

Composition of India's Engineering Goods Exports

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Abstract

The composition of engineering goods exports shows the nature and structure of India Economy in general and engineering industry in particular. There has been tremendous change in the composition of engineering goods exports over the last seven decades. The changes witnessed in the structure of India exports helped in the emergence of new manufacture foods like engineering goods, chemicals, etc on the export front. These products have been identified as dynamic exports that would lead to buoyant export growth. As such, an analysis of trends, growth, and composition of engineering export would help in identifying the factors responsible for export performance. An attempt is made in this research paper in two stages. First the broad trends are analysed and then by using Constant Market Share Model the various factors at work are analyzed to understand the nature and composition of India's Engineering Goods Exports.

Keywords: Engineering Exports, Exports, India's Engineering Goods, Composition of Engineering Goods

Introduction

Engineering exports now consist of a wide variety of items such as iron & steel, machine tools, machinery & instruments, manufacture of metals, project good, ferro alloys, aluminium products, transport equipment, residual engineering items, management & technical services etc. During the initial period, India's Engineering Exports consisted mainly of steel, pig iron based items, consumer products like casting, buckets, drum, tubes trunks, hand tools, builders hardware, lock, pad lock, steel furniture, aluminium, brass and copper utensil, electric fans and batteries. However, over the years there has been substantial diversification in the export of engineering products, especially after the mid seventies. A close look at the change in composition of engineering exports during 1960-61 to 2019-20 highlights the forward march of Engineering Goods exports. Table -1 depict the changing composition of Indian engineering exports during 1960-61 to 2019-20.

Table -1
Change in Composition of Engineering Goods Exports
(1960-61 TO 2019-20)

Items	Year (1960-61) % Share	Year (2002-03)% Share	Year (2019-20) % Share
Capital Goods	12.46	32.69	43.23
Primary Metals	30.85	33.54	29.26
Non-ferrous Metals	13.33	7.38	3.94
Consumer Durables	43.35	22.13	18.46
Management & Consultancy Service	0	4.23	5.11
Total	100	100	100

Source: 1. Engineering export promotion Council (EEPC), 2020
2. DGCIS, Kolkata

Table - 2 exhibits the percentage of share of major engineering goods, as per the latest data available for 2019-20:

Table -2
Share of Engineering Goods

S.No.	Engineering Goods	%Share
1.	Machinery and Instrument	21.30
2.	Manufacture of Metals	20.00
3.	Transport Equipment's	17.2
4.	Iron & Steel bar and primary and semi finished iron & steel	22.14
5.	Electronics	10.7
6.	Non-ferrous metals	4.6
7.	Aluminium products	1.10
8.	Ferro Alloys	1.11
9.	Project Goods	0.29
10	Machine tools	0.98
11.	Residual Engineering Goods	0.42

Source: EEPC & Economic Survey 2019-20.

From table-1 and -2 it is understood that there has been marked shift and significant change in the composition of the engineering export in the last seven decades. The most significant change has been in the export of capital goods whose share in total engineering exports increased from 12.46 percent in 1960-61 to 43.23 percent in 2019-20, which is a symptom of the marked progress by engineering industry. Thus, capital goods sector presently occupies a pride position. The primary steel which accounted for 30.85 percent in 1960-61 has marginally increased to 33.54 percent in 2002-03, and slightly decreased to 29.26 percent in 2019-20. On the other hand, the share of non ferrous metals has come down from 13.33 percent to 3.94 percent. Lastly, the management and consultancy services that account for zero percentage in 1960-61 has started making its presence felt by contributing around 5.11 percent in the year 2019-20. All these shows the increasing significance of capital goods exports as well as management and consultancy services, while the significance of non ferrous metals and consumer durables have been reduced.

Review of Literature

Many studies were undertaken with renewed interest in the estimation of elasticities for the exports for Composition of Engineering Goods. Houthakker and Magee preferred ordinary least squares method in estimating price and income elasticities of demand as "simultaneous equation models have so far had very limited success in the area of international trade." Another problem to be confronted here is the functional form of the model. While Leamer and Stern leave the choice of the functional form to the individual researcher depending on his theoretical leanings such that the choice does not adversely affect the result, Houthakker and Magee prefer using of double logarithmic form because of their generally superior fit and ease of interpretation. The study of Singh is an attempt to separate the relative influence of external factors (those emanating from abroad) and internal factors (those operating within India) i.e., demand and supply factors. He maintains that both factors have to be considered as each commodity faces different conditions of demand in the world market and supply in the domestic market. He classifies India's exports into three broad groups:

1. Commodities for which India is a major exporter in the world market. India has to compete with other exporters. This may be represented as an oligopoly market,
2. Commodities in which India enjoys an almost monopoly position in world trade and
3. Commodities for which India is only a marginal exporter in the world market.

Database Research Methodology

The present research paper is mainly based on secondary sources of data. The data's have been collected through various Central Government Organisations like DGCI&S, Engineering Export Promotion Council (EEPC), Ministry of Trade and Commerce, Government Of India, Foreign Trade Review, India's Statistical Office, WTO, Economic Survey. The method of Constant Market Share Analysis and Regression Coefficients Analysis is also used to draw the conclusions regarding changing composition of India's Engineering Exports to various countries.

Objective of the Study

The present research paper is having the following objectives:

1. To analyse the Composition of India's Engineering Goods Exports.
2. To find out the causes of change in the composition of India's Engineering Goods Exports.
3. To find out the reason of the changing pattern of foreign demand for India's Engineering Goods.
4. To analyse the Nature and overall composition of Engineering Exports.

RITC Group Level Composition of India's Engineering Exports

The composition of Engineering Exports is further explained in terms of groups based on Revised India Trade classification. The percentage share of the product groups is presented in table 3.

It can be seen that some product groups have increased their shares in total engineering exports while some other groups realized declining contributions. The remaining product groups maintained their proportion more or less constantly. The first group consists of finalized structural parts, wire products, hand tools metal working machinery, electrical power machinery, distribution equipment,

telecommunication equipment, railway vehicles, road transport equipment and transport, cutlery, household equipment, other metal manufactures, power generating machinery, office machinery, textile and leather machinery domestic electric equipment, electro-medical apparatus, other electrical machinery and aircraft machinery belong to the second category

that experienced declining percentage shares during this period. The product groups that maintained their proportion more or less constantly throughout the period are agricultural machinery, special industrial machinery, other non-electric machinery and watches and clocks.

Table -3
Composition of India's Engineering Exports

Product	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1990-91
Finished Structural Parts	3.72	0.32	1.78	9.59	8.95	14.07	9.69
Metal Containers for storage and Transport	1.37	0.82	0.89	0.80	0.51	0.49	0.32
Wire products	0.75	0.97	2.47	2.19	1.85	2.57	2.36
Tool's per use in land	2.14	4.22	4.68	5.52	3.34	2.54	4.69
Cutlery	3.19	1.68	0.80	0.66	0.67	0.47	0.40
Household equipment	9.16	8.67	5.90	8.68	4.70	3.62	2.93
Metal Manufacturers	9.89	11.70	8.19	7.56	6.09	4.70	4.48
Power generating machinery	10.09	9.92	7.72	4.07	4.79	4.80	5.20
Agricultural machine	0.23	0.41	0.65	0.83	0.74	0.63	0.49
Office machinery	3.09	1.61	2.34	2.11	1.97	2.87	2.41
Metal Working machinery	0.93	1.61	2.34	2.11	1.97	2.87	2.41
Textile & leather machinery	6.45	5.43	4.84	4.62	3.74	8.39	7.36
Special industrial machinery	1.99	2.68	1.96	0.92	1.18	0.89	1.51
Machinery,	7.72	8.23	8.57	9.46	7.95	10.11	6.06
Management and consuler	0	0	0	0	0	0	0
Electric Power machinery & Switch gear	1.04	2.18	2.28	2.87	3.09	3.58	3.58
Distribution equipment	2.86	2.79	3.53	3.91	8.14	4.93	3.42
Telecommunication apparatus	1.21	1.64	2.28	1.26	2.29	3.60	2.59
Domestic electric equipment	6.69	6.51	7.09	4.85	3.38	2.42	1.49
Electric medical apparatus	0.75	0.02	0.01	-	-	0.01	0.05
Other electrical machinery	6.08	8.04	8.64	5.34	4.70	4.41	3.58
Railway vehicles	0.61	0.09	3.89	3.97	11.15	1.04	2.70
Road motor Vehicles	8.74	7.67	9.00	7.32	9.27	13.92	20.02
Other non-motor vehicles	5.93	8.14	6.10	7.09	6.11	5.75	6.80
Aircraft	0.88	0.58	1.88	0.15	0.09	0.14	0.08
Ship and Boats	0.03	0.05	0.01	0.03	0.05	0.12	0.05
Scientific instruments	1.30	1.13	0.69	1.20	1.15	1.08	1.36
Watches and clocks	0.01	0.06	0.02	0.03	0.01	0.01	0.02
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table -3 continued....

Product	1991-92	1992-93	1995-96	2000-01	2001-02	2002-03	2019-20
Finished Structural Parts	5.47	5.80	3.24	3.15	4.20	5.49	10.02
Metal Containers for storage and Transport	0.43	0.60	0.52	0.54	0.63	0.92	3.41
Wire products	2.46	1.80	2.45	4.45	2.39	2.68	2.01
Tool's per use in land	5.91	6.29	4.74	5.16	5.79	7.03	3.13
Cutlery	0.44	0.48	0.32	0.25	0.19	0.14	0.35
Household equipment	3.96	4.18	4.95	3.76	3.00	4.06	2.91
Metal Manufacturers	5.39	5.22	5.14	4.86	4.79	5.74	4.70
Power generating machinery	5.53	7.66	8.22	9.35	8.51	7.85	5.14
Agricultural machine	0.37	0.51	0.81	0.91	0.99	0.57	0.41

Office machinery	2.15	1.86	2.57	1.93	1.37	0.55	2.15
Metal Working machinery	2.27	1.46	1.95	2.10	2.13	3.88	2.57
Textile & leather machinery	5.52	4.12	3.46	6.81	6.73	3.93	7.01
Special industrial machinery	1.74	1.57	3.28	1.96	2.38	2.34	1.89
Machinery	6.64	7.62	9.42	8.78	9.47	8.39	5.45
Electric Power machinery & Switch gear	4.76	4.74	4.72	5.18	4.87	4.38	0.05
Distribution equipment	5.42	5.62	3.93	5.30	5.16	5.08	3.65
Telecommunication apparatus	3.00	2.43	2.94	2.31	2.50	2.29	3.87
Domestic electric equipment	1.55	2.60	2.04	2.92	2.36	2.87	2.45
Electric medical apparatus	0.09	0.04	0.04	0.13	0.10	0.14	2.14
Other electrical machinery	3.91	4.35	4.55	4.12	3.74	4.51	4.89
Railway vehicles	6.69	3.35	4.12	3.47	4.10	2.62	3.24
Road motor Vehicles	14.97	13.51	9.60	10.73	12.34	12.40	13.45
Other non-motor vehicles	7.34	8.84	9.40	7.67	7.18	5.07	7.65
Aircraft	1.67	0.16	0.19	0.25	0.10	0.05	2.11
Ship and Boats	0.08	1.40	2.26	0.71	0.70	1.44	1.54
Scientific instruments	1.65	2.81	1.47	1.16	1.35	1.13	2.15
Watches and clocks	0.02	0.02	0.09	0.08	0.09	0.06	1.65
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Monthly Statistics of the Foreign Trade of India DCI & S, Kolkata.2020

During 1964-65 seven product groups, viz., metal manufactures, power generating machinery, other non-electrical machinery, domestic electrical equipment, other electrical machinery and other transport equipment contributed 49.31 percent of engineering exports. But this declined to 42.83 per cent in 1990-91 and further to 41.76 percent by 2002-03 and further declined to 33.43 percent in 2019-20. These changes in the product composition need to be seen against the composition of world engineering exports to realize maximum export earnings. India's product composition appears to be in conformity with the composition of world engineering exports.

Trends in the Exports of Selected Products

Table -4 presents the percentage share of the selected product viz., typewriters, metal working machine tools textile machinery, sewing machines, radio receivers and bicycles in total engineering exports. The share of these products ranged in between 11.93 percent in 1994-95 and 21.82 percent in 1989-90. The trend shows more or less stagnation in the 2003, while it fluctuated in the 1960s. Among the products selected metalworking machine tools, textile machinery, radio receivers and bicycles have recorded increased shares in total engineering exports from India. On the other hand, the contribution of typewriters rose for some time and then declined, whereas sewing machines witnessed consistent decline, starting from 10.83 percent in 1998-89 declining to 2.31 per cent in to 0.24 percent in 2002-03.

Average Annual Growth Rate: Selected Products

As seen from table-4 all the selected products except sewing machines and typewriters

achieved higher growth rate of engineering exports. Sewing machines and typewriters recorded lower growth.

Table- 4

Average Annual Growth Rates: Selected Products

Sl. No	Product	1960-74	1990-91	2002-03	2019-20
1.	Typewriters	12.38	30.82	12.04	0.00
2.	Machine Tools	35.59	27.78	20.67	26.50
3.	Textile Machinery	25.53	34.76	17.92	18.18
4.	Sewing machines	38.32	57.60	17.44	12.12
5.	Radio receivers	35.12	32.73	22.29	15.12
6.	Bicycles	35.12	32.73	29.22	17.00
7.	Average Export growth	24.50	28.09	24.44	9.40

Source: The CSO, Govt. of India 2019-20.

Constant Market Share Analysis

Before going into the results of the mode, it is of relevance to know the extent of diversification/ concentration in India's engineering exports. The results of commodity concentration (Ce) country concentration (Gc) and regional concentration (Re)³ pertaining to the Indian engineering exports are presented in table-4. It can be seen from the table that the minimum values for commodity concentration, country concentration and regional concentration are 18.90, 7.72 and 33.33 respectively.

Table - 5
Coefficients of Concentration for India's Exports of Engineering Goods

Year	CEt	GEt	REt
1988-99	-	28.06	52.08
1989-90	-	28.02	52.55
1990-91	-	27.54	51.84
1991-92	-	26.23	50.28
1992-93	25.67	26.14	51.84
1993-94	26.48	24.58	40.58
1994-95	24.33	25.26	45.54
1995-96	24.54	23.25	44.69
1996-97	25.08	24.86	46.62
1997-98	27.57	22.61	44.29
1999-2000	31.67	21.58	45.42
2000-01	25.24	20.06	46.45
2001-02	25.14	20.21	46.12
2002-03	23.15	20.42	47.25
2019-20	22.14	20.14	47.14

Source: Monthly Statistics of the Foreign Trade of India, DGCI & S, Kolkata.

An overall reduction in all the three coefficients is noticeable. The commodity concentration has declined by only about 2 percentage point during 1992-93 to 2019-20, the years 1997-98 and 1998-99 show higher concentration while the remaining part of the period exhibits either a constant or slightly declining trend in the coefficient of commodity concentration. The decline in the trend is not significant statistically. On the other hand, the coefficients of country and regional concentration reveal considerable declining trend. The coefficient of country concentration during the period 1988-99 to 2019-20 has declined from 28.09 in 1988-89 to 20.42 in 2019-20 i.e. by about 8 percentage points. The decline has been rather steady. This would imply that India is diversifying its market distribution nullifying the view that India exports its engineering goods only to other neighboring developing countries. Regional concentration co efficient exhibition similar trend. It has declined by about 5 percentage point during the reference period. Overall, it may be discerned that diversification in India's engineering exports is mainly achieved country-wise and to some extent region

wise. Though the coefficient of commodity concentration by 2019-20 is closer to the minimum value, it has not varied much during the period under consideration.

The significance of the reduction in concentration can be statistically known by regressing the values of commodity, country and regional concentration coefficients on time which indicates the trends in these coefficients. The equations estimated are based on the functional form,

$$\text{Log CET} = \log a + b \log t$$

Where t=time

The results are given in table -6 in all the three equations, the coefficients of time are of expected sign. But the coefficient of time for commodity concentration is not significant whereas for country and regional concentration it is significant at one per cent level. The magnitudes of the coefficients are weak. The explanatory power except for regional concentration is also weak. It may be concluded that country concentration and regional concentration declined while commodity concentration shows a tendency towards decline, not significantly.

Table -6
Regression Results

Dependent Variable	Independent	Variable	R2
Log CEt	3.27	-0.01 (0.05)	0.28
Log GEt	3.92	-0.01 (2.26)	0.23
Log REt	3.38	- 0.03 (12.32)	0.92

This analysis would make the policy makers believe that the significant country and regional diversification and, marginally, commodity diversification would help in achieving stable export growth. But if this diversification is achieved in commodities whose growth in international market is lower than average growth of world engineering exports, realization of higher export growth would become difficult. Similar possibility would result if diversification is achieved in country and region-wise distribution whose import growth. This would erode

market share of the country, and indirectly may constrain the tempo of the development process. Hence, the relevant issue for the policy maker is the market shares of the countries. This is analyzed under the Constant Market Share Model.

Results of Constant Market Share Analysis

Table - 6 gives the results of the analysis. It can be observed that during the period 1995-96 to 2019-20 out of a change of 100 percent in India's engineering exports, 24.80 percent is due to growth in world trade, and commodity composition contributed

3.10 percent while the share of market distribution is 10.70 percent.

Conclusion

The Engineering Export Industry in India is one of the most significant contributor for India's GDP. It has contributed to an amount of 75.97 b USD during the fiscal year of 2020-21. It contributes about 25 % in total exports from India at present. This sector is the single largest foreign exchange earner for India's Economy. The Weight of Engineering Sector in India's Index of Industrial production stood at a reasonable 30 %. Over the years there have been significant changes in the composition of India's Engineering Goods Exports to different countries. The new goods comprises heavy machine tools, transportation items, computer hardware's, Medical Equipment's, Iron and Steel, Motor Vehicle, Cars, Iron And Steel products, metal products, Industrial machinery, Auto and its parts, transport and

equipment's etc. These items have replaced the old Engineering exports such as Sewing Machines, Type writers and other related items which are not in demand in the world market now.

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