

Performance of machinery and transport equipment in India: an analysis

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Abstract

Objectives: To examine the internal and external performance of machinery and transport equipment (capital goods) in India.

Methods/Statistical analysis: The study has used secondary data for the production, exports and imports of machinery and transport equipment for the period 2000 to 2018. The compound annual growth rate (CAGR) of production and the growth rate of the industrial production index were used to examine the internal performance (domestic performance) of the goods. External performance (performance in world) of machinery and transport equipment has been examined by using export share in total exports, export-import ratio, CAGR of exports, export shares in world and revealed comparative advantage (RCA).

Findings: Though the production of all the products grew at positive CAGR except three products 'Food Machinery Non-Domestic, Telecommunication, sound recording and 'Ships and boats'. But still this sector showed a poor trade performance in 2018. India had trade deficit in 38 product categories out of 45 under SITC code. The production sector is unable to produce according to local requirements. As a consequence, demand for imported goods has increased and thus the trade deficit has also increased. The export share of these goods in the total composition of exports has increased since 1990. However, the share is very low compared to the developed countries in the world. The market share of India's total machinery and transport equipment goods in the world is very low and less than 1%. India has not been able to show a comparative advantage in the export of these goods.

Application/Improvements: India's performance in machinery and transport equipment is not as impressive as that of other advanced countries around the world. Government initiatives are needed to strengthen this sector. Research and development activities in the production sector should be carried out in order to improve the quality of these goods. Only skilled workers should be used. Infrastructure facilities should be improved.

Keywords: Machinery, Transport equipment, Capital goods, Exports, CAGR, RCA

1. Introduction

Manufacturing sector is known as an engine of growth. The role of this sector in developing countries is very important. The contribution of manufacturing sector to the GDP was 16.5 % in 2018-19. The total workforce employed in manufacturing sector was 24.7 %. Manufacturing sector comprises chemicals, basic manufactures, machinery and transport equipment and miscellaneous manufactures. India's latest phase of economic reforms was initiated in mid-1991 with a primary focus on trade policy reforms. Government of India has taken several measures to robust the industrial growth of the economy. The trade policy changes of India since 1991 aimed at creating a far more open and competitive environment. Since 1991, the Government eliminated quotas, along with sharp tariff cuts, which resulted in significantly opening up of the economy to global competition. Duties on capital goods also came down. The import weighted tariff rate dropped from 87% in 1990-91 to 10% in 2018. The industrial sector was de-licensed with 100% FDI permission. The Government relaxed the excise duties on factory gate taxes, capital goods, consumer durables and vehicles, with a view to boosting the manufacturing sector. The study examined the performance of machinery and transport equipment (capital goods) in India.

These goods are the back bone of the entire manufacturing sector. The sector includes all the power generating machinery, special purpose machinery, electrical machinery, road vehicles, metalworking machinery, office machinery, and telecommunication and transport equipment. The paper studied the internal and external performance of this sector in India. The main objective of this study was to examine the internal (domestic) and external (world) performance of India's machinery and transport equipment. Government of India has taken a number of steps to strengthen this sector. The National Capital Goods Policy 2016 has been introduced to increase production in this sector and to create opportunities for employment. The Engineering Export Promotion Council was set up in 1955 to promote engineering products. The scheme 'Make in India' was launched to improve the efficiency of this sector.

2. Performance of machinery and transport equipment Industries in India

1. Production of machinery and transport equipment in India

The following Table 1 shows compound annual growth rates of production of capital goods during the period 2000-2005, 2006-2010 and 2011-2018. Production of all the goods grew at a positive CAGR during the period 2000-2005. The production of 'Aircraft' grew at a highest CAGR followed by 'Road Vehicles' and 'Civil Engineering Equipment'. Although the tariff rates for all capital goods have been reduced from the peak level, road vehicles and motorcycles are still protected with high tariff rates in order to provide protection against imported automobiles. It has a positive impact on the production of 'Road Vehicles'. During 2006-10, the growth rate of 'Office Machines', 'Telecommunication, sound recording' and 'Ships and Boats' improved significantly. But, there was drastic decline in the CAGR of 'Steam Boilers & Auxiliary Plants' and 'Aircraft'.

Table 1. Production and CAGR of capital goods

Product categories	2000-2005	2006-2010	2011-2016
Steam Boilers & Auxiliary Plants	19.7%	3.3%	6.7%
Agriculture Machinery	11.9%	24.4%	0.3%
Civil Engineering Equipment	21.7%	11.5%	3.7%
Textile, Leather Machinery	13.0%	10.6%	7.7%
Food Machinery Non-Domestic	14.3%	6.0%	-4.6%
Machine Tools For Metal	18.8%	20.8%	4.3%
Metal Working Machinery nes (not elsewhere specified)	16.9%	29.6%	1.0%
Heating, Cooling Equipment	9.6%	18.7%	9.3%
Office Machines	13.5%	11.3%	6.2%
Telecommunication, sound recording	4.7%	22.5%	-9.5%
Electro-Medical, X-Ray Equipment	8.6%	29.3%	10.1%
Household Type Equipment nes	4.7%	38.1%	6.0%
Electrical Machinery nes	10.4%	17.0%	13.1%
Road Vehicles	25.5%	16.7%	9.8%
Motor Vehicles Parts, Accessories nes	20.3%	25.5%	6.8%
Cycles, etc Motorized	18.9%	14.2%	4.6%
Motorcycles	20.9%	12.4%	4.7%
Cycles not motorised	7.5%	28.8%	3.2%
Railway Vehicles	17.5%	34.5%	6.4%
Aircraft	28.3%	3.3%	46.6%
Ships and boats	6.2%	24.9%	-2.9%

Source: Annual Survey of Industries, Various Issues [1]

Production of Aircrafts increased significantly at 46.6 % growth rate during the period 2011-2016. This is followed by Electro-Medical, X-Ray Equipment (16.4 %), and Electrical machineries (not elsewhere specified) (13.1 %) and Road Vehicles (9.8 %). As the tariff rate cuts have reduced the cost of imported raw materials. Whereas the cost of production decreased for 'Food machinery non-domestic', 'Telecommunication non-domestic' and 'Ships and Boats'. This was due to slowdown in the economic activity in 2013. Decline in domestic production resulted in increase in the demand for imported goods. Hence it has a negative impact on the domestic industries.

The following compound annual growth rate (CAGR) of machinery and transport equipment during the period 2011-2016. Out of 29, three products have negative growth rate during the period 2011-16. These are 'Food Machinery Non-Domestic, Telecommunication, sound recording and 'Ships and boats'. Index numbers of industrial production shows that capital goods grew at negative rate from 2013-14 to 2014-15, but this sector showed some improvement after 2015-16. And growth rate increased from 3 % in 2015-16 to 4 % in 2017-18 as shown in Table 2.

Table 2. Index Numbers of Industrial Production - Growth Rates (Base: 2011-12)

	Primary goods	Capital goods	Intermediate goods	Infrastructure/ construction goods	Consumer durables	Consumer non-durables
2012-13	0.5	0.3	5.1	5.4	4.9	6.1
2013-14	2.3	-3.7	4.6	5.7	5.6	3.7
2014-15	3.8	-1.1	6.1	5.0	4.0	3.8
2015-16	5.0	3.0	1.5	2.8	3.4	2.6
2016-17	4.9	3.2	3.3	3.9	2.9	7.9
2017-18	3.7	4.0	2.3	5.6	0.8	10.6

Source: Reserve Bank of India [2]

2. Export to imports ratio and self-sufficiency of the machinery and transport equipment sector in India

This sector plays an important role in the manufacturing of goods and services. As this sector provides machinery to the industries used for the production of various products. But India could not attain self-sufficiency in this sector. The production from of this sector is unable to meet the growing demand of consumers. There is a supply-demand gap in the production of these goods. This sector is reliant on imports to fill this gap. Trade deficit of India is widening in this sector. These goods have emerged as the second largest import category in the total non-petroleum and oil imports of India. Imports are growing faster than exports of these goods. The following Table 3 shows ratio of exports to imports of machinery and transport equipment in India. If the export / import ratio is greater than one, the country will be independent and competitive. But, if the export / import ratio is below one, the country is dependent and less competitive.

India was found to be less self-sufficient in machinery and transport equipment over the period 2000-2018. Out of 43 product categories, India was self-sufficient in 12 products in 2000. Export-import ratio was highest for 'Road Motor Vehicles' followed by 'Cycles, scooters, motorized or not.', 'Tractors and motor' and 'Lorries and special purpose motor vehicles'. In 2018, India was found to be self-sufficient only in 8 product categories of machinery and transport equipment out of 43. Export-import ratio was highest in the 'Road motor vehicles' followed by 'Passenger motor vehicles', 'Tractor Non Road' and 'Lorries and special purposes motor vehicles'. India showed competitiveness in the product categories 'Agricultural machinery', 'Food processing machinery', 'Television receivers', 'Equipment for the distribution of the electricity', 'Motor vehicles parts', and 'Trailers and other vehicles parts' in 2000, but lost it in 2018. India gained self-sufficiency in the product categories 'Steam engine & turbines' and 'Aircraft' in 2018 compared to 2000.

3. Export performance of machinery and transport equipment sector in India

Export performance of this sector has been examined in terms of shares in total exports, growth rates of exports, share in world exports and revealed comparative advantage.

Table 3. Exports to imports ratio of machinery & transport equipment (2000-2018)

SITC Code	Product categories	2000	2005	2010	2015	2018
7	Machinery & Transport Equipment	0.39	0.31	0.50	0.53	0.42
711	Steam boiler & auxiliary plant	2.65	1.14	0.44	3.54	6.25
712	Steam engines, turbines	0.03	0.17	0.16	0.52	1.67
713	Internal combustion piston engines	0.98	0.84	0.51	0.98	0.77
714	Engines & motors, non-electric; parts,	0.07	0.15	0.39	0.18	0.97
716	Rotating electric plant and part	0.72	0.34	0.58	0.71	0.72
718	Other power generating machinery	0.16	0.35	0.45	0.91	0.64
721	Agricultural machinery (excluding tractors)	1.04	0.69	0.58	0.77	0.73
722	Tractors Non-Road	13.35	39.48	83.53	30.28	15.11
723	Civil engineering, contractors' plant and equipment	0.15	0.20	0.46	0.74	0.52
724	Textile and leather machinery	0.31	0.07	0.12	0.20	0.23
725	Paper and paper manufacture machinery	0.59	0.22	0.16	0.34	0.29
726	Printing, bookbinding machinery	0.57	0.38	0.27	0.24	0.20
727	Food-processing machines (non-domestic)	1.57	1.38	0.72	0.85	0.65
728	Other machinery, equipment, for specialized	0.46	0.36	0.21	0.43	0.29
736	Metalworking machine-tools, parts and accessories	0.41	0.20	0.13	0.21	0.11
737	Metalworking machinery (other than machine-tools)	0.30	0.40	0.15	0.35	0.26
741	Heating & cooling equipment and part	0.25	0.42	0.48	0.39	0.30
742	Pumps for liquids, liquid elevators, and parts	0.64	0.49	0.53	0.93	0.68
743	Pumps, compressors; centrifuges; filtering apparatus	0.38	0.44	0.37	0.53	0.43
744	Mechanical handling equipment, and parts	0.37	0.19	0.15	0.36	0.24
745	Other non-electric machinery, tools	0.60	0.45	0.32	0.37	0.28
749	Non-electric parts and accessories of machinery	0.36	0.60	0.47	0.69	0.60
751	Office machines	0.37	0.63	0.09	0.13	0.44
752	Automatic data processing machines and units	0.10	0.09	0.11	0.04	0.03
761	Television receivers	1.36	0.34	0.31	0.16	0.01
762	Radio-broadcast receivers	0.08	0.39	0.03	0.04	0.11
763	Gramophones, dictating machines and other sound	0.26	0.03	0.01	0.04	0.04
771	Electric power machinery, and parts	0.97	0.91	0.80	0.83	0.55
772	Electrical apparatus for making and breaking	0.49	0.50	0.96	0.72	0.44
773	Equipment for distribution of electricity	1.25	0.71	0.61	0.78	0.63
774	Electro-medical and radiological equipment	0.59	0.74	0.55	0.37	0.35
775	Household type equipment	0.69	0.88	0.37	0.50	0.29
776	Thermionic, microcircuits, transistors, valves.	0.16	0.21	0.34	0.08	0.04
778	Electrical machinery and apparatus	0.66	0.48	0.45	0.39	0.39
781	Passenger motor vehicles (excluding buses)	6.15	7.29	9.81	24.00	22.97
782	Lorries & special purposes motor vehicles	8.82	5.60	6.82	13.07	11.74
783	Road motor vehicles	112.97	265.81	88.80	30.61	28.97
784	Motor vehicle parts and accessories	1.29	1.62	0.72	1.07	0.88
785	Cycles, scooters, motorized or not; invalid carriages	19.43	7.18	2.54	3.81	2.15
786	Trailers & other vehicles, not motorized	3.94	1.24	0.43	0.74	0.71
791	Railway vehicles & related equipment	0.22	0.16	0.18	0.18	0.78
792	Aircraft	0.23	0.01	0.46	1.34	1.08
793	Ships, boats & floating structures	0.16	0.35	1.17	0.86	0.51

Source: UNcomtrade [3], based on author calculation

1. Export share of machinery and transport equipment in total exports of India

The Table 4 shows the export share of top ten products of 'Machinery & Transport Equipment' in total exports of India. The share of these goods in total exports of India showed an improvement as the share increased from 7.42 % in 1990 to 17.86 % in 2018. It indicates that demand of these goods at global level has increased.

The performance of this sector has been improving, as the share in total exports has been increasing since 1990. Export shares of 'Passenger motor vehicles', 'Motor Vehicle parts and accessories', Engines and motors, non-electric' and 'Ships and Boats' has increased in 2018 compared to 1990 and each capital product comprised more than one percent share in total exports of India. This was due to increase in the production of capital goods.

Table 4. Export share of capital goods in total exports of India

Code	Product categories	1990	2000	2010	2018
7	Machinery & Transport Equipment	7.42	8.93	14.55	17.86
781	Passenger motor vehicles (excluding buses)	0.13	0.24	2.05	2.23
784	Motor vehicle parts & accessories, nes	0.67	0.85	0.95	1.89
714	Engines and motors, non-electric	0.00	0.01	0.12	1.14
793	Ships, boats & floating structures	0.20	0.13	1.92	1.10
749	Non-electric parts & accessories of machinery	0.13	0.46	0.63	1.06
785	Cycles, scooters, motorized or not; invalid carriages	0.64	0.72	0.48	0.90
778	Electrical machinery & apparatus	0.55	0.60	0.44	0.77
713	Internal combustion piston engines, & parts	0.52	0.94	0.44	0.77
772	Electrical apparatus for making and breaking electrical circuits	0.17	0.34	0.84	0.69
792	Aircraft	0.05	0.15	0.70	0.63

Source: U.N., UNCTAD Handbook of Statistics (Various Issues) [4], based on author's calculations. The export shares of top 10 products ranged from 2.23 % for 'Passenger motor vehicles' to 0.63 % for 'Aircraft' in 2018.

2. Compound annual growth rates of machinery and transport equipment

Export performance of these goods has been measured in terms of the compound annual growth rates during the period 2001-2005, 2006-2010 and 2011-2018. The compound annual growth rate (CAGR) of machinery and transport equipment declined significantly from 29.4 % during 2001-2005 to 4.6 % during 2011-2018. This was due to negative growth rates of product categories 'Television Receivers', 'Telecommunication Equipment', 'Ships and boats', 'Automatic data processing machines', 'Aircraft' and 'Printing and bookbinding machinery' during the same period. The decline in exports has been on account of slowdown in the global economy in 2012-13. The export of Aircraft grown significantly at 126.8 % rate during 2006-2010. This was due to a dramatic increase in production during the period. The slowdown in the global economy resulted decrease in the demand for automobile, hence CAGR of 'Road Vehicles' declined considerably during 2011-2018 compared to 2001-2005 as shown in Table 5.

3. Export performance of machinery and transport equipment in terms of world' export shares

Table 6 shows categories wise export share of machinery and transport equipment in world. The market share of machinery & transport equipment in the world remained below 1% and could not improve over the period 2011-2018. The world export share of the categories 'Power generating machinery and equipment', 'Machinery specialized for particular industries', 'General industrial machinery and equipment' and 'Road Vehicles' increased to more than one percent over the period. The market share of 'Electric machinery apparatus and appliances', 'Office machinery' and 'Metal working machinery' could not improve over the period. In case of 'Other transport equipment' decreased from 3.03% in 2014 to 1.67 % in 2018.

Market share of machinery and transport equipment at global level is not very impressive. This was due to competition from the high quality products from other countries. It resulted the less demand for exports of capital goods in world.

Table 5. Compound annual growth rates of the exports of machinery and transport equipment

SITC CODE	Product categories	2001-2005	2006-2010	2011-2018
7	Machinery & Transport Equipment	29.4%	24.8%	4.6%
711	Steam boilers & auxiliary plant & parts	32.8%	24.9%	9.9%
712	Steam engines & turbines	13.5%	5.9%	18.2%
713	Internal combustion piston engines,	38.8%	11.1%	7.9%
714	Engines & motors, non-electric	5.9%	81.8%	56.8%
716	Rotating electric plant & parts	24.8%	11.3%	6.6%
718	Other power generating machinery	23.8%	25.8%	9.9%
721	Agricultural machinery excluding tractors	21.7%	17.5%	11.5%
722	Tractors Non-Road	64.6%	23.4%	2.6%
723	Civil engineering, contractors' plant & equipment	34.2%	31.0%	5.0%
724	Textile & leather machinery & parts	6.0%	13.8%	10.5%
725	Paper & paper manufacture machinery	13.7%	20.5%	9.5%
726	Printing, bookbinding machinery	36.1%	-2.8%	-1.6%
727	Food-processing machines (non-domestic)	33.7%	13.2%	0.5%
728	Other machinery, equipment, for specialized industries	27.7%	3.2%	8.0%
736	Metalworking machine-tools, parts & accessories	21.5%	5.8%	0.4%
737	Metalworking machinery (other than machine-tools) parts	43.8%	-6.0%	3.6%
741	Heating and cooling equipment & parts	41.9%	25.0%	3.7%
742	Pumps for liquids; liquid elevators & parts	16.6%	14.9%	9.2%
743	Pumps, compressors, centrifuges, filtering apparatus parts	45.3%	17.2%	6.2%
744	Mechanical handling equipment & parts	25.5%	16.6%	10.3%
745	Other non-electric machinery, tools & mechanical apparatus	28.2%	9.5%	6.1%
749	Non-electric parts & accessories of machinery	41.9%	9.5%	7.9%
751	Office machines	31.2%	8.7%	9.8%
752	Automatic data processing machines & units	14.7%	12.0%	-4.7%
759	Parts and accessories for machines	-0.1%	1.4%	11.1%
761	Television receivers	26.9%	34.1%	-32.1%
762	Radio-broadcast receivers	65.3%	-18.5%	39.9%
763	Gramophones, dictating machines & other sound recorders	-21.3%	-13.6%	24.1%
764	Telecommunication equipment parts & accessories	24.7%	55.1%	-11.9%
771	Electric power machinery & parts	32.6%	10.2%	4.2%
772	Electrical apparatus for making & breaking electrical circuits	29.8%	33.3%	6.3%
773	Equipment for distribution of electricity	15.9%	8.8%	5.2%
774	Electro-medical and radiological equipment	16.7%	6.3%	7.1%
775	Household type equipment	29.6%	5.5%	1.0%
776	Thermionic, microcircuits, transistors, valves, etc	19.7%	35.0%	-0.6%
778	Electrical machinery and apparatus	16.7%	17.1%	10.3%
781	Passenger motor vehicles (excluding buses)	80.6%	44.0%	10.2%
782	Lorries & special purposes motor vehicles	41.8%	36.5%	6.4%
783	Road motor vehicles	56.3%	11.5%	0.6%
784	Motor vehicle parts & accessories	36.6%	11.0%	10.5%
785	Cycles, scooters, motorized or not; invalid carriages	12.4%	17.3%	8.2%
7851	Motorcycles, auto-cycles; side-cars of all kind, etc	32.3%	24.2%	8.2%
7852	Cycles, not motorized	-0.4%	3.1%	-0.8%
786	Trailers & other vehicles, not motorized	22.0%	5.7%	9.6%
791	Railway vehicles related equipment	-8.0%	-2.5%	24.3%
792	Aircraft	-7.5%	126.8%	-1.7%
793	Ships, boats & floating structures	108.3%	52.4%	-9.3%

Source: UNComtrade [3], based on author calculations

Table 6. Product-wise share of machinery and transport equipment in world

SITC Code	Product Categories	2011	2012	2013	2014	2015	2016	2017	2018
7	Machinery & Transport Equipment	0.72	0.68	0.76	0.78	0.73	0.74	0.77	0.84
71	Power generating machinery & equipment	0.73	0.72	0.88	0.98	0.98	1.12	1.45	1.91
72	Machinery specialized for particular industries	0.80	0.85	0.98	1.03	1.10	1.04	1.01	1.12
73	Metalworking machinery	0.50	0.52	0.62	0.54	0.64	0.73	0.62	0.61
74	General industrial machinery & equipment	0.75	0.80	0.93	0.87	0.95	0.96	1.02	1.05
75	Office machines & automatic data processing equip	0.12	0.12	0.11	0.09	0.11	0.11	0.14	0.15
76	Telecommunications, sound recording	0.75	0.61	0.55	0.26	0.17	0.19	0.14	0.29
77	Electric machinery, apparatus, appliances	0.41	0.39	0.43	0.42	0.41	0.42	0.41	0.45
78	Road vehicles	0.76	0.89	0.97	0.99	1.00	1.06	1.10	1.18
79	Other transport equipment	2.54	1.66	2.19	3.03	2.14	1.80	1.97	1.67

Source: UNcomtrade [3], based on author's calculations

4. Export performance of machinery and transport equipment in term of revealed comparative advantage

Table 7 shows revealed comparative advantage of machinery and transport equipment over the period 2001 to 2018.

Table 7. Revealed comparative advantage of machinery and transport equipment

Product Category	2001	2005	2010	2015	2018
Machinery & Transport Equipment	0.22	0.28	0.41	0.44	0.47
Power generating machinery & equipment	0.25	0.40	0.48	0.61	1.04
Machinery specialized for particular industries	0.38	0.45	0.46	0.68	0.61
Metalworking machinery	0.43	0.54	0.36	0.40	0.33
General industrial machinery & equipment and parts of	0.30	0.48	0.49	0.59	0.57
Office machines & automatic data processing equipment	0.15	0.10	0.07	0.07	0.08
Telecommunications, sound recording equipment	0.07	0.07	0.26	0.10	0.16
Electric machinery, apparatus, appliances and parts	0.24	0.27	0.31	0.26	0.25
Road vehicles	0.21	0.35	0.56	0.62	0.64
Other transport equipment	0.13	0.60	1.19	1.33	0.91

Source: Uncomtrade [3], based on author's calculations

India did not show revealed comparative advantage in any product category till 2005. The product category 'Other transport equipment' gained comparative advantage in 2010 and 2015, but lost it in 2018. In 2018, India exhibited revealed comparative advantage only in 'Power generating machinery equipment'. At aggregate level, total of machinery and transport equipment could not gain comparative advantage throughout the period. As India was unable to compete with high-quality products from other countries. Exports were unable to increase because the production was lower than demand. The domestic demand for these goods is met by imported goods.

4. Conclusion and Policy recommendations

The paper found that the production of machinery and transport equipment grew at the rate of 6.5% during the period 2011-2016 and 18 product categories out of 21 grew at positive rate. The product categories 'Aircrafts', 'Electro-Medical, X-Ray Equipment', 'Electrical machinery nes' and 'Road Vehicles' showed good performance with positive growth rate in production over the period. But the production of 'Food machinery, non-domestic', 'Telecommunication non-domestic' and 'Ships and Boats' grew at a negative rate. Capital goods sector showed a poor trade performance in 2018. India had trade deficit in 38 capital goods out of 45. The production sector is unable to produce according to local requirements. As a consequence, demand for imported capital goods has increased and thus the trade deficit has increased.

The share of machinery and transport equipment in total composition of exports has been rising since 1990 and has increased to 17.86 % in 2018. But still it is very low compared to the developed countries in world. Government initiative in terms of high import tariff rates in case of road vehicles has a positive impact on production and exports of these goods. Passenger motor vehicles and Motor vehicles parts are top two items of the capital goods exports. The slowdown in the global economy in 2008 and in 2011 has affected both the production and export of goods. It resulted in drastic reduction in growth rates of the exports of machinery and transport equipment in 2011-2018 to 4.6 % from the peak level of 26.4 % in 2001-2005. Most of the product categories experienced decline in growth rate during 2011-2018 compared to 2001-2005. Market share of total machinery and transport equipment of India in world is very low and less than one percent. The categories 'Power generating machinery and equipment', 'Machinery specialized for particular industries', 'General industrial machinery and equipment' and 'Road Vehicles' have attained more than one percent market share in world. In case of other categories share is very low.

India could not show revealed comparative advantage in the exports of machinery & transport equipment. India exhibited revealed comparative advantage only in the category 'Power generates machinery & equipment' in 2018. India's performance in this sector is not as impressive as that of other advanced countries in the world. Government initiatives are needed to upgrade this sector. The following are the main policy recommendations for the growth of this sector in India.

1. Research and development activities in the production sector should be carried out in order to improve the quality of machinery and transport equipment and to make them competitive compared to imported goods.
2. Reforms are required in the labour market to make them skilled and trained. Only trained and skilled labour should be used in industries to make internationally competitive products.
3. Anti-dumping measures should be adopted to protect the domestic industries from low cost imported products.
4. Non-tariff barriers should be used to restrict the quantity of the imported products and to boost production of capital goods.
5. Production of capital goods for which India is depending on imports to meet increasing demand should be increased. Government should encourage industrial production by providing incentives this sector.
6. The high cost of transportations and the poor infrastructure facilities is adding more financial burden on the production sector. Infrastructure facilities should be provided to the Industrial Sector. These facilities will increase both employment and production in this sector.
7. Export subsidies and domestic support should be provided to machinery and transport equipment industries in order to make them internationally competitive. Export earnings must be exempt from taxes and exporters must not be subject to local sales taxes.
8. GST rates are still very high and ranged from 5% to 28%. It is required to abolish GST on the raw materials, packing materials, machinery and spares used for export production.

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