

An Empirical Analysis of the Growth Patterns of the Automobile Industry in India

Navleen Kaur 

Department of Commerce, S.A. Jain (P.G.) College, Ambala City, Haryana, India.

kaur.navleen4@gmail.com (Corresponding Author)

ARTICLE INFORMATION

Received: November 30, 2022
Revised: December 24, 2022
Accepted: February 15, 2023
Published Online: April 10, 2023

Keywords:

Automotive, Annual production, Automobiles, Domestic sales, Exports

ABSTRACT

Background: Since the introduction of the LPG economy in 1991, the automobile industry in India has progressed rapidly, and a large number of global auto manufacturers have established manufacturing facilities in India; however, the Indian industry lags behind that of many other countries. Therefore, a comprehensive framework is required for the growth and development of the industry.

Purpose: This paper attempts to study the growth of the automobile industry in India over the selected period. The study also makes projections of various growth parameters of the industry based on an analysis of past trends.

Methods: This study examines secondary data collected from the Society of Indian Automobile Manufacturers' (SIAM) website spanning 19 years, from 2003-04 to 2020-21. The data were characterized using various descriptive statistical measures, including mean, standard deviation, coefficient of variation, and extreme values. An exponential growth rate was determined to examine the industry expansion. Subsequently, growth forecasts were developed for the selected parameters by employing trend equations.

Results: The study finds that annual production, domestic sales, and exports of the industry showed an increasing trend until the outbreak of coronavirus in 2019. Subsequently, a sudden decrease was observed in the production, sales, and exports of automobiles from India. The research revealed that the passenger vehicle sector experienced the most significant increase in production and sales within the industry during the timeframe examined. The two-wheeler sector demonstrated the highest growth rate in vehicle exports during the study period.

Conclusion: The implementation of the Bharat stage VI standards and the outbreak of COVID-19 will have a significant impact on the industry. The industry is negatively affected by the pandemic. However, the extent to which the loss will occur and how the industry will recover from it can be determined in the long run. The study proposed that the government should develop a detailed roadmap to help the industry navigate the challenges posed by the COVID-19 pandemic more effectively. In addition, it recommends that the Indian automotive sector prioritize self-sufficiency in manufacturing advanced and environmentally friendly vehicles.



DOI: [10.15415/jtmge/2023.141007](https://doi.org/10.15415/jtmge/2023.141007)

1. Introduction

A nation's economic advancement, including that of India, depends heavily on a well-developed transportation network. The ability to transport individuals and merchandise efficiently is essential for fostering economic progress. The automotive sector plays a crucial role in facilitating growth and advancement. The automotive industry in India affects many other sectors in the country because an increase in the demand for automobiles also increases the demand for raw materials such as rubber, plastic, steel, and glass. The Indian automotive industry is divided into two major segments: the Indian automobile industry and the Indian auto- component

industry. The Indian automobile industry is comprised of four major segments: commercial vehicles, two-wheelers, three-wheelers, and passenger vehicles. The Indian government has formulated several plans and policies for the growth and development of the automotive industry. Auto Policy 2002, Automotive Mission Plan 2006-16, Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles in India (FAME) 2015, National Auto Policy 2018, National E-Mobility Scheme 2018, National Electric Mobility Mission Plan 2020, Automotive Mission Plan 2016-26, etc. The Auto Policy 2002 was the first comprehensive policy formulated by the Government of India for the regulation of this industry, after which the Indian Government continuously formulated

various plans, policies, and programs for the upliftment of the industry. The Indian automobile industry ranks second largest in two-wheelers, eighth largest in commercial vehicles, and sixth largest in passenger vehicles at the global level (Plan, 2016). Globally, the Indian automobile sector, also referred to as Original Equipment Manufacturers (OEMs), is one of the most fiercely competitive industries. By rapidly transitioning from conventional internal combustion engine vehicles to electric vehicles, this sector has a significant opportunity to enhance its competitive advantage. This paper attempts to study the growth of the automobile industry in India for 19 years, i.e., from 2003-04 to 2021-22. This study also makes projections of the selected growth parameters of the industry based on a study of past trends. The paper is divided into the following sections: a review of the literature, the need for the study, objectives of the study, research methodology, results and discussion, conclusions and recommendations, limitations of the study, and scope for further research. The declaration of conflicting interests and references are presented at the end of this paper.

2. Review of the Literature

Globally, scholars are investigating diverse aspects of India's automotive sector, encompassing broad topics such as expansion and progress as well as intricate subject areas. The Indian automotive industry has become increasingly stronger with every major shift in the Indian government's policies (Ranawat & Tiwari, 2009). The Indian government's tax relief and liberalization policies have resulted in the development of the country's automobile industry over the past few years (Hesse, 2018). The four-wheeler segment of the industry has shown great progress since the delicensing and opening up of the industry to foreign direct investment in 1991 (Acharya & Rahman, 2022). There has been a significant increase in the registration and exports of automobiles from India since the implementation of the goods and services tax (Basavanagouda & Panduranga, 2021). Several studies have examined the factors contributing to this industry's underperformance during specific periods. The major reasons for the downfall of the Indian car market in 2012 were the rise in petrol prices in Delhi since 2002, economic slowdown, political uncertainty, high interest in car loans, and emerging second-hand car markets (Agnihotri & Chaturvedi, 2013). Miglani (2019) analyzed the roles of government policy, infrastructure, and other enabling factors in the growth and expansion of the automotive industry in India. Research has shown that, for the past two decades, India has been a desirable location for global manufacturers of automobiles and auto parts. However, the adoption of international best practices in India has been slower than in China. It was also found that India continued to be a net importer of auto components,

with its trade deficit increasing from 2004-05 to 2015-16. Vijayaragavan (2021) examined the performance of the Indian automobile industry over six years from 2015-16 to 2020-21, focusing on production, exports, and sales figures. The research revealed a general upward trend in automobile production throughout most of the study period, except for the final two years, 2019-20 and 2020-21. The findings also indicate that the industry was experiencing significant challenges, and required government assistance to overcome these difficulties. Furthermore, various studies have discussed factors that contribute to the advancement of this sector. Maintaining rigorous quality benchmarks, enhancing service offerings, and implementing cutting-edge technology could give the Indian automobile industry a competitive advantage on a global scale (Krishnaveni & Vidya, 2015). The major factors contributing to the growth and development of the industry are favorable government policies and the role of supporting industries (Shoeb & Maqbool, 2017). Creating a favorable economic climate through careful restructuring of industrial policies concerning the industry is necessary for the growth and development of the Indian automobile industry (Chowdhury & Chatterjee, 2020). Focusing on innovation and R&D efforts plays a crucial role in promoting the growth and development of the Indian automotive sector (Meena *et al.*, 2020).

3. Need of the Study

India's automobile industry is one of the country's core industries. The development of an economy's infrastructure plays a very important role in its overall growth and development. The automobile industry plays an important role in its infrastructural development by providing connectivity among various regions of the country. After the introduction of the LPG economy in 1991, the automobile industry in India has progressed rapidly, and a large number of global auto manufacturers have established their manufacturing facilities in India; however, the Indian industry lags behind that of many other countries. Thus, a comprehensive framework is required for growth and development. The present study will help in understanding the growth and development of the industry for 19 years, i.e., from 2003-04 to 2021-22, which will further help in laying a future roadmap for the upliftment and all-round development of the industry.

4. Objectives of the Study

The present study was conducted to achieve the following objectives:

- To study the growth of the Indian automobile industry
- To make growth projections concerning the selected industry parameters based on a study of past trends

5. Research Methodology

5.1. Sources of Data Collection

The present study is based on secondary data collected from the website of the Society of Indian Automobile Manufacturers (SIAM). SIAM is the apex body, representing major vehicle and vehicular engine manufacturers in India.

5.2. Period of Study

This study examined data spanning 19 years, from 2003-04 to 2020-21. The introduction of the Auto Policy 2002 brought significant transformations to India's automobile sector, as it was the first comprehensive framework established by the Indian government to foster industrial growth and development. Consequently, this analysis selected 2003-04 as its starting point to evaluate the industry's evolution following the implementation of the Auto Policy, 2002.

5.3. Techniques Used for Data Analysis

The data were characterized using various descriptive statistical measures, including mean, standard deviation,

coefficient of variation, and extreme values. The exponential growth rate was determined to examine the expansion of the industry. Subsequently, growth forecasts were developed for the selected growth parameters by employing trend equations.

6. Results and Discussion

6.1. Annual Production of Automobile Industry in India

Table 1 highlights the data related to the annual production of vehicles by different segments of the automobile industry in India for the period 2003-04 to 2020-21. The variations in the production of vehicles produced by various segments of the industry were also computed by taking 2003-04 as the base year, and these variations are shown in Table 2. Table 3 shows the trend coefficient for annual production of the automobile industry in India for the period 2003-04 to 2020-21, and Table 4 depicts future projections of production of different segments of the industry from the period 2022-23 to 2026-27 made on the trend equations.

Table 1: Annual Production of Segments of Automobile Industry in India for the Period 2003-04 to 2021-22
(No. of Vehicles in Thousands)

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	275.04	356.22	5622.74	989.56	1810.89
2004-05	353.70	374.45	6529.83	1209.88	2116.96
2005-06	391.08	434.42	7608.70	1308.91	2435.78
2006-07	519.98	556.13	8466.67	1545.22	2772.00
2007-08	545.18	500.59	8026.05	1762.13	2708.49
2008-09	416.87	497.02	8419.79	1838.59	2793.07
2009-10	567.56	619.19	10512.90	2357.41	3514.27
2010-11	760.74	799.55	13349.35	2982.77	4473.10
2011-12	929.14	879.29	15427.53	3146.07	5095.51
2012-13	831.74	839.74	15721.18	3231.06	5155.93
2013-14	699.04	830.11	16883.05	3087.97	5375.04
2014-15	698.30	949.02	18489.31	3221.42	5839.51
2015-16	782.81	934.10	18830.23	3465.05	6003.05
2016-17	810.29	783.72	19933.74	3801.67	6332.35
2017-18	894.55	1021.91	23147.06	4010.37	7268.47
2018-19	1112.18	1268.72	24503.09	4026.05	7727.51
2019-20	756.73	1132.98	21032.93	3424.56	6586.8
2020-21	624.94	614.61	18349.94	3062.28	5662.94
2021-22	805.53	758.67	17821.11	3650.7	5759.00

EGR (%)	5.66	3.98	6.07	6.87	6.09
Average	672.39	744.76	14667.12	2743.25	4706.88
S.D.	218.05	257.38	5950.62	998.22	1837.49
C.V. (%)	32.43	34.56	40.57	36.39	39.04
Minimum	275.04	356.22	5622.74	989.56	1810.89
Maximum	1112.18	1268.72	24503.09	4026.05	7727.51

Source: Compiled and calculated from data taken from Society of Indian Automobile Manufacturers, Retrieved from <http://www.siamindia.com>

Table 1 shows that the production of the automobile industry in India increased from 1810.89 thousand vehicles in 2003-04 to 5759.00 thousand vehicles in 2021-22, resulting in an increase of 3948.11 thousand vehicles over the study period. The exponential growth rate of industrial production was 6.09 percent during the study period. The average production of the two-wheeler segment of the industry was the highest (14667.12 thousand vehicles), followed by the passenger vehicle segment (2743.25 thousand vehicles), the three-wheeler

segment (744.76 thousand vehicles), and the commercial vehicle segment (672.39). Compared to the industry-wide average, the two-wheeler sector demonstrated higher mean production levels. Conversely, the passenger vehicle category exhibited a steeper exponential growth curve than that observed across all industries. Maximum variation (40.57 percent) was observed in the production of two-wheeler segments, whereas minimum variation (32.43%) was observed in the production of commercial vehicle segments in the industry.

Table 2: Trend Analysis of Annual Production of Segments of the Automobile Industry in India for the period from 2003-04 to 2021-22

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	100	100	100	100	100
2004-05	129	105	116	122	117
2005-06	142	122	135	132	135
2006-07	189	156	151	156	153
2007-08	198	141	143	178	150
2008-09	152	140	150	186	154
2009-10	206	174	187	238	194
2010-11	277	224	237	301	247
2011-12	338	247	274	318	281
2012-13	302	236	280	327	285
2013-14	254	233	300	312	297
2014-15	254	266	329	326	322
2015-16	285	262	335	350	331
2016-17	295	220	355	384	350
2017-18	325	287	412	405	401
2018-19	404	356	436	407	427
2019-20	275	318	374	346	364
2020-21	227	173	326	309	313
2021-22	293	213	317	369	318

Source: Computed based on data given in Table 1

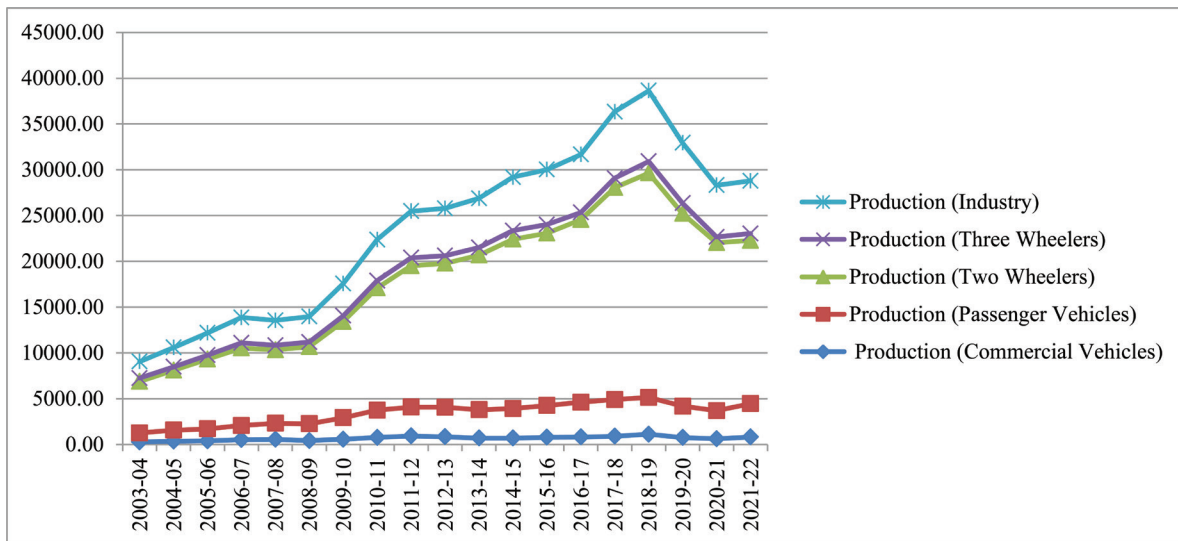


Figure 1: Trend Analysis of Annual Production of Segments of Automobile Industry in India for the Period 2003-04 to 2021-22

Source: Constructed based on data given in Table 1

Table 3: Trend Co-efficient for Annual Production of Automobile Industry in India for the Period 2003-04 to 2021-22

S. No.	Type	Y=α + βX + e		
		α	β	R2
1.	Commercial Vehicles	379.96	29.243	0.57
2.	Three-wheelers	399.91	34.485	0.57
3.	Two-wheelers	4967.4	969.97	0.84
4.	Passenger Vehicles	1141.5	160.17	0.81
5.	Industry	1722.2	298.47	0.84

Source: Computed based on data given in Table 1

Table 4: Annual Production Projections of the Automobile Industry in India for the period 2022-23 to 2026-27
(No. of Vehicles in Thousands)

Year	Commercial Vehicles	Three-Wheelers	Two-Wheelers	Passenger Vehicles	Industry (Average)
2022-23	964.82	1089.62	24366.81	4344.99	7691.56
2023-24	994.06	1124.10	25336.78	4505.17	7990.03
2024-25	1023.31	1158.59	26306.75	4665.34	8288.50
2025-26	1052.55	1193.07	27276.72	4825.52	8586.96
2026-27	1081.79	1227.56	28246.69	4985.69	8885.43

Source: Computed by using trend equations shown in Table 3

6.2. Domestic Sales of Automobile Industry in India

Table 5 carries the data relating to the domestic sales of vehicles by different segments of the automobile industry in India and Table 6 shows the trends of domestic sales by various

segments of the industry by taking 2003-04 as the base year. Table 7 shows the trend coefficient for domestic sales of the automobile industry in India for the period 2003-04 to 2021-22 and Table 8 depicts future projections of domestic sales of different segments of the industry from the period 2022-23 to 2026-27 made on the trend equations.

Table 5: Annual Domestic Sales of Segments of Automobile Industry in India for the Period 2003-04 to 2021-22
(No. of Vehicles in Thousands)

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	260.11	284.08	5364.25	902.10	1702.63
2004-05	318.43	307.86	6209.77	1061.57	1974.41
2005-06	351.04	359.92	7052.39	1143.08	2226.61
2006-07	467.77	403.91	7872.33	1379.98	2531.00
2007-08	486.82	364.70	7248.59	1547.99	2412.02
2008-09	384.19	349.73	7437.62	1552.70	2431.06
2009-10	532.72	440.39	9370.95	1951.33	3073.85
2010-11	684.91	526.02	11768.91	2501.54	3870.35
2011-12	809.53	513.25	13435.77	2618.07	4344.16
2012-13	793.15	538.29	13797.75	2686.43	4448.43
2013-14	632.85	480.09	14806.78	2503.51	4605.81
2014-15	614.95	532.63	15975.56	2601.24	4931.09
2015-16	685.70	538.21	16455.85	2789.21	5117.24
2016-17	714.08	511.88	17589.74	3047.58	5465.82
2017-18	856.45	635.70	20192.67	3287.97	6243.20
2018-19	1007.32	701.01	21181.39	3377.44	6566.79
2019-20	717.59	637.07	17416.43	2773.52	5386.15
2020-21	568.56	219.45	15120.78	2711.46	4655.06
2021-22	716.57	261.39	13570.01	3069.52	4404.37
EGR (%)	5.33	-0.44	4.88	6.45	5.00
Average	610.67	452.93	12729.87	2289.80	4020.53
S.D.	198.07	136.09	4900.95	790.94	1483.58
C.V. (%)	32.44	30.05	38.50	34.54	36.90
Minimum	260.11	219.45	5364.25	902.10	1702.63
Maximum	1007.32	701.01	21181.39	3377.44	6566.79

Source: Compiled and calculated from data taken from Society of Indian Automobile Manufacturers, Retrieved from <http://www.siamindia.com>

Table 5 depicts that domestic sales of the automobile industry in India increased from 1702.63 thousand vehicles to 4404.37 thousand vehicles, with an average domestic sale of the whole industry of 4020.53 thousand vehicles during the study period of 19 years. The maximum average domestic sales (12729.87 thousand vehicles) were recorded by two-wheeler segments, while

the minimum average domestic sales (452.93 thousand vehicles) were recorded by the three-wheeler segment of the industry. High sales of two-wheeler segments indicate a high demand for these vehicles in India. The exponential growth rates of domestic sales of the passenger vehicles segment (6.45 percent) and commercial vehicle segment (5.33 percent) were higher than the exponential growth

rate of domestic sales of the whole industry (5.00 percent). The coefficient of variation of domestic sales of the two-wheeler segment (38.50 percent) was the highest, followed

by that of the passenger vehicle segment (34.54 percent), commercial vehicle segment (32.44 percent), and three-wheeler segment (30.05 percent).

Table 6: Trend Analysis of Annual Domestic Sales of Segments of the Automobile Industry in India for the Period 2003-04 to 2021-22

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	100	100	100	100	100
2004-05	122	108	116	118	116
2005-06	135	127	131	127	131
2006-07	180	142	147	153	149
2007-08	187	128	135	172	142
2008-09	148	123	139	172	143
2009-10	205	155	175	216	181
2010-11	263	185	219	277	227
2011-12	311	181	250	290	255
2012-13	305	189	257	295	261
2013-14	243	169	276	278	271
2014-15	236	187	298	288	290
2015-16	264	189	307	309	301
2016-17	275	180	328	338	321
2017-18	329	224	376	364	367
2018-19	387	247	395	374	386
2019-20	276	224	325	307	316
2020-21	219	77	282	301	273
2021-22	275	92	253	340	259

Source: Computed based on data given in Table 5

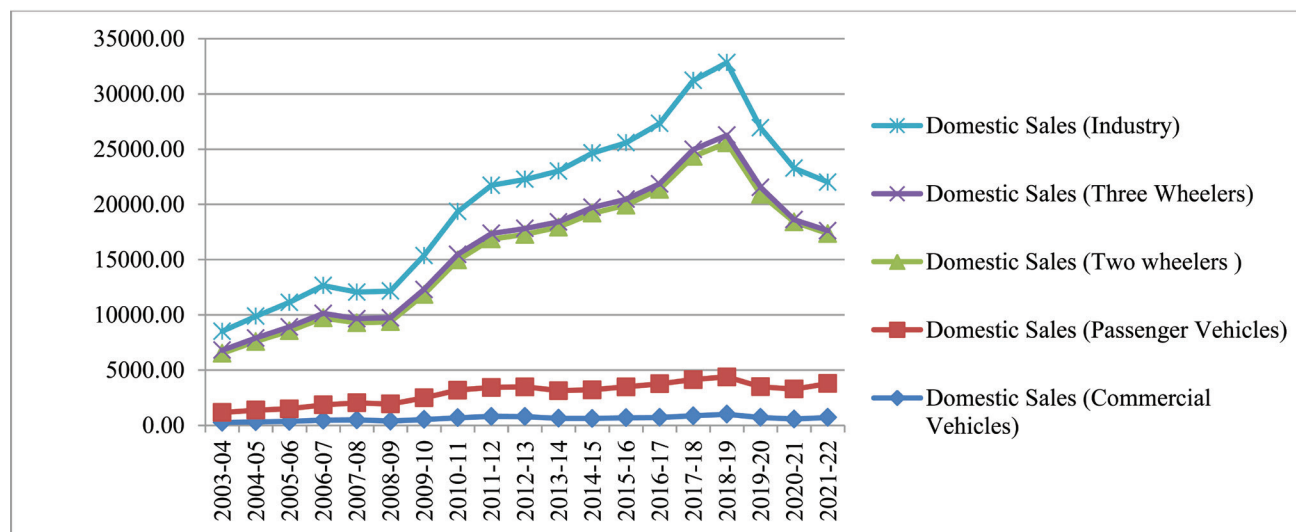


Figure 2: Trend Analysis of Domestic Sales of Segments of Automobile Industry in India for the Period 2003-04 to 2021-22

Source: Constructed based on data given in Table 9

Table 7: Trend Co-efficient for Domestic Sales of Automobile Industry in India for the Period 2003-04 to 2021-22

S. No.	Type	Y= $\alpha + \beta X + e$		
		α	β	R ²
1.	Commercial Vehicles	343.61	26.71	0.58
2.	Three-wheelers	363.66	8.93	0.14
3.	Two-wheelers	5117.4	761.25	0.764
4.	Passenger Vehicles	1002.4	128.74	0.84
5.	Industry	1706.5	231.4	0.77

Source: Computed based on data given in Table 5

Table 8: Domestic Sales Projections of Automobile Industry in India for the Period 2022-23 to 2026-27

(No. of Vehicles in Thousands)

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry (Average)
2022-23	877.73	542.19	20342.33	3577.20	6334.58
2023-24	904.44	551.12	21103.58	3705.94	6565.98
2024-25	931.14	560.05	21864.83	3834.68	6797.39
2025-26	957.85	568.97	22626.07	3963.42	7028.79
2026-27	984.55	577.90	23387.32	4092.16	7260.19

Source: Computed by using trend equations shown in Table 7

6.3. Exports of Automobile Industry in India

Table 9 carries the data relating to the number of vehicles exported by different segments of the automobile industry in India, and Table 10 shows the export trends by taking 2003-

04 as the base year. Table 11 shows the trend coefficient for exports of the automobile industry in India for the period 2003-04 to 2021-22 and Table 12 depicts future projections of exports of different segments of the industry from the period 2022-23 to 2026-27 made on the trend equations.

Table 9: Annual Exports of Segments of the Automobile Industry in India for the Period 2003-04 to 2021-22

(No. of vehicles, in Thousands)

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	17.43	68.14	265.05	129.29	119.98
2004-05	29.94	66.80	366.41	166.40	157.39
2005-06	40.60	76.88	513.17	175.57	201.56
2006-07	49.54	143.90	619.64	198.45	252.88
2007-08	59.00	141.24	819.85	218.42	309.62
2008-09	42.63	148.07	1004.17	335.73	382.65
2009-10	45.01	173.21	1140.06	446.15	451.11
2010-11	74.04	269.97	1531.62	444.33	579.99
2011-12	92.66	362.88	1947.20	507.32	727.51
2012-13	79.94	303.09	1960.94	554.69	724.71
2013-14	80.03	353.39	2084.00	596.14	778.39
2014-15	86.94	407.60	2457.47	621.34	893.34
2015-16	103.12	404.44	2482.88	653.05	910.87

2016-17	108.27	271.89	2340.28	758.73	869.79
2017-18	96.87	381.00	2815.02	747.29	1010.04
2018-19	99.93	567.69	3280.84	676.19	1156.16
2019-20	60.38	501.65	3519.41	662.12	1185.89
2020-21	50.33	393	3282.79	404.4	1032.63
2021-22	92.3	499.73	4443.13	577.88	1403.26
EGR (%)	8.77	10.49	14.84	7.88	12.94
Average	68.89	291.29	1940.73	467.03	691.99
S.D.	27.18	156.99	1198.81	209.17	385.22
C.V. (%)	39.45	53.89	61.77	44.79	55.67
Minimum	108.27	567.69	4443.13	758.73	1403.26
Maximum	17.43	66.80	265.05	129.29	119.98

Source: Compiled and calculated from data taken from Society of Indian Automobile Manufacturers, Retrieved from <http://www.siamindia.com>

Table 9 highlights that exports of commercial vehicles increased from 17.43 thousand vehicles in 2003-04 to 92.30 thousand vehicles in 2021-22, while those of three-wheelers increased from 68.14 thousand vehicles in 2003-04 to 499.73 thousand vehicles in 2021-22. The exports of two-wheelers increased from 265.05 thousand vehicles in 2003-04 to 4443.13 thousand vehicles in 2021-22 while the passenger vehicle segment recorded an export of 129.29 thousand vehicles in 2003-04 which increased to 577.88 thousand vehicles in 2021-22. The exports of the entire industry increased from 119.98 thousand vehicles to 1403.26 thousand vehicles, registering an exponential

growth rate of 12.94 percent during the study period. This increase indicates an increasing demand for Indian automobiles at the global level. The exponential growth rate of exports in the two-wheeler segment (14.84 percent) was the highest, followed by the three-wheeler segment (10.49 percent), commercial vehicle segment (8.77 percent), and passenger vehicle segment (7.88 percent). Maximum variation was noticed in the exports of two-wheeler segments (61.77 percent), whereas minimum variation was noticed in the exports of the commercial vehicle segment (39.45 percent) of the industry.

Table 10: Trend Analysis of Annual Exports of Segments of the Automobile Industry in India for the Period from 2003-04 to 2021-22

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry Average
2003-04	100	100	100	100	100
2004-05	172	98	138	129	131
2005-06	233	113	194	136	168
2006-07	284	211	234	153	211
2007-08	338	207	309	169	258
2008-09	245	217	379	260	319
2009-10	258	254	430	345	376
2010-11	425	396	578	344	483
2011-12	532	533	735	392	606
2012-13	459	445	738	433	604
2013-14	459	519	786	461	649
2014-15	499	598	927	481	745
2015-16	592	594	937	505	759
2016-17	621	399	883	587	725
2017-18	556	559	1062	578	842

2018-19	573	833	1238	523	964
2019-20	346	736	1328	512	988
2020-21	289	577	1239	313	861
2021-22	530	733	1676	447	1170

Source: Computed based on data given in Table 9

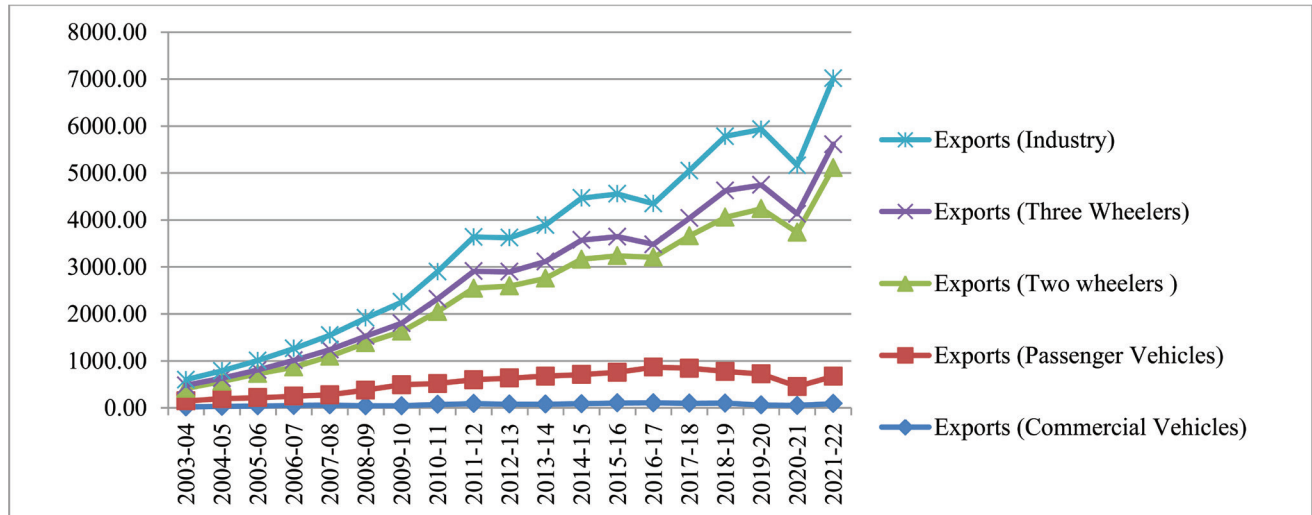


Figure 3: Trend Analysis of Exports of Segments of Automobile Industry in India for the Period 2003-04 to 2021-22

Source: Constructed based on data given in Table 9

Table 11: Trend Co-efficient for Exports of Automobile Industry in India for the Period 2003-04 to 2021-22

S. No.	Type	Y=α + βX + e		
		α	β	R2
1.	Commercial Vehicles	35.26	3.36	0.49
2.	Three-wheelers	34.04	25.73	0.85
3.	Two-wheelers	-151.93	209.27	0.96
4.	Passenger Vehicles	158.02	30.90	0.69
5.	Industry	18.85	67.31	0.97

Source: Computed based on data given in Table 9

Table 12: Exports Projections of the Automobile Industry in India for the Period 2022-23 to 2026-27

(No. of Vehicles, in Thousands)

Year	Commercial Vehicles	Three-wheelers	Two-wheelers	Passenger Vehicles	Industry (Average)
2022-23	102.53	548.55	4033.40	776.03	1365.13
2023-24	105.89	574.28	4242.66	806.93	1432.44
2024-25	109.25	600.00	4451.93	837.83	1499.76
2025-26	112.62	625.73	4661.20	868.74	1567.07
2026-27	115.98	651.45	4870.46	899.64	1634.38

Source: Computed by using trend equations shown in Table 11

7. Conclusion

After studying various growth parameters of the industry, it was found that annual production, domestic sales, and exports increased at rates of 6.09 percent, 5 percent, and 12.94 percent, respectively, from 2003-04 to 2021-22. It was found that annual production, domestic sales, and exports of the industry showed an increasing trend until the outbreak of coronavirus in 2019. Subsequently, a sudden decrease was noticed in the production, sales, and exports of automobiles from India. The research revealed that the passenger vehicle sector experienced the most significant increase in production and sales within the industry during the timeframe examined. The two-wheeler sector demonstrated the highest growth rate in vehicle exports throughout the same period. With the increasing demand for Indian automobiles at the global level, the future of the Indian automobile industry is bright. The Bharat VI standards came into force in India on April 1, 2020, and no Bharat IV vehicles are allowed to be sold in the country with effect from this date. With the implementation of Bharat VI emission standards, the automobile industry in India will witness drastic changes. The automobile industry in India also bears the loss of revenue due to the outbreak of coronavirus in the country because most auto manufacturers suspended their manufacturing activities as a preventive measure. It is too early to conclude anything about the effect of the coronavirus on the automobile industry in India because it is just the onset of the virus. The industry will be negatively affected by this pandemic; however, the extent to which the loss will occur and how the industry will recover from this loss can be determined in the long run. The government is urged to develop a comprehensive strategy to guide industry through the challenges posed by the pandemic. Given the current difficulties faced by businesses, government assistance is crucial. Additionally, it is recommended that India should prioritize self-sufficiency by emphasizing the domestic production of components necessary for manufacturing advanced and environmentally friendly vehicles.

8. Limitations of the Study

This study had the following limitations:

1. The study period was limited to 19 years i.e. from 2003-04 to 2021-22.
2. This study was based only on secondary data.

9. Scope for Further Research

This study considers only India's automobile industry. The automotive industry in India consists of the automobile and

auto-component industries. In future research endeavors, the growth of India's auto-components industry can be studied along with the automobile industry to gain an overall understanding of the automotive industry in India. The impact of the implementation of Bharat Stage VI standards and the outbreak of coronavirus on the automotive industry of India can also be studied in the future.

Acknowledgement

The author declares that there are no acknowledgements for this research paper.

Authorship Contribution

Everything is done by the author.

Funding

The author received no external funding to conduct this study.

Declaration

Author hereby declares that this research paper, is an original work conducted by the author. All sources and references have been appropriately acknowledged, and the work has not been submitted or published elsewhere.

Conflict of Interest

The author declares no conflict of interest.

References

- Acharya, P., & Rahman, A. (2021). Compound Annual Growth Rate (CAGR) of Select Financial Variables in Indian Four-wheeler Automobile Companies. *Wesleyan Journal of Research*, 14(15).
<https://ssrn.com/abstract=4170796>
- Agnihotri, D., & Chaturvedi, P. (2013). Indian Automobile Industry: A Life Cycle. *International Journal of Business and Management Research*, III (VIII), 323-330. https://www.academia.edu/33615290/INDIAN_AUTOMOBILE_INDUSTRY_A_LIFE_CYCLE?auto=download on January 20, 2020.
- Basavanagouda & Panduranga, V. (2021). Analysis of Goods Services Tax (GST) Impact on Indian Automobile Industry. <http://dx.doi.org/10.2139/ssrn.3851580>
- Chowdhury, S. G., & Chatterjee, S. (2020). Determinants of Indian automobile industry growth. *Eurasian*

- Journal of Business and Economics*, 13(26), 65-91. <https://doi.org/10.17015/ejbe.2020.026.04>
- Hessle, A. (2018). Top Reasons Why Indian Automobile Market Is Attracting Global Players. <https://ssrn.com/abstract=3214440>
- Krishnaveni, M. & Vidya, R. (2015). Growth of Indian Automobile Industry. *International Journal of Current Research and Academic Review*, 3(2), 110-118. <http://www.ijcrar.com/vol-3-2/M.%20Krishnaveni%20and%20R.%20Vidya.pdf>
- Meena, A., & Dhir, S. (2021). An analysis of growth-accelerating factors for the Indian automotive industry using modified TISM. *International Journal of Productivity and Performance Management*, 70(6), 1361-1392. <https://doi.org/10.1108/IJPPM-01-2019-0047>
- Miglani, S. (2019). The growth of the Indian automobile industry: Analysis of the roles of government policy and other enabling factors. *Innovation, economic development, and intellectual property in India and China: Comparing six economic sectors*, 439-463. https://doi.org/10.1007/978-981-13-8102-7_19
- Plan, A. M. (2016). Ministry of Heavy Industries & Public Enterprises. *Government of India*. <https://heavyindustries.gov.in/>
- Ranawat, M., & Tiwari, R. (2009). Influence of government policies on industry development: The case of India's automotive industry. *Technology and Innovation Management (University of Hamburg) Working Paper*, 57. <https://dx.doi.org/10.2139/ssrn.1583449>
- Shoeb, A., & Maqbool, A. (2017). Growth of Indian Automobile Industry. *International Journal of Emerging Research in Management and Technology*, 6(5), 26-29. <https://doi.org/10.23956/ijermt/V6N5/103>
- Vijayaragavan, T. (2021). An Overview of Automobile Industry in India. *International Journal of Creative Research Thoughts*, 9(8), 398-403. <https://ijcrt.org/papers/IJCRT2108158.pdf>



Journal of Technology Management for Growing Economies

Chitkara University, Saraswati Kendra, SCO 160-161, Sector 9-C,
Chandigarh, 160009, India

Volume 14, Issue 1

April 2023

ISSN 2456-3226

Copyright: [©2023 Navleen Kaur] This is an Open Access article published in Journal of Technology Management for Growing Economies by Chitkara University Publications. It is published with a Creative Commons Attribution- CC-BY 4.0 International License. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.