent of export revenues in 2014 |

Table 3.Key advantages of industry sector in terms of demand conditions and corresponding challenges of the enumerated advantages

| components | advantages of demand conditions | Channels of interaction with manufacturing sector | Functional deficiencies associated with advantages of demand conditions |
| --- | --- | --- | --- |
| Domestic market | * Urban areas accounting for 74 percent of population * Having 8 cities accommodating more than one million people | * Higher demand for infrastructure and consequently greater demand for intermediary industries (basic metals, non-metallic minerals and petrochemical products) * Higher demand for durable consumer goods (home appliances, motor vehicles, office machinery etc.) | * Decline in domestic market size due to goods smuggling * Low competitiveness of domestic manufactured goods with domestic market influenced by imported substitutes * manufactured products terms of trade falling 7 percent during 2011-2016 |
| * High marginal propensity to consumption * Ranking 19th in terms of domestic market size (among 144 nations) | * Direct effect on demand for domestic manufacturing products |
| foreign market | * Ranking 28th (among 144 nations) in terms of foreign market size (2016) | * Positive effect on costs associated with exports | * Iran's low rank in terms of export share of GDP * High concentration of export (55 percent) to 5 destinations * terms of trade for manufactured products falling from 0.35 to 0.26 in export markets during 2011-2016 |
| * Access to a market of about 400 million people within neighboring countries | * 89 percent dependence of manufactured products on domestic market * Durability rate of 30 percent within regional markets |

Table 4. Key advantages of industry sector in terms of market structure and corresponding challenges of the enumerated advantages

| components | advantages of market structure | Channels of interaction with manufacturing sector | Functional deficiencies associated with advantages of market structure |
| --- | --- | --- | --- |
| Competitive structure of the industry | * creating competitive markets through the Act of the execution of the General Policies of article 44 of the Constitution | * intensifying the competitive atmosphere within industry sector | * sub-governmental companies dominance over market discouraging new investors to enter the industry * Iran's low rank (121) in terms of local competitive intensity |
| * Enjoying 66 thousand micro firms and 16 thousand SMEs | * Firms serving as physical capital within manufacturing sector | * Bipolar structure of industrial firms (small firms and firms with 500+ employees accounting for 73 and 2 percent of the local market) * Large firms 69 percent concentration in 7 major economic activities |

For the case of **challenges**, tables … includes key challenges, underlying factors and resulting consequences.

Table 5. Key challenges of Industry sector in terms of the structure of industrial production, underlying factors and the resulting consequencett

| components | Key challenges in connection with the structure of industrial production | underlying factors(position in a systematic pattern) | Resulting Consequences |
| --- | --- | --- | --- |
| Structure of industrial production | higher dependence on natural resources in value added creation and manufactured export | This challenge is the result of all problems dominating the Industry sector | industrial production and export susceptibility to fluctuations in global commodity prices |
| considerable share of Low tech industries in manufacturing value added and manufactured export | Low share of technological innovations in both product and production process section of industrial production (key challenge)  reduction of investment resources within industry sector (resource pressure) | manufactured products declining terms of trade |
| Diminishing level of manufacturing value added | Decline in investment resources within industry sector (resource pressure) | Industry sector decreasing share of GDP in current prices |
| Rising share of imported intermediate goods (resource pressure) |
| Position against other economic sectors | Diminishing returns on industrial production compared to other economic sectors | low value added creation by manufactured products(key challenge) | Declining motivation for investment in industry sector |
| Considerable growing return in parallel sectors ( structural factors) |
| Improper pricing system and its impact on quality and productivity enhancement (sectoral policies) |
| Global stance | Declining competitiveness of Iran's manufactured products | Rising production cost due to high inflation (structural factors) | Low share of Iran manufactured export in global manufactured export  Low competitiveness of domestic manufactured products against imported goods |
| Low level of modern technology absorption by firms and its impact on quality and price of manufactured products within the global scale (key challenge) |
| Low share of high tech products in manufactured export (key challenge) |
| Responsiveness regarding developmental goals | Decline in job creation within industry sector | export oriented industries low contribution to employment (key challenge) | Misaligned policies within economic and industrial development plans |
| Reduction of job creation within firms |
| Environmental challenges of manufactured products | Lack of policy coherence between industry and other economic sectors | Unsustainable industrial development |

Table6. Key challenges of Industry sector in terms of factors of production, underlying factors and the resulting consequences

| components | Key challenges in connection with factors of production | underlying factors(position in a systematic pattern) | Resulting challenges |
| --- | --- | --- | --- |
| Raw materials | Deficiencies in the Intermediary industries to organize industrial supply network | Disorganized and scattered nature of major SMEs involved in intermediary industries (industry structure) | An increase in production cost of manufactured products  High volume of imported industrial intermediate goods |
| Monopolistic behavior of big intermediary industries in meeting market industrial needs (industry structure) |
| energy | Firms failure to benefit from natural energy advantages | The pricing system dominating the energy sector and lack of motivation for energy optimization in manufacturing business units (sectoral policies) | Increasing opportunity cost of access to cheap energy within industry sector |
| High level of energy consumption by production facilities (factors of production condition) |
| facilities | Weak technological infrastructure within industry sector | Low level of technology transfer in the absence of FDI | A decline in both price and cost competitiveness of manufacturing firms |
| Firms unwillingness to upgrade technology and facility (firm knowledge, development activities) |
| Firms inclination to use decrepit production facilities (firm knowledge, development activities) |
| High dependence on imports of production facilities | low production capability of facilities | High cost of hiring production facilities |
| High reliance on foreign-exchange reserves for production facilities imports | low access to foreign-exchange reserves in meeting import needs | Industrial production susceptibility to imports of facilities |
| Labor force | Low productivity of manufacturing labor | Improper training courses in manufacturing firms (firm knowledge, development activities) | Decline in cost competitiveness of manufactured products |
| Low share of educated and skilled labor in manufacturing business units (firm knowledge, development activities) |
| Labor occupational concentration in big industries owned by governmental or sub-governmental organizations |
| Labor law as an impediment to adjust human resources (legal and regulatory issues) |
| inefficient managerial approaches dominating the industry sector (firm knowledge, development activities) |
| Industry's limited capacity to hire educated labor | weak training system (sectoral policies) | Limited capacity to enhance human resource quality through the educational system |
| Research & Development | domestic research and development low contribution to manufactured products | Limited funding and high susceptibility of allocated financial resources to fluctuations in government budget | High reliance on imports of facility |
| High share of foreign facilities in R&D expenditure |
| Low share of innovative product and processes in developmental programs of industries | deficient legal framework for Intellectual property protection | Decline in qualitative competitiveness of manufactured products |
| tech firms not matching industry needs |
| Universities incapability in training entrepreneurs |

Table7. Key challenges of Industry sector in terms of market structure, underlying factors and the resulting consequences

|  |  |  |  |
| --- | --- | --- | --- |
| components | Key challenges in connection with factors of production | underlying factors(position in a systematic pattern) | Resulting challenges |
| Energy infrastructure | Instability of development plans for manufactured products in terms of secure access to water and energy resources | Absence of a strategic plan to equip infrastructure based on industrial planning | High risk of investment within sector |
| **Financing infrastructure** | Limited facilities and capacities for developmental investment within the sector | Weak financing instruments (weak supporting infrastructure) | Decline in industrial investment |
| Deficiencies in pledging loans for the purpose of securing debt (weak supporting infrastructure) |
| Limited financial resources available within industry sector (weak supporting infrastructure) |
| Decreased investment return in the sector (key challenge) |
| **Other infrastructures** | Declined export competitiveness due to inefficient trade and logistics infrastructure | Low share of railway transport in industrial freight (supporting infrastructure) | Increased transaction costs and dampened cost competitiveness of exporting goods (even those enjoying cheap energy) |
| Deficiencies in exploiting logistic infrastructures (weak supporting infrastructure) |
| Domestic banking system failure to connect to global banking system (weak supporting infrastructure) |
| Inefficient customs infrastructure |

Table 8. Key challenges of Industry sector in terms of demand, underlying factors and the resulting consequences

|  |  |  |  |
| --- | --- | --- | --- |
| components | Key challenges in connection with factors of production | underlying factors (position in a systematic pattern) | Resulting challenges |
| Domestic market | manufactured products reliance on domestic market | inefficient tariff system due to import substitution approach dominance in policy making (sectoral policies) | Industries increased vulnerability to domestic market fluctuations |
| Over evaluated exchange rate system (macroeconomic policies) |
| Weak export orientation in manufacturing firms (firm knowledge, development activities) |
| Disorganized market penetration strategy in an international scale (sectoral polices) |
| Worsening domestic terms of trade for manufactured products | Decreased ability to create manufacturing value added (key challenge) | Industry's diminished returns relative to other sectors |
| Inefficiencies associated with manufactured products pricing system (sectoral polices) |
| Foreign markets | Manufactured export dependence on a few number of countries and production plants | Failure to organize exporting business units in a competitive scale | Failure to position domestic industrial products in global markets |
| Weak strategic cooperation between manufacturing business units |
| Manufactured products low durability in export markets | Economic sanctions and trade diplomacy pressures (macro factors) |
| worsened manufactured products terms of trade in export markets | Nonmatching combination of export and import goods in terms of technological depth and raw material exporting (key challenge) | Negative trade balance of major manufactured products |

Table 9. Key challenges of Industry sector in terms of industry structure, underlying factors and the resulting consequences

|  |  |  |  |
| --- | --- | --- | --- |
| components | Key challenges in connection with factors of production | underlying factors (position in a systematic pattern) | Resulting challenges |
| Competition structure within industry | Bipolar structure of the industry: aggressive competition between small enterprises and the monopolistic behavior of large firms | Inefficient regulatory system within sector (firm licensing and failure to comply with minimum scale) | fewer opportunities to take advantage of economies of scale and thus higher finished goods costs |
| Sub-governmental and also unspecialized organizations dominance over industry | Inefficiencies dominating mergers and acquisitions | Foreigners are less motivated to invest in industry sector |
| Profit distribution | Imbalances in manufacturing value chain in terms of profit distribution | Deficiencies associated with mergers and acquisitions | Non-uniform distribution of investment resources |
| Structure of industries in terms of economic activities location | Balanced distribution of firms in terms of spatial criteria | Absence of strategic approach in positioning industries | higher finished goods costs of different economic activities within sector |
| Structure of industries in terms of consumption, capital or intermediate goods activities | Unbalanced development of consumption, capital and intermediate goods industries | Policy concentration on capital and intermediate goods industries (sectoral policies)  Consumption goods industries failure to add dynamism to capital and intermediate goods industries | Imbalanced industrial development |

**REFERENCE**

1. **Export-led industrial strategic development document (2017). Institute for Trade Studies and Research.**
2. **Central Bank of Iran**
3. **Statistical Canter of Iran**
4. **Trade Promotion Organization database**
5. **Iran's Economic, Social, and Cultural Development Plan Documents**
6. **Iran Small Industries and Industrial Parks Organization**
7. **United Nations Industrial Development Organization (UNIDO)**
8. **World Bank**
9. **World Economic Forum**

1. . The annual data reported by Iran's datacenters are based on solar calendar (12 months of time period ending the 21st of March of each year). [↑](#footnote-ref-1)
2. . It is noteworthy that despite *increased economic vulnerability* during 2010-2013, there emerged some sort of economic rebound in 2014- 2015 as a result of nuclear agreements, pushing inflation down (to 15 percent) and bringing on a relative stability in exchange rate market, increased non-oil export revenues - particularly petrochemical products – as well as increased transactions with the European Union. [↑](#footnote-ref-2)
3. . Indices are reported by selected international organization as World Economic Forum, Heritage Foundation and World Bank. [↑](#footnote-ref-3)
4. . The improvement was accompanied with a shift towards high-tech industries in this economy. [↑](#footnote-ref-4)
5. . Turkey is Iran's rival in the south-west Asia regarding non-oil export whereas Saudi Arabia is Iran's rival in the south-west Asia regarding oil export [↑](#footnote-ref-5)
6. . Medium- and High-tech [↑](#footnote-ref-6)
7. . Although there was a positive economic growth of 3 percent in Iran in 2014, it is still lagging behind its position in 2010. [↑](#footnote-ref-7)
8. . Of 3 percent growth in Iran GDP in 2014, the contribution of service sector was 1.5 unit percent and that of manufacturing sector was 1.1 unit percent. [↑](#footnote-ref-8)
9. . The index is reported by World Bank and ranges between 0 and 1. The greater the value of the index, the higher the degree of concentration. [↑](#footnote-ref-9)
10. . Agriculture-based activities. [↑](#footnote-ref-10)
11. . Specialized firms producing technology to be sold into other firms, e.g. specialized machinery production and high-tech instruments. [↑](#footnote-ref-11)
12. . It is characterized by mainly large firms producing basic materials (steel, cement, etc.) and consumer durables (automotive, home appliances, etc.) [↑](#footnote-ref-12)
13. . It is related to high-tech firms which rely on R&D from both in-house sources and university research, including industries such as pharmaceuticals and electronics. Firms in this sector develop new products or processes and have a high degree of appropriability from patents, secrecy, and tacit know-how. [↑](#footnote-ref-13)
14. - for tables containing the challenges, please refer to the appendix [↑](#footnote-ref-14)
15. - Potential exports can be decomposed into a supply and a demand (market access) component. Potential export (including revealed comparative advantage, growth of revealed comparative advantage, share of world export and its growth), export performance (trade balance plus its changes, average value of export and its growth) and level of technology (in terms of the type of good: intermediate, capital or inputs) are three sub-indicators that feed into EPI index. [↑](#footnote-ref-15)
16. - including backward and forward linkages, value added as well as value added to output ratio [↑](#footnote-ref-16)
17. - including job creation and water consumption indexes [↑](#footnote-ref-17)