



PRODUCTION AND SALES TREND OF AUTOMOBILE INDUSTRY IN INDIA

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Abstract

The present paper studies the trend of automobile industry in terms of production and sales. In recent years India has been growing as a market potential for automobiles due to rise in demand and as a result there is an increased production to tap the growing demand both at home and in the foreign markets. This is reflected in the production figures of the industry especially remarkable in the motor cycle and three wheeler divisions, where production rose from 7.64 lakhs in the year 1995-96 to 20 lakh in the year 2002-03 and reached to 4.9 million in the year 2007-08. The sales figure of the industry reveals that sales of motor cycles have increased massively from 2.6 million to 8 million from the year 1995-96 to 2007-08. In the two-wheeler segment mopeds and scooters have exhibited a declining trend. The sales of passenger vehicles have increased from 4.4 lakhs to 1.7 million during the period 1995-96 to 2007-08, while commercial vehicles have grown almost 2.5 times. The analysis of the 13 year data of the industry indicates that the sale of the industry is quite satisfactory. Two wheelers continue to dominate the industry while passenger vehicles and commercial vehicles showing signs of slow growth. The exports of made in India vehicles soared by 31% in financial year 2004-05 as passenger cars, two and three wheelers, commercial and multi utility vehicles continue to charm overseas buyers. A total of 1.2 million units were shipped during financial year 2007-08 over 1 million units exported in the financial year 2006-07. Europe continue to be the biggest importer of cars from the country while, African nations bought bulk of buses and trucks. The Asian region became the prime destination for Indian two wheelers. A large number of joint ventures and technical collaborations of old renowned manufacturers have been approved for production of automobiles and their components within the country for domestic and international needs. This is likely to further increase the investment and market employment in the industry.

Objectives

- 1) To study the segmentation wise production trend of Automobile industry.
- 2) To analyze the segmentation wise sales trend of Automobile industry.
- 3) To examine the overall production and sales trend of the Automobile industry.

Key words: Automobile industry, production, sales, segmentation, growth.

1.0 Introduction

The automobile industry in India is growing especially after 1991 industrial policy. The industry is booming after removing restrictions on foreign collaborations. The automobile industry is one of the largest industries with deep forward and backward linkages and hence has a strong multiplier effect.

The automobile industry is also the largest consumer of raw materials like steel, aluminum & zinc alloys & also rubber and plastics. Automobile industry has become the back bone of the Indian economy which employs 13 million individuals in India. The objective of the present paper is to highlight the production and sales trend of the industry.

The automobile industry in India is the eleventh largest in the world with an annual production of approximately 2 million units. India is expected to overtake China as the world's fastest growing car market in terms of the number of units sold, because of its large market (India has a population of 1.1 billion; the second largest in the world), a low base of car ownership (25 per 1,000 people) and a surging economy, India has become a huge attraction for car manufacturers around the world.

Though several major foreign automakers, like Ford, GM and Honda, have their manufacturing bases in India, Indian automobile market is dominated by domestic companies. Maruti Suzuki is the largest passenger vehicle company, Tata Motors is the largest vehicle company while Hero Honda is the largest motor cycle company in India Other major Indian automobile manufacturers include Mahindra & Mahindra, Ashok Leyland and Bajaj Auto.

The automotive industry directly and indirectly employs 13 million persons in India. The Industry is valued at about US \$ 35 billion contributing about 3.1% of India's GDP (nominal). India's cost-competitive auto components industry is the second largest in the world. In addition, India's motor cycle market is also the second largest in the world with annual sales of about 5 million units.

2.0 Review of Earlier Studies

Research Section NPC,¹ (1988), indicates that the automobile industry is of strategic importance in the context of the country's economic development and its defence and security needs. The results reveal that its importance has grown over the years and from a sample CKD assembler, it has now acquired the status of a full-fledged automobile producer.

The scale of operations has, however, remained small which has seriously handicapped its efforts to compete in the world market.

Though India has been exporting automobile for the past three decades or so it still remains a marginal exporter. The position is unlikely to change very much in the near future as most of the automobile manufacturers continue to be low output high cost units and can not stand in competition with the long established automobile manufacture elsewhere in the world. The entry of Maruthi Udhhyog with a small fuel efficient car has provided some respite to the car sector but the situation in the auto industry as a whole remains somewhat unsatisfactory.

Sharma, J.P., & Bhatnagar Anjali² (2006), explains the automobile industry in India is booming especially after restrictions on foreign collaborations were lifted. The auto component industry has also become a key sector in the economy, with a turnover of around Rs 120 billion. The automobile industry is also the largest consumer of raw materials like steel, aluminum and zinc alloys, and also of high value rubber and plastics. This paper examined these multiplier effects on the manufacturing and service industries and analyses why the automobile industry is viewed as engine of growth in India.

In a nutshell road transport industry has always been saddled with pressure in terms of paying taxes and duties inspite of the fact that road transport industry is considered to be the back bone of the country's economy.

Singh Surjeet, and Khan Ahmed Irshad³ (1991), attempted to explain that the development of automobile industry has been a powerful stimulant to the industrial growth in the economically developed as well as developing countries. However it has been a late comer in India, tasting development only during the post-independence era. Some of the earlier characteristics of the industry have been limited production and sales, dependence on import of vehicles and components, cost in efficiency, low quality and reliability, backward technology, lack of modernization, fuel inefficiency, existence of seller's market, and almost indifferent attitude of the govt. The automobile industry no doubt has made tremendous strides both in quality and size over the years, but, still, it is far behind world leaders in automotive technology.

Sohn Ira,⁴ (2010), provides some "back-of-the-envelope" estimates of the direct gasoline (and oil) requirements that will be needed by China's automobile sector as vehicle ownership rapidly expands in tandem with economic development over the next 20 to 40 years. The impact of China's remarkable and still unfinished development program initiated around 1980 on its demand for minerals-both fuel and non-fuel – is nothing less than astounding.

The main focus of this paper has been to demonstrate how set of carefully-chosen, reasonable assumptions regarding the man drivers of economic well-being-demographic change, economic growth, technological advance, and changing government-imposed regulations and standards-can be combined to generate long-term projections of one of the most important ingredients of a modern standard of living.

Das Kusum Deb,⁵ (2004), examines the productivity performance of Indian manufacturing under varying trade regimes. The analysis focuses on the overall period of 1980-2000 and four sub-periods to reflect the shifts in trade policy regime. There is no evidence of much change in total factor productivity growth following liberalization of the regime initiated in the early 1980s. As in the 1980s factor accumulation rather than productivity growth accounts for most of the output growth during this period.

The work considered a set of 75 three digit manufacturing industries. The period of analysis is 1980-81 to 1999-2000. The panel of 75 three digit industries covers the following two digit numbers-cotton textiles, textile products, leather and leather products, basic chemicals, rubber, plastics and petroleum products, basic metals, metal products, non-electrical machinery, electrical machinery and transport and equipment.

Erumban Azeez Abdul,⁶ (2000), has presented new and up to date results on unit value ratios, labour productivity and unit labour cost for Indian manufacturing in comparison with some developing and developed countries. These figures help one understand the comparative position of Indian manufacturing from an international perspective using two extensive data sets on quantities and values of manufactured products in India and Germany the author has derived the relative prices between these two countries which are subsequently used to express the output values in a common currency.

The scholar has observed that though the labour productivity in Indian manufacturing has improved over the past quarter of a century, it is still much lower than that of the advanced countries and most developing countries.

Goldar Bishwanath,⁷ (1993), in this research work explains that technological advancement is usually major source of productivity improvement. But in Indian industries, while there has been a significant inflow of advanced technology, there has been no appreciable rise in productivity. The writer analyses the problems encountered in indigenization of foreign technology and concludes that local R&D efforts and development of indigenous technology would go a long way in ensuring productivity growth.

The scholar in this paper describes that during the last four decades, there has been a significant inflow of advanced foreign technology in Indian industries. But in terms of productivity improvement, the performance of Indian industry has been quite poor.

Goldar Bishwanath,⁸ (2009) in his work explains that the contradicting findings of several earlier studies, recent studies on productivity trends in Indian manufacturing by Unel (2003) and Tata Services (TSL) (2003) have concluded that total factor productivity (TFP) growth in Indian manufacturing accelerated after the 1991 economic reforms. This

paper presents an alternative set of estimates of TFP growth in Indian manufacturing in the last two decades, which have largely been made following the methodology of input and output measurement adopted in the studies of Unel and TSL, but avoiding the methodological inadequacies noticed in them.

The earlier works concentrated on production and sales trend of Automobile industry. This paper focuses on segmentation wise growth of production and sales trend of the industry.

3.0 History of Automobile Industry in Post Independence Period

While automobiles were introduced to India in the late 1890's, the manufacturing industry only took off after independence in 1947. The protectionist economic policies of the government gave rise in the 1950's to the Hindustan Motors Ambassador, based on a 1950's Morris Oxford and, is still ubiquitous in the roads and highways of India. Hindustan Motors and a few smaller manufacturers such as Premier automobiles, Tata Motors, BajajAuto, Ashok and Standard motors held an oligopoly until India's initial economic opening in the 1980's. The maverick Indian politician Sanjay Gandhi championed the need for a "people's car"; the project was realized after his death with the launch of a state-owned firm Maruti Udyog which quickly gained over 50% market share. The Maruti 800 became popular because of its low price, high fuel efficiency, reliability and modern features relative to its competition at the time. Tata Motors exported buses and trucks to niche markets in the developing world.

The liberalization of 1991 opened the flood gates of competition and growth which have continued up to today. The growth in the Indian economy has resulted in all major international car manufacturers entering the Indian market. General Motors, Ford, Toyota, Honda, Hyundai, and others set up manufacturing plants. Rolls Royce, Bentley, and Maybach are examples of the few high end automobile manufacturers which entered India in the recent years. The Tata Nano is at the lower end of the price range costing approximately US\$ 2,500 and Bugatti Veyron at the other with a price tag of over US\$ 2 million.

India's love affair with the automobile is famously embodied in the 1920's Rolls Royce collections of the erstwhile maharajas. The growing middle class aspires for the automobile for its convenience and as a status symbol. Upper middle class and wealthy car owners employ full-time chauffeurs to navigate the aggressive and seemingly lawless traffic patterns of most cities. The construction of expressways such as the Mumbai-Pune expressway has opened up new touring opportunities. The expected launch of a Formula one circuit in New Delhi is expected to spark public enthusiasm for a motor sporting industry.

3.1 Current Status of the Industry

India's automobile industry growth rate is 30 percent in the year 2004 which is already double that of China's 15 percent growth rate. In the year 2003-08, the estimated CAGR (Compound Annual Growth Rate) list, India scores 16 percent to China's 12.4 percent⁹. Analysts estimate that growth will make the Chinese market the second largest in the world by 2008. According to analysis by German consultants India is already the second most attractive auto engineering destination scoring 7.5 out of 10 on the index just below China's 10 on 10. While Latin America also scores a 7.5, east Europe the other growth engine in autodom is at 5 as does Africa¹⁰.

3.2 Structure of the Automobile Industry

The Indian automotive industry comprises of the automobile industry and auto-components sectors. The automobile industry has a relatively low share (5% to 6%) of industrial output in India compared to the (8% to 10%) share in developing countries like Mexico and Brazil and a much higher share of around (15% to 17%) in countries like US & Germany¹¹.

The Indian automotive industry has a 6% share in the country's industrial output and gross value added, 5.5% share in industrial employment and more than 17% share in indirect tax collection. In absolute numbers the automobile industry employs more than 0.2 million personnel directly and 1.0 million personnel indirectly. India currently produces about 6 million two wheelers, 1 million passenger cars and multi-utility vehicles (MUVs) and 0.3 million commercial vehicles (CVs). India ranks second in the world in the production of the two-wheelers only after China, fifth in the production of commercial vehicles and thirteenth in the production of passenger cars¹².

The following are the features of automobile industry which constitutes the three categories viz commercial vehicles (CV), passenger cars, multi utility vehicles (MUV), and two and three wheelers. It is important to assess the market share of each segment to understand their relative importance, Two wheelers constitute the largest market share in the industry.

3.3 An Update of the Industry

The automobile industry made a gentle beginning in the post 1950s. Till 70s the industry received ill treatment because no major policy decisions regarding the sector were made. The decision in the late 1980s allowed foreign collaborations in the sector which was a stepping stone for this industry. Later on, the industry benefited hugely from the new economic policy announced by the then govt of India, Given below is the profile of each of the product categories of automobile industry.

3.3.1 Commercial Vehicles

The proportion of increased freight and passenger movement are the results of increased urbanization in towns and cities. Hence the importance of commercial vehicles cannot be under estimated. It comprises three sub divisions-the LCVs (light), MCVs (medium) and HCVs (heavy) commercial vehicles. India's \$5 billion truck and bus market, in the world fifth largest has been enjoying a 30 per cent annual growth rate in the past three years¹³.

Heavy commercial vehicles transport bulk cargo over 500 km on an average consisting of industrial products and raw materials like iron and steel, cement, petroleum products, consumer goods, pharmaceuticals, agriculture commodities, electronics goods, industrial equipment and machinery.

The national and state highways which constitutes 8 per cent of total road length in our country and which carries 80 to 90 percent of total road freight traffic. Further the length of the national highways is only 2 percent of total road length and carries 40 percent of freight traffic which are the results of the poor state of road infrastructure and non existence of vehicle scrapping norm in India. (Agarwal P N "A comprehensive history of business in India –from 3000 BC to 2000 AD", Tata Mc Graw Hill publishing company Ltd , New DELHI 2001.

3.3.2 Multi Utility Vehicle Segment

In the last fifty years the MUVs market has grown tremendously from around 2000 vehicles in the late 1940 to around 181,000 vehicles in 2004-2005¹⁴. This category of vehicles till the mid-80s was primarily used by the government, army, police and Paramilitary forces exclusively are today an important mode of mass transport in rural and urban areas. These vehicles enjoy the benefits of some duties and concessions as commercial vehicles, which are substantially lower than those of passenger cars.

3.3.3 Passenger Cars

India is one of the oldest automotive industries in south and in south-East Asia, with the first passenger car made in the early 1940s. However, since then, the development of the industry shifted to two wheelers and LCVs. The industry profile in India is different from the global profile. Globally, passenger cars are the largest segment of the automobile industry, but in India it is much smaller. The Budget for 2006-07 has reduced the excise duty on small cars from 24 percent to 16 percent with the intention to become more price competitive in order to make India a hub for exporting small cars. India overtook China in 2004 as the fastest growing automobile market and closed the year with sales of a million passenger vehicles.

Maruti started operations in partnership with Suzuki motors in 1984, till then the passenger cars supply was low. In the year 1991 the new industrial policy as a part of liberalization movement announced delicensing for the passenger car segment. Though there was no restrictions in terms of entry but the excise concessions was removed to make this segment the most heavily taxed segment among all segments (excise duty of 40 percent)¹⁵. This clearly indicates the government bias against the segment and cars being viewed as a luxury product.

3.3.4 Two and Three Wheelers

The two wheeler industry comprises of mopeds scooters, motor cycles .Scooters form the largest segment in the industry (37 percent) while the major part of the growth has come from motor cycles. Till mid 1980s scooters dominated the market but now motor cycles currently account for around two-third of the two wheeler market .The demand for two wheelers has come from rural areas. In these areas these vehicles are used as a means of carrying both passenger and goods.

4.0 The Industry Profile

4.1 Production Trend

During 1989-90, 11.90 lakh rupees vehicles were produced in the automobile industry. The production worth has increased to 16.46 lakhs in the year 1993-94. The production of the industry had increased almost by 4 times in the year 1993-94 from 16.46 lakh rupees vehicles to 63.57 worth lakh rupees vehicles were produced during the year 2003-2004. In the year 2007-08 the production of the industry had increased significantly to 20.59 million rupees. In recent years India has a growing market potential for automobiles, due to a rise in demand and as a result there is an increased production to tap the growing demand both at home and in the foreign markets. This is reflected in the production figures of the industry, especially remarkable in the motor cycle & three wheeler division, where production rose from 7.64 lakh, in the year 1995-96 to 20 lakh in the year 2002-03 and reached to 4.9 million in the year 2007-08. This is a remarkable change in the two wheeler & three wheeler segment. There is a massive production of commercial vehicles (HMV) and passenger vehicles (MV) in the said period. The production of passenger vehicles & commercial vehicles almost increased above four times from the year 1995-96 to 2007-08. Overall, the production of automobile industry has increased quite significantly during this period.

A large number of joint ventures and technical collaborations of world renowned manufacturers have been approved, for production of automobiles and their components within the country for domestic and international needs. This is likely to further increase the investment and market employment.

Production Trend of the Automobile Industry

In lakhs (rupees)

YEARS	PRODUCTION 2 & 3 WHEELERS	PRODUCTION HMV & MV	TOTAL PRODUCTION
1989-1990	2,15,696	7,61,105	9,76,801
1990-1991	2,90,189	9,00,647	11,90,836
1991-1992	2,77,143	8,44,511	11,21,654
1992-1993	3,05,257	11,15,806	14,21,063
1993-1994	3,75,910	12,70,939	16,46,849
1994-1995	5,22,662	18,32,500	23,55,162
1995-1996	7,64,534	29,75,673	37,40,207
1996-1997	9,98,260	26,28,912	36,27,172
1997-1998	8,04,064	30,88,816	38,92,880
1998-1999	9,79,683	28,71,426	38,51,109
1999-2000	11,93,661	26,69,335	38,62,996
2000-2001	14,54,374	24,81,468	39,35,842
2001-2002	16,00,521	24,35,363	40,35,884
2002-2003	20,00,127	34,93,350	54,93,477
2003-2004	22,92,628	40,64,564	63,57,192
2004-2005	33,16,200	1,03,55,400	1,36,71,600
2005-2006	41,38,415	1,13,54,712	1,54,93,127
2006-2007	49,08,503	1,38,96,372	1,88,04,875
2007-2008	49,23,989	1,56,74,947	2,05,98,936

Source: Annual survey of industries(ASI), Central statistical organization (CSO) ¹⁶

Growth Model for Production

The Growth of Production:

The equation of the growth model is $y = a*(1+r)^n$

Where $\log y = \log a + n \log (1+r)$

Where natural log of dependent variable (production) is linearly regressed on time

Where $Y = \log y$,
 $A = \log a$,
 $B = \log (1+r)$

The transformed equation is $Y = A + Bn$

Where $a = e^A$
 $r = e^B - 1$

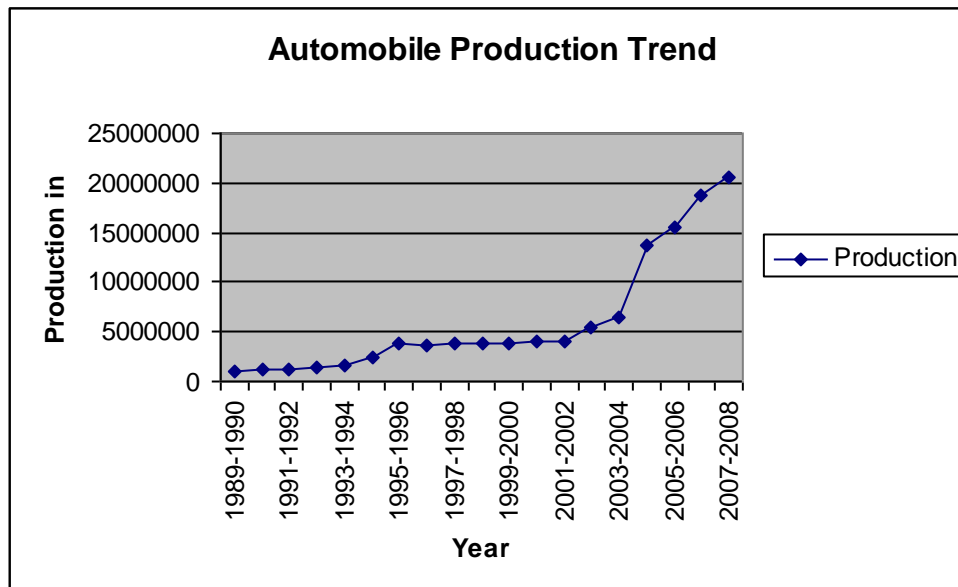
The fitted growth model to the given production data over a period of time is

$$y = 793493(1 + 0.1752)^n$$

This states that, the annual compound growth rate of production of Automobile industry is 0.1752 per year or 17.52% per year.

The coefficient of determination (r^2) for the given model is 0.93 which implies that 93% of the variation in production is explained by the variable time.

The Growth of Production of Automobile Industry is explained with the following graph.



4.2 Segmentation Wise Relative Trend Of Production And Sales

4.2.1 PRODUCTION TREND OF THE INDUSTRY

During 1995-96, 3.5 million vehicles were produced in the automobile industry. The production has increased almost 2.5 times from 6.2 million vehicles in the year 2002-03 to 10.8 million vehicles in the year 2007-08 as shown in the table. In the recent years India has had a growing market potential for automobiles due to a rise in demand. As a result there is an increased production to tap the growing demand both at home and in the foreign markets. This is reflected in the sales and production figures of the industry especially remarkable in the motor cycle division, where production rose from 2.6 million in the year 1995-96 to 5 million in the year 2002-03 and reached to 10.8 million in the year 2007-08. This is a remarkable change in the two wheeler segment. There is a massive production of commercial vehicles and passenger vehicles in the said period. The production of passenger vehicles almost increased four times from the year 1995-96 to 2007-08. Overall, the production of automobile industry has increased quite significantly during this period.

Automobile production trends(Number of vehicles)

Category	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Passenger vehicles	454,491	545,728	535,655	512,416	700,274	632,244	698,082	735,941	1,007,993	1,214,540	1,310,525	1,545,555	1,765,867
Commercial vehicles	217,437	240,551	160,894	186,446	173,541	152,014	146,314	198,827	275,098	350,032	391,078	520,000	545,104
Three wheelers	176,413	221,619	234,867	208,042	205,739	191,204	212,753	266,619	340,729	371,208	434,424	555,887	500,592
Two wheelers	2,656,017	2,979,227	3,072,667	3,197,131	3,722,477	3,756,130	4,324,631	5,087,539	5,624,950	6,454,765	7,601,801	8,436,186	8,009,292
Grand total	3,504,358	3,987,125	4,004,083	4,104,035	4,802,031	4,731,592	5,381,780	6,288,926	7,248,770	8,390,545	9,737,828	11,057,628	10,820,855

Source: J P Sharma and Bhatnagar, Central statistical organization (CSO), Statistical abstract india¹⁷

4.2.2 Sales Trend of the Industry

Sales figures for the automobile industry including exports have increased tremendously from 3.5 million in the year 1995-96 to 10.8 million in the year 2007-08. The sales figures for motor cycles increased massively from 2.6 million to 8 million from the year 1995-96 to 2007-08. In the two wheeler segment mopeds and scooters have exhibited declining trend. The sales of passenger vehicles have increased from 4.4 lakhs to 1.7 million in the above period, while commercial vehicles have grown almost 2.5 times.

An analysis of thirteen year data is seen in the following table for the auto industry indicates that the sales of the industry is quite satisfactory, showing almost 3.5 times rise in sales. Two wheelers continued to dominate the industry, while passenger vehicles and commercial vehicles showing signs of slow growth.

It is not an exaggeration to say about two wheelers since the beginning of the industry this segment is dominating the industry. The reason for this is two wheelers have capitalized on better styling, better quality of ride, engineering as well as aggressive financing schemes that made their mark from 2002-03 onwards. This drove a growth in volumes from 5.6 million units in 2003-04 taking the share of two wheelers in the overall industry to 8 million units in the year 2007-08. As a result of arrival of new brands and companies in passenger vehicles segment, it began to show up. The prime driver of this expansion was the multi utility vehicle sub segment, where a series of brand launches from M&M, Hyundai, Maruti, Ford, Toyota and Honda are positioned these bulky vehicles to increase sales. Several state laws were framed banning old trucks from plying the roads as well as emergence of new 13-40 tonne trucks from the three main components in this business Tata Motors, Ashok Leyland and Volvo India, given a boost to this segment.

Exports of made in India vehicles soared by 31 percent in financial year 2004-05 as passenger cars, two and three wheelers commercial and utility vehicles continued to charm over sea buyers. A total of 1.2 million units were shipped during financial year 2007-08 over 1 million units exported in 2006-07 financial year.

Europe continued to be the biggest importer of cars from the country while African nations bought bulk of the buses and trucks. The Asian region became the prime destination for Indian two wheelers.

The government has decided to set up National Automobile Testing R&D infrastructure project (NATRIP) to improve the global competitiveness of the Indian automotive sector.

Sales trend of automobile industry (Number of vehicles)													
Category	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Passenger Vehicles	449,600	545,946	551,022	521,687	762,061	717,672	668,281	779,203	1,031,387	1,227,974	1,318,648	1,578,431	1,766,403
Commercial Vehicles	215,638	235,512	157,898	139,930	171,523	150,355	158,541	202,937	277,546	348,370	391,641	517,302	545,816
Three Wheelers	177,055	220,436	233,733	210,220	189,860	198,162	215,738	274,895	332,222	374,657	436,801	547,806	505,938
Two Wheelers	2,658,288	2,963,489	3,042,855	3,403,247	3,776,778	3,745,516	4,367,908	4,991,808	5,629,301	6,576,172	7,565,560	8,491,948	8,068,436
Grand Total	3,500,581	3,965,383	3,985,508	4,275,084	4,900,222	4,811,705	5,410,468	6,248,843	7,270,456	8,527,173	9,712,650	11,135,487	10,886,593

Source: www.siamindia.com: J P Sharma and Anjali Bhatnagar {2006} ¹⁸

4.2.3 Segmentation Wise Growth Rates of Production and Sales

Period from 1995-96 to 2007-08		
Category of vehicles	Production growth rate	Sales growth rate
Passenger vehicles	11.86%	11.8%
Commercial vehicles	9.19%	9.88%
Two wheelers	10.82%	10.78%
Three wheelers	9.43%	9.5%
overall	10.8%	10.79%

The above table explains growth rates of different categories of vehicles for the thirteen year period. In the beginning we computed aggregate growth rate of production which explains general trend of the industry. The imbalance growth in different categories of vehicles in the industry will be better understood by computing segmentation wise growth rates. By observing and comparing segmentation wise growth rates of different category of vehicles during the period mentioned above will bring out useful and interesting information about the industry.

The production and sales growth rate of passenger vehicles is 11.86% and 11.8% which states that there is not much gap between sales and production which indicates that there is a good demand for our automobile vehicles in India and in the global market. The above table explains that the production of passenger vehicles is more during the period than the other segment of vehicles.

There is not much gap between production and sales growth rates of commercial vehicles which states that whatever is produced is sold in the market. The growth of production of commercial vehicles is a good sign which indicates growth in commercial activities which will have multiple effects on employment, trade and transport.

The production and sales growth rate of two wheelers are 10.82%, and 10.78% respectively. In case of three wheelers there is not much gap between production and sales which states that the Indian manufacturers effectively introducing innovative technological products in order to attract customers simultaneously concentrating on sales promotion methods.

Conclusion

This paper provides a picture of automobile industry production and sales. The industry production has increased substantially from 1.19 million rupees in the year 1989-90 to 20.59 million rupees in the year 2007-08 with an annual growth rate of 17.52% per year. On the other hand the thirteen year sales period of the industry indicates that the sales of the industry increased almost by 3.5 times during this period. However these figures give us information relating to aggregate production and sales of the industry. Hence segmentation wise study is useful to have a close view over the industry.

The production of passenger vehicles is more during the period 1995-2008 with annual growth rate of 11.86% than the growth rate of other segment of vehicles. The production and sales growth rate of two wheelers are 10.82%, and 10.78% respectively. This states that the Indian two wheeler manufacturers are penetrated into the global market.

The Indian automobile industry has a significant growth potential given its existing low penetration levels and a fast growing economy, with a high income group of consumers. In terms of manufacturing base, India offers some significant advantages, namely a large pool of well qualified manpower, which can also be utilized in fostering local research and development, availability of enough land and other natural resources like iron ore, coal, bauxite and a well defined legal environment.

In spite of the above advantages the Indian automotive industry still continues to be plagued by issues such as multiplicity of local taxes, cascading impact of taxes and duties, high import duties on raw materials, taxes on services in addition to corporate taxes. Incidentally road transport industry is the highest tax generating segment in the country, equivalent to 40 percent on cost. In a nutshell, road transport industry has always been saddled with pressure in terms of paying taxes and duties. In spite of above all reasons, road transport industry is considered to be the back bone of the country's economy.

Appendix

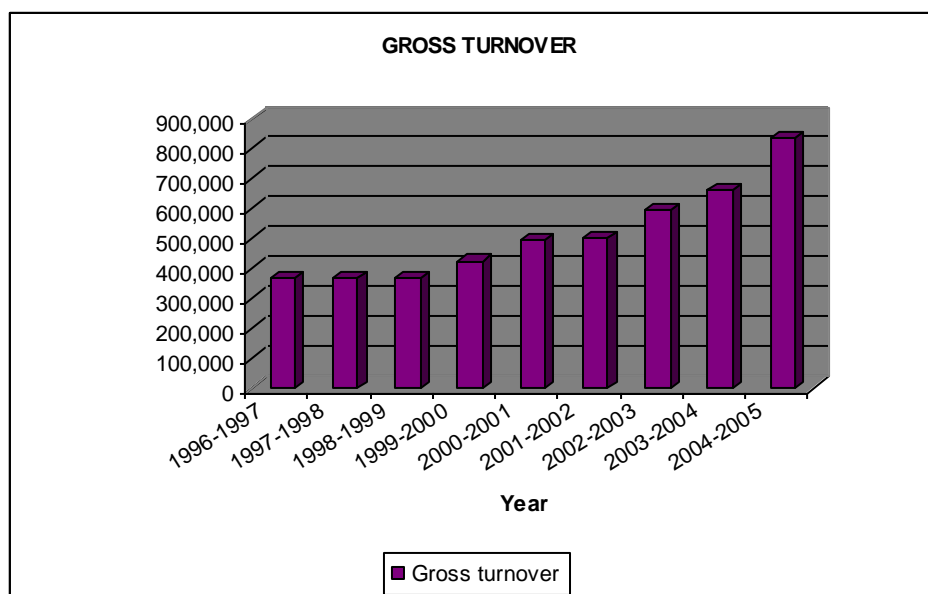
Gross turnover of Automobile Industry

The size of gross turnover has shown an impressive jump over a period of nine years from 0.36 million in the year 1996-97 to 0.83 million in the year 2004-05.

Turnover of Automobile Manufacturers	
Year	(Rs. in millions)
1996-97	364,450
1997-98	365,411
1998-99	368,262
1999-00	422,933
2000-01	492,024
2001-02	499,136
2002-03	595,184
2003-04	661,769
2004-05	835,851

Source: www.siamindia.com: J P Sharma and Anjali Bhatnagar {2006} ¹⁹

The turnover of automobile industry is diagrammatically represented by the following bar diagram for the years 1996-2005. The compound annual growth rate of gross turnover is 10.93% and the fitted growth model for the gross turnover is $y = (292582)(1.1093)^n$



Production Analysis of the Industry

- 1) The fitted growth model to the given passenger vehicles production data over 13 years period of time is $Y = 371016(1.1186)^n$

This states that the annual compound growth rate of production of passenger vehicles of automobile industry is 11.86% per year.

- 2) Similarly the fitted growth model to the given production of commercial vehicles in the same period of time is $Y = 133573(1.0919)^n$

This states that the annual compound growth rate of production of commercial vehicles of automobile industry is 9.19% per year.

- 3) The fitted growth model to the given production data of Two wheelers during the period of time is $Y = 2255315(1.1082)^n$

This states that the annual compound growth rate of production of Two wheelers of the industry is 10.82% per year.

- 4) The fitted growth model to the given production data of Three wheelers during the period of time is $Y = 149074(1.0943)^n$

This states that the annual compound growth rate of production of Three wheelers of the industry is 9.43% per year.

- 5) The fitted growth model to the overall production data during the period of time is $Y = 2916223(1.108)^n$

This states that the annual compound growth rate of total production of the industry during the given period is 10.8% per year.

Sales Analysis of the Industry

- 1) The fitted growth model to the given sales data of passenger vehicles over 13 years period of time is
 $Y = 382276.7(1.118)^n$

This states that the annual compound growth rate of sales of passenger vehicles of automobile industry is 11.8% per year.

- 2) Similarly the fitted growth model to the given sales data of commercial vehicles in the same period of time is
 $Y = 125367(1.0988)^n$

This states that the annual compound growth rate of sales of commercial vehicles of automobile industry is 9.88% per year.

- 3) The fitted growth model to the given sales data of Two wheelers during the period of time is
 $Y = 2274112(1.1078)^n$

This states that the annual compound growth rate of sales of Two wheelers of the industry is 10.78% per year.

- 4) The fitted growth model to the given sales data of Three wheelers during the period of time is
 $Y = 148153(1.095)^n$

This states that the annual compound growth rate of production of Three wheelers of the industry is 9.5% per year.

- 5) The fitted growth model to the overall sales data during the period of time is
 $Y = 2939647(1.1079)^n$

This states that the annual compound growth rate of total sales of the industry during the given period is 10.79% per year.

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