

# A Study on Manufacturing and Sales Performance of Leading Motor Manufacturers

Dr. Esha Raffie B<sup>1</sup>, Deepika A<sup>2</sup>

<sup>1,2</sup>Sri Krishna Arts and Science College, Coimbatore

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## ABSTRACT

The article describes the developments of motor vehicle or automobile industry in terms of production. In recent years, the growth in market potential for automobiles is directly proportional to the emerging demand. The analysis of the past year data of the industry indicates that the production of the industry is quite satisfactory. A large number of joint ventures and technical collaboration of old renowned manufacturers has been approved for production of automobiles within countries for domestic and international needs. Statistical techniques were used to predict an increase of an investment and market employment of the industry.

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## INTRODUCTION

In today's fast and developing world, there is no life without a motor vehicle. A motor vehicle is also known as motorized vehicle or automotive vehicle, is a self-propelled vehicle, commonly wheeled, that does not operate on rails and is used for the transportation of people or cargo. The vehicle propulsion is provided by an engine or motor, usually an internal combustion engine or an electric motor, or some combination of the two, such as hybrid electric vehicles and plug-in hybrids. For legal purpose, motor vehicles are often identified within a number of vehicle classes including cars, buses, motorcycles, off-road vehicles, light trucks and regular trucks.

The first motor vehicle was built by a French Engineer, Nicolas –Joseph Cugnot in the 18<sup>th</sup> century, which ran on steam. Many people across the world brought further developments to the motor vehicle in the late 19<sup>th</sup> century. Automakers started producing compact cars that were fuel-efficient. By 1980 Japan became the largest car producing countries in the world and became the first automobile to be mass-produced on a moving assembly line.

Motor vehicle or Automobiles can increase quality of life through increased mobility, comfort, and safety. The industry also contributes to job creation and skill development. Its numerous forward and backward links bring both direct and indirect employment. Cars have increased the level of air and noise pollution in cities, causing more humans to suffer from respiratory, heart diseases, or cancers. Owning a car is expensive and requires additional costs to maintain and repair it.

Tires affect how a vehicle handles rides and brakes—all in the name of safety. When tires are defective, they can lead to serious car crashes and lifelong or fatal injuries. The single most important innovation in the evolution of vehicle safety features, wearing your seat belt is the single most effective thing you can do to protect yourself in a crash. Defective seatbelts can lead to head, brain, chest, abdomen, spine, and other injuries. Airbags work with seatbelts to prevent more serious personal injuries. Airbags have been mandatory on all cars since 1998. Airbags are a crucial component in saving lives.

The development of the motor vehicle has contributed to changes in employment distribution, shopping patterns, social interactions, manufacturing priorities and city planning; increasing use of automobile has reduced the roles of walking, horses and railroads. A certain degree of car dependency might be positive for the economy at a macroeconomic level, since it demands automobile production, therefore resulting also in job demand and tax revenue. Several developed countries have car manufacturers productive enough to satisfy their country's internal demand for cars.

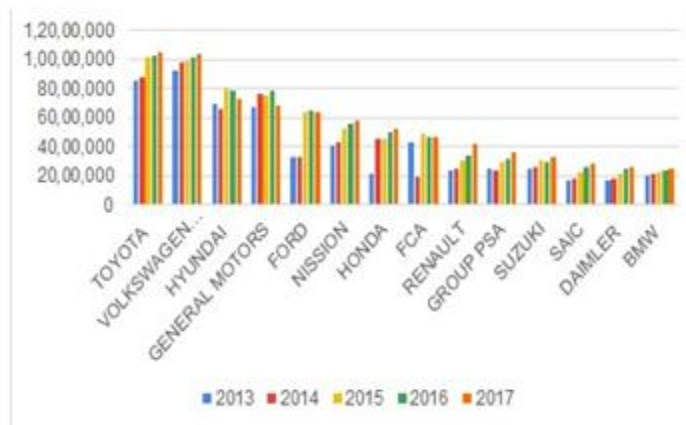
Jimmy Corton Gddam (2013) studied that the Indian automobile industry has a significant growth potential; it is a fast growing economy, with a high income group of consumers. India offers a well-qualified manpower and natural resources. Walmik Kachru Sarwade (2015) studied that the Indian Automobile market is a promising industrial sector that is growing

immensely every passing year. The four-wheeler industry in India has not been able to match up to the performance of its counterparts in other parts of the world due to the regulatory atmosphere that prevailed till the deregulation in the mid-1990s. Several Indian Automobile manufacturers have spread their operations globally, asking for more investments in the Indian automobile Sector by the MNC's. Sujeet Kumar Yadav, MridulaSahay studied that the trade liberalization of 1990's brought many new industries and many Foreign Direct Investments (FDI) inflows. The accelerated economy growth and increase in the population created many demands and the India market flourished. The automobile sector is further expected to increase as the income level of the people is expected to improve. The increase in the automobile will increase the consumption of fossil fuels and will in turn increase the rate of the pollution.

Even though today's car is a great machine that is fast, elegant and beautiful to look at, engineers are constantly working on a car that will make today's automobile look old. As oil is becoming more and more expensive, alternative power sources are being explored. Cars are becoming computerized machines. Some day they may drive themselves. The pace of technological improvement will continue to increase, but the benefits of those improvements are not likely to be fully realized until 2050 or later.

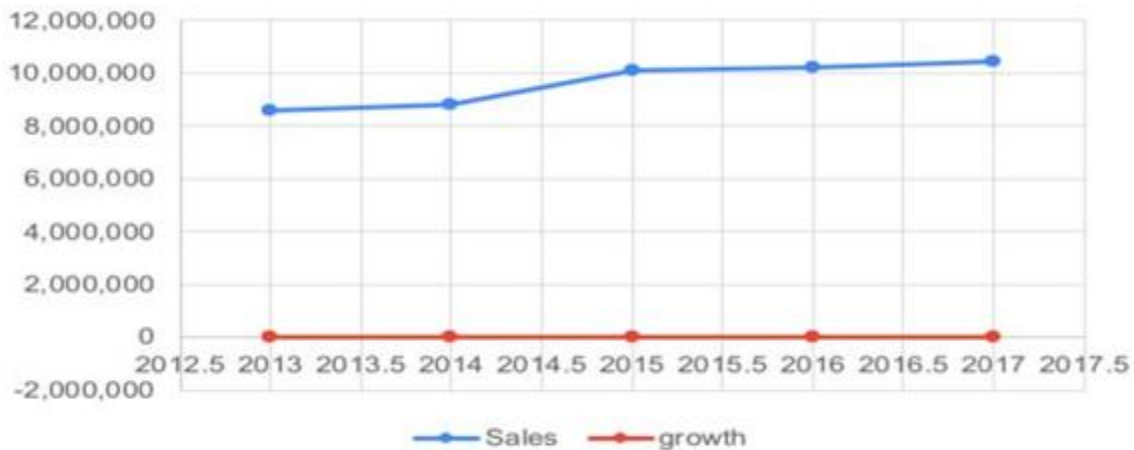
**Leading Manufacture Company**

The below bar diagram indicate production of vehicles in famous and best branded companies. This diagram explains consequent years and their production of vehicles at leading companies.



**Growth Leading Manufacture Company:**

Growth rates refer to the percentage change of a specific variable within a specific time period. For investors, growth rates typically represent the compounded annualized rate of growth of a company's revenues, earnings, dividends, such as gross domestic product (GDP) and retail sales.



The above diagram gives sales and growth of top most companies of consequent years. So, these 5 years growth of all company is same but sales of vehicle are different.

**MULTIPLE LINEAR REGRESSIONS:**

**Table 1: Summary table of Multiple R and R Square**

Regression	Statistics
Multiple R	0.976578
R Square	0.953704
Adjusted R	0.933127

**Table 2: ANOVA**

	df	SS	MS	F	Significance
Regression	4	8640000	2160000	46.35	0.000
Residual	9	4190000	4660000		
Total	13	9060000			

**Table 3: Regression**

	Coefficients	Standard error	t statistics	P Value
Intercept	286414.8	549117.2	0.5216	0.6415
B	0.60195	0.234247	2.569726	0.0302
C	2.644044	1.076285	2.45664	0.0364
D	-2.37567	1.374273	-1.72868	0.1179
E	0.057865	0.481251	0.120238	0.9069

The first table is the Summary table. This table provides the R, R<sup>2</sup>, adjusted R<sup>2</sup>, and the standard error of the estimate the regression. The “R” column represents the value of R, the multiple correlation coefficient. R can be considered to be one measure of the quality of the prediction of the dependent variable. A value of 0.976578 indicates a good level of prediction. The “R Square” column represents the R<sup>2</sup> value (also called the coefficient of determination), which is the proportion of variance in the dependent variable that can be explained by the independent variables (technically, it is the proportion of variation accounted for by the regression above and beyond the mean). You can see from our value of 0.953704 that our independent variables explain 95.3704 of the variability of our dependent variable. However, you also need to be able to interpret “Adjusted R Square” (adj.R2) to accurately data.

ANOVA Statistical significance The F-ratio in the ANOVA table tests the overall regression . The table shows that the independent variables statistically significantly predict the dependent variable, F(4,9) =46.34991,p <.0005. Statistical significance of the independent variables. You can test for the statistical significance of each of the independent variables. This tests whether the unstandardized (or standardized) coefficients are equal to 0. If p < .05, you can conclude that the coefficients are statistically significantly different to 0 (zero). The t-value and corresponding p-value are located in the “t” and p-value columns, respectively. You can see from the significance value column that all independent variable coefficients are statistically significantly different from 0. Although the intercept, β<sub>0</sub>, is tested for statistical significance.

$$Y=286414.8+0.60195x_1+2.644044x_2-2.37567x_3+0.057865x_4+.....$$

**CONCLUSION**

The study illustrates on the topic “Statistical study on leading motor manufacturers in worldwide “.The statistic shows the world's leading motor vehicle manufacturers in 2017, based on production. Volkswagen produced about 10.4 million vehicles in 2017. Meanwhile, Toyota produced around 10.5 million units, and China's SAIC produced some 2.9 million motor vehicles.New motor vehicle production grew to almost 97 million units in 2017. That year, Toyota, Volkswagen, Hyundai, GM, and Ford continued to be the leading producers of motor vehicles. Toyota and Volkswagen managed to increase production volumes by around 250,000 units each. These two companies are also the leading motor vehicle manufacturers in terms of sales. Other notable gainers included Nissan, Honda, and Renault. General Motors and fellow American carmaker Ford, as well as Hyundai were among the manufacturers in the top five to report a decline in motor vehicle production. General Motors spun off its European Opel and Vauxhall brands in 2017. Both brands were acquired by Groupe PSA, the maker of Peugeot and Citroen.

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