PERFORMANCE OF TRENDS IN PRODUCTION, SALES AND COST
STRUCTURE OF AUTOMOBILE INDUSTRY IN INDIA

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ABSTRACT
Automobile industry is a major constituent of surface transport. Automobile manufactures, particularly car manufacturers are attracting buyers with new model shopping to tap growing demand for automobiles. Utility vehicles also posted significant growth. Further, two and three wheelers industries specially the motor cycle segments have shown a steep jump, while the volume growth of all the players has recorded pretty good market share. Therefore, automobile industry has been selected for this study in order to determine its working capital performance during the study period. In this study researcher focuses on automobiles such as LCV & HCV, Passenger Cars, Motor Cycles & Mopeds, Scooters & Three Wheelers and Tractors.

Keywords: Production, Sales, Cost Structure, LCV & HCV, Passenger Cars, Motor Cycles & Mopeds, Scooters & Three Wheelers and Tractors
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Introduction

Transport sector is the backbone of country’s economic growth and development. Transportation throughout the world has made possible an unprecedented level of mobility across the geographical boundaries. The mobility has given many people more options about where to live and work than they had years ago. Similarly, mobility has broadened the access of business to new markets and more choices by increasing the available pool of resources. From the economic point of view, transportation is a vital factor for steady economic growth and development. The trade facilitated by transportation has been a growing component of national income in all the countries. Studies show that the contribution of transportation in GDP has a positive impact. The structure of the economy also influences the transport system because consumer expenditure on transportation contributes to national economy. Transport sector is equally important for both industrialized and developing economies. Transport sector including water transport, aviation and surface transports are major players of Gross Domestic Product (GDP), which includes the value of all goods and services. Being the largest transport networking in the world, particularly in road transportation, automobile industry plays a significant role in the GDP of the country.

Statement of the Problem

Production is considered as the backbone of the manufacturing sector. The production performance is important to know the operating level of the business enterprise. A sale is the important component for the development of the business. Because of the pricing policy of the government, the automobile industry has to face some fluctuations in the sales. These fluctuations lead to increase or decrease in the financial risk. The profitability of the business depends on the cost incurred for the production of goods. If the cost increases, the profit of the business is reduced and consequently the business may go to the liquidation stage. Hence, the analysis of production, sales and cost of a automobile industry is utmost importance.
Objectives of the Study

The study is carried out with the following specific objectives:

1) To analyze the trends of production, sales and cost of the automobile industry in India.

2) To present summary of the study and to make suitable suggestion for improvement in the competitive business world.

Research design

The automobile industry is purposively selected for the present study, considering its importance as the backbone of economic growth in any country. The database of CMIE has made compilation for more than eighty automobile companies of which only sixty eight companies have financial data for a continuous period of 10 years for the period 2008-09 to 2017-18. Owing to several constraints such as non-availability of financial statements or non-working of a company in a particular year, etc., the researcher classified five sectors of automobile industries. The criterion adopted for the selection of industry in the present study is based on the size of their total assets. Only, the companies which are having more than ten thousand crores turnover in the given financial period are selected for the purpose of the study. The following table shows that different automobile industry selected for the study.

Table A

Sample Design of the Automobile Industries in India

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the Automobile Industries</th>
<th>Total Assets as on 31st March 2018 (in crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCV &amp; HCV</td>
<td>58645.30</td>
</tr>
<tr>
<td>2</td>
<td>Passenger Cars</td>
<td>10965.26</td>
</tr>
<tr>
<td>3</td>
<td>Motor Cycles &amp; Mopeds</td>
<td>57955.43</td>
</tr>
<tr>
<td>4</td>
<td>Scooters &amp; Three Wheelers</td>
<td>12590.07</td>
</tr>
<tr>
<td>5</td>
<td>Tractors</td>
<td>16348.07</td>
</tr>
</tbody>
</table>

Source: Annual Reports of the Select Automobiles Companies (Prowess, 2018)
Period of the Study

The period of study has been confined to ten years, from 2008-09 to 2017-18.

Limitations of the study

1. The period covered under the study is ten years only (from 2008-09 to 2017-18).
2. The study solely depends on the published financial data, so it is subject to all limitations that are inherent in the condensed published financial statement.
3. As per requirement and necessity some data are grouped and sub grouped.
4. Also, in spite of being aware of the fact that inflation is so certain a factor, it could not be taken into consideration in the present study.

REVIEW OF LITERATURE

It is compulsory to review the literature available with respect to the area of the research study. Measuring the performance of the corporate sector is always an area of controversies from the point of view of the government, shareholders, prospective inventors, creditors, employees and any other stockholders. Several studies have been undertaken to evaluate the financial performance in the corporate sector. This chapter presents some of the studies conducted by financial analysis.

Sam Luther (2007) examined the liquidity, Risk and profitability. To measure the liquidity two significant ratios are used; they are current ratio and quick ratio. There are two major categories of profitability ratios 1. profit in relation to sales and 2. profits in relation to investments. One of the major disadvantages of the profits in relation to sales is that it ignores the Japanese electric power firms have suffice managerial and financial capabilities even if the American financial standard is hypothetically introduced into the evaluation of their financial performances. However, the empirical results also indicate that the empirical results also indicate that the Japanese power industry performs barely above the American standard. Thus, corporate leaders in the Japanese power industry need to pay more serious attention to their corporate finances and financial strategies. Such financial perspective will be increasingly important along with the current deregulation policy of the Japanese government.
Dr. B. Ramachandra Reddy and Dr. B. Yuvaraja Reddy (2007) in their study, they examined the effect of selected variables on MVA of selected cement companies in India from 01.04.2003 to 31.03.2004. For the purpose of the study 3 major cement units and 7 mini plants were selected. The MVA has been taken as a dependent variable and return on net worth, capital productivity, labour productivity, earnings per shares, economic value added, return on sales (or) turnover, return on total assets and cash profits have been selected as independent variables. It can be inferred them regression analysis that none of the factors was found to have significant impact on MVA. But EPS was found to have a negative and significant effect on MVA. This indicates that the MVA of cement companies is not only affected by selected independent variables but also influenced by other factors.

Kasturi Rangan, S.(2008) in his study made an attempt to identify the factors determining the profitability of the banks through partial correlation co efficient for the period from March 2000 to 2007. These banks were classified into 5 different groups for the purposes of analysis.

Victoria Bellou, Andronikidis,(2009) depicts in their study that organizational climate, which comprises the setting of values, rules and priorities to be followed by all individuals involved in the organization, has been receiving enlarged attention over recent years. The purpose of this paper is to look into the prevalent organizational climate within hotels and to identify variations employees’ perception, based on whether they hold managerial or non-managerial positions. The results show that efficiency, reflexivity, innovation and flexibility, supervision support and quality were among the most prominent characteristics affected by organizational climate, whereas outward focus and pressure to produce were least affected. Furthermore the only differences revealed between managerial and non-managerial employees were in the areas involvement and efficiency.

Ray Sarbapriya and Mihir Kumar Pal (2010) in their study reflect dismal declining trend after the path -breaking economic reforms in 1991. There is an acute need for developing a comprehensive plan for cement industry so that it can survive in the post -liberalized Indian environment and make its presence global.
Chandrakumarmangalam and Govindasamy (2010)\(^6\) in their study have disclosed the impact of leverage on the profitability of the firm. The relationship between the debt and equity ratio and earnings per share and how effectively the firm be financing. The leverage and profitability and growth are related and the leveraging impact on the profitability of the firm.

Glocker, Daniela (2011)\(^7\) in their research paper evaluate the effect of student aid on the success of academic studies focus on two dimensions, the duration of study and the probability of actually graduating with a degree. To determine the impact of financial student aid, the researcher estimates a discrete-time duration model allowing for competing risks to account for different exit states (graduation and dropout) using individual level panel data from the German Socio-Economic Panel (SOEP) for the years 1984-2007. They suggest that the duration of study is responsive to the type of financial support a student receives. They concluded three main results. First, student aid recipients finish faster than comparable students who are patronized by the same amount of parental/private transfers only. Second, although higher financial aid does on average not affect the duration of study, this effect is (third) dominated by the increased probability of actually finishing university successfully.

Rai Sandeep Kumar and Dwivdei Shailes K, (2011)\(^8\) in their study, stated that the Cement Industry in India is moment. Driven by a booming real estate sector, global demand and increased activity in his fracture development such as state and national highways, the cement industry has seen tremendous growth. The realty sector boomed but could not sustain for long and it collapsed because of the loan defaults. This situation spread like wild fiber and put the Indian economy in danger like the US economy. The US financial crises have affected many countries of the world and India is no exception to it. Because of these financial crises, Indian economy has lost more than 2% of GDP growth. Almost all sectors of the Indian economy have been affected by this crisis.

N.VenkataRamana(2012)\(^9\) he observed that bankruptcy is a situation where the liabilities surpassed the assets in the company, generally it happens due to under capitalization, not maintain sufficient cash, sources are not utilize properly, in efficient management in all activities, sales decline and market situation etc. Predicting bankruptcy is a dire vital for taking curative and corrective measures for better financial planning, profitability, liquidity and solvency efficiency of the firm. In this study an
attempt have been made to know the financial performance and also to predict the risk of bankruptcy for selected cement companies from 2001-to-2010.

Liquidity Ratios; Working Capital Ratios, Solvency Ratios and Altman Z-Score Analysis was made to diagnose the problem of bankruptcy. The results make known that liquidity, working capital turnover efficiency and solvency position of the selected cement companies are not satisfactory. In this study the Z-Score analysis results shows that KCP Ltd and Kesoram Industries Ltd have poor financial performance and Dalmia Bharat Ltd is at the edge of bankruptcy.

Sachin Mittal, (2012) he analyzed that, the Indian cement industry is the second largest cement industry in the world. The paper attempts to examine the working capital trends on the basis of size of working capital, ratio of working capital to total assets, fitting trend line analysis, and correlation amongst the profit, sales and current assets. The present study proposed that in India, cement industry has low level of profitability due to mismanagement of current assets and current liabilities. The main objective of working capital management is to arrange the needed funds at right time from the right sources and for the right period so that tradeoff between liquidity and profitability may be realized. The study excavated that the cement industry in India are failing to maintain the required level of working capital.

Sarangarajan (2013) Indian cement industry is the second largest cement industry in the world. The paper attempts to examine the performance and management of assets of the select cement companies in Tamil Nadu with the support of Trend analysis. Data employed in this study are all secondary in nature which is frequently inspected by Institute of Charted Accountants of India and Security Exchange Board of India. The pooled data collection is to assess the impact of regulation on performance of asset of cement companies in Tamil Nadu over the time horizon viz., 1996-97 to 2005-06. The variables used in this study are Land, plant, stock, cash and debtors. The authors have preferred four cement companies in Tamil Nadu and using a statistical technique as Trend analysis with the aid of Minitab software version 15. On an analysis it is found that cement plants taken first study have collected land not only for plant construction but also mining lands keeping the future expansion/new plant on a long term basis. It is natural for Tamil Nadu cement factories to hold higher inventory of limestone because of various factors involved in mining operation and location of the mining land from the
factory. As found in the Trend Analysis the cement plants had changed their marketing policy from “Cash and Carry” to credit sales. This change in policy of offering credit to large consumers is a major cause for higher debtors balance in the recent years.

The cement plants in Tamil Nadu in their efforts to enlarge their market share started offering credit to the consumers especially for real estate builders which has resulted in low cash balance. It is expected that change in cement customer mix will result in a comfortable cash balance in future. It is found that so many small cement industries have been closed because of improper cash management. This has resulted in cash crunch In Cash Trend Analysis. The consumption of cement by government increases, this trend may be expected to decline.

**Dr.P.Krishna Kumar (2013)** The study was designed to scrutinize the growth of Indian cements industry since 1991, in terms of its growth in installed capacity, production, exports, and value additions; In detail the research methodology used for the study that has highlighted on the past, present and the future performance of Indian Cement Industry (ICI) at the macro level and the Chettinadu Cement Corporation Limited (CCCL) at the micro level as a case firm. The study purely depends on secondary data. The secondary data were collected for a period of fifteen years (1991-92 to 2005-06) from the database maintained and made available by several organizations viz., Cement Manufacturers Association, Export Import Bank of India, Center for Monitoring Indian Economy etc. for the purpose of effective periodical analysis. In order to know the progress of ICI, annual time series data for the six variables were.

Studied for trend, cyclical variation and random variation, as seasonal variation was not observable in the annual data. The estimated trend equations were evaluated for their goodness of fit and predictive power and found valid to draw inferences. The values of the six variables were projected to the next five years. Estimated values were adjusted for the likely effects of cyclical variations (c) the reliability of predicted values were evaluated with the help of forecasting error. In the end of the study indications and conclusion were provided.

**Acharekar Sachin Vilas Vijaya (2013)** Working capital is considered to be life -giving force to an economic entity and managing working capital one of the most important functions of corporate management. Working capital management (WCM) is the management of short – term financing requirements of a firm which includes
maintaining optimum balance of working capital components – receivables, inventory and payables – and using the cash efficiently for day – to -day operations. The main objectives of this study are to examine and evaluate the working capital management in Cement Industries Limited, observe the management pattern of inventory, liquidity position and receivables management. This also finds the relationship between Working Capital Efficiency and Profitability, Profitability.

Joseph Jisha (2014) closely observe the study of working capital management in Ashok Leyland and points out that the liquidity and profitability position of the company is not satisfactory and needed to be strengthened in order to be able to meet its obligations in time.

RESULTS AND DISCUSSIONS

Trend analysis is effective only when relevant and suitable items are studied together. Thus, the results which are shown have to be viewed in conjunction with the resources employed. For the purpose of analysis all components have been pooled. Value is calculated in automobile industries to analyze the production, sales and cost position of industry under study. 2008-09 has been preferred as the base year equal to 100. Index numbers have been calculated for the remaining years based on the base year.

Trends in Production

Production may be considered as the backbone of a manufacturing enterprise. In business enterprise, production will be considered to be very effective and useful when it serves the dual purpose: 1) It must operate primarily to content customer demands and 2) It must permit production activities to operate in an economical and efficient manner. In the economic sense “production” means both making goods and rendering services that add value to a product even though there are no utilities and utilization of resources such as, labour, energy, materials, equipment and machinery, etc. Utilities are goods and services which have want satisfying powers.¹⁵

Ho: There is no significant difference between actual value of production and the trend value of production among different years.

The trends in production of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It shows that the highest mean value of
production was Rs.110349.49 crores in Passenger Cars which accounts of total industrial production, followed by Rs.61895.52 crores in LCV & HCV production. The remaining production of industry by Motor Cycles & Mopeds was Rs.34924.46 crores, followed by Scooters & Three Wheelers with Rs.19540.89 crores and Tractors with Rs.14596.18 crores. On the basis of average productions, the maximum contribution together by Passenger Cars and LCV & HCV of industrial productions.

The value of production of the automobile industry for the period of study from 2008-09 to 2017-18 has been shown in Table 4.1.1. The production of automobile industry has clearly marked an increasing trend throughout the period except in the year 2017-18. In the year 2007-08 the production was Rs.112786.75 crores which increased to Rs.350939.09 crores in 2016-17, marking an increase of 311.15 per cent in the indices. The mean value of production of automobile industry during the study period was Rs.214306.53 crores. The compound annual growth rate of production was 38.16 per cent. The CV value of actual value of production was 8.46 per cent which shows more gradually increase in the production of automobile industry during study period.

The comparison of actual value of production has been shown in Table 1 which represents that the trend values differed materially from the actual production. The original values of production were lower than the trend values in 2008-09, 2009-10, 2010-11, 2011-12, 2012-13 and 2017-18. It may be indicated that in the remaining year, the original values of production were higher than the trend values. The calculated $\chi^2$ value comes to 68685.14 which is higher than the table value of 16.919 at 5 per cent level. It indicates that the differences between actual values of production and trend values of production in different years were significant. Further the fitted linear regression can be used for prediction of production.

**Trends in Sales**

‘Sales’ is the value of output supplied to the customers. It is the life blood of a business enterprise without which the business cannot survive. Further, ‘Sales’ is the indicator of the operational efficiency of management in how efficiently the management has used the assets of the business. The higher volume of sales is more efficient the management. Sale is also related to profitability of an enterprise. The higher amount of sales more profitable the business is and vice versa. The matching of costs sustained
during a certain period with sales generated during that period reveals the net income or net loss.

The trend of sales specifies the direction in which a concern is going and on the basis of which forecast can be made. The trend analysis of sales helps to understand the growth of a business enterprise.

**Ho:** There is no significant difference between the actual value and trend value of sales among different years.

The trends in sales of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It put on view that the highest mean value of sales was Rs.109663.74 crores in Passenger Cars which accounts of total industrial sales, followed by Rs.61209.77 crores in LCV & HCV sales. The remaining sales of industry by Motor Cycles & Mopeds were Rs.34238.72 crores, followed by Scooters & Three Wheelers with Rs.18169.39 crores and Tractors with Rs.13224.68 crores. On the basis of average sales, the maximum contribution together by Passenger Cars and LCV & HCV of industrial sales.

The value of sales of the automobile industry for the period of study from 2008-09 to 2017-18 has been shown in Table 1. The actual sales of automobile industry have marked an increasing trend throughout the period. In the year 2008-09 the sales were Rs.108318.05 crores which increased to Rs.249719 crores in 2017-18, marking an increase of 230.54 indices. The mean value of sales during the study period was Rs.236506.30. The SD and CV value were 92058.39 and 38.92 per cent which point toward more fluctuation in the sales of automobile industry during the study period. The CAGR values were registered at 8.71 per cent.

The comparison of actual value of sales and trend value of sales has been shown in Table 1 which represents that the trend values varied materially from the actual sales. The original values of sales were lower than the trend values in the year 2008-09, 2009-10, 2010-11, 2011-12 and 2017-18. In the remaining years, the original values of sales were higher than the trend values. The calculated \( \chi^2 \) value comes to 69223.29 which is higher than the table value of 16.919 at 5 per cent level. It indicates that the differences between actual value of sales and trend value of sales in different years were significant.
Trends in Cost of Production

The price for the product is always fixed by taking into account the cost of the production and adding a mark-up which may be stated as a percentage of the cost for profit. The cost of production value is determined by the sum of the cost of the resources that went into making it. The cost can be composed of the cost of any of the factors of production including prime cost, work cost, administrative cost and selling cost, etc. Broadly, the determinants of cost of production are: the size of the plant, the level of production, that is, the utilization of the plant, the nature of technology used the process of the various inputs like raw materials, labour, power and fuel, managerial and labour efficiency, etc. For instance, the larger the size of the plant, the greater are the internal economies of production and consequently. The large firm will experience increasing returns of decreasing cost. In other words, the average physical product will rise and correspondingly, the average cost will decline. Likewise, there will be better utilization of plant, the use of better technology, and fall in the cost of production. In the same manner, a fall of prices of inputs like raw materials, or a fall in transport charges will also reduce the average cost of production.16

Ho: There is no significant difference between actual values and trend values of cost of production among different years.

The trends in cost of production of automobile industries companies for the periods from 2008-09 to 2017-18 have been shown in Table 1. It represents that the highest mean value of cost of production was Rs.103492.01 crores in Passenger Cars which accounts of total industrial cost of production, followed by Rs.55038.04 crores in LCV & HCV cost of production. The remaining cost of production of industry by Motor Cycles & Mopeds was Rs. 28066.99 crores, followed by Scooters & Three Wheelers with Rs.16891.64 crores and Tractors with Rs.9160.82. On the basis of average cost of production, the maximum contribution together by Passenger Cars and LCV & HCV of industrial cost of production.

The value of cost of production of automobile industry for the period of study from 2008-09 to 2017-18 has been shown in Table 1. The cost of production of automobile industry has marked an increasing trend all over the period. The mean value of cost of production of automobile industry during the study period was Rs.212649.51
The SD and CV values of cost of production were 85311.11 and 40.12 per cent respectively during the study period. The CAGR value was marked 7.66 per cent.

The comparison of actual value and trend value of cost of production has been represented in Table 1 which shows that the trend value varied materially from the actual value of cost of production except during the year 2008-09 to 2017-18. The original values of cost of production were lower than the trend values in the year 2009-10, 2010-11, 2011-12 and 2017-18. It may be pointed out that the lower cost of production incurred in the automobile industry. In the remaining year, the original values of cost of production were higher than the trend values. The calculated $\chi^2$ value comes to 67059.53 which is higher than the table value of 16.919 at 5 per cent level of significance. It indicates that the difference between the actual and trend values of cost of production in different years were significant.

Trends in Raw Material Expenses

Raw material is a very vital factor of production. It includes physical commodities used to manufacture the final end product. It is the starting point from which the first operations start. It is the first and most important element of cost. According to the Indian Association of Materials Management, 64 paise in a rupee are spent on raw materials by Indian industries. Materials are the principal substances used in production, and are transferred into finished goods. Raw material consumed consists of the amount spent on various types of raw materials and components consumed during the course of manufacturing. Additionally, the figure has been arrived at by adding the cost of opening stock of raw materials to the purchase of raw material and deducting the cost of closing stock.

**Ho: There is no significant difference between actual values and trend values of raw material expenses among different years.**

The trends in raw material expenses of automobile industries for the periods from 2008-09 to 2017-18 have been shown in Table 1. It represents that the highest mean value of raw material expenses was Rs.73699.19 crores in Passenger Cars which accounts of total industrial raw material expenses, followed by Rs.44842.73 crores in LCV & HCV raw material expenses. The remaining raw material expenses of industry
by Motor Cycles & Mopeds was Rs.22399.38 crores, followed by Scooters & Three Wheelers with Rs.12546.80 crores and Tractors with Rs.8650.50 crores. On the basis of average raw material expenses, the maximum contribution together by Passenger Cars and LCV & HCV of industrial raw material expenses.

The value of raw material expenses of automobile industry during the study period from 2008-09 to 2017-18 has been shown in Table 4.1.4. The raw material expenses of automobile industry have marked an increasing trend throughout the period except in the year 2017-18. In the year 2008-09, raw material expenses was Rs.77838.391 crores which crossed the mark of Rs. 256974.67 crores during the year 2016-17 and reached Rs.173344.72 crores in the year 2016-17, marking an increase of 222.70 indices. The mean value of raw material expenses was Rs.162138.59 crores. The SD and CV values were 62315.92 and 38.43 per cent respectively which designate more normally increased and some fluctuation in the raw material expenses of automobile industry during the study period. The CAGR value was 8.34 per cent.

The actual and trend value of raw material expenses comparison indicated in the Table 4.1.4 depicts that the trend value varied from the actual value of raw material. The original values were lower than the trend values in the years 2008-09, 2009-10, 2010-11, 2011-12 and 2017-18. It shows during the years the lower raw material expenses were incurred. In the remaining years, the original values were higher than the trend values. The calculated $\chi^2$ value comes to 19154.56 which is higher than the table value of 16.919 at 5 per cent level. It indicates that the differences between actual value and trend value of raw material expenses in different years were significant.

**Trends in Wages and Salaries Expenses**

Wages and salaries as a means of providing income for the workers become the only sources of income which determines their economic survival in the society; so they try to force the employers to follow a method of payment which entitles them to higher wages. High wages and salaries are given to workers to become efficient and produce more. Increased production will result in lower cost per unit. Thus, cost of production per unit will come down. The amount paid to employees by way of salaries, wages, bonus, gratuities, and contribution towards the provident funds, superannuation funds,
family pension scheme, staff welfare expenses, Voluntary Retirement Service (VRS) compensation funds have been categorized as ‘Wages and Salaries’ in the present study.

**Ho: There is no significant difference between actual value and trend value of wages and salaries expenses among different years.**

The trends in wages and salaries expenses of automobile industries for the periods from 2008-09 to 2017-18 have been shown in Table 1. It describes that the highest mean value of wages and salaries expenses was Rs.4144.62 crores in LCV & HCV which accounts of total industrial wages and salaries expenses, followed by Rs.3599.09 crores in Passenger Cars wages and salaries expenses. The remaining wages and salaries expenses of industry by Motor Cycles & Mopeds was Rs.1277.97 crores, followed by Scooters & Three Wheelers with Rs.712.92 crores and Tractors with Rs.911.31 crores. On the basis of average wages and salaries expenses, the maximum contribution together by LCV & HCV and Passenger Cars of industrial wages and salaries expenses.

The value of wages and salaries expenses of automobile industry for the period of study from 2008-09 to 2017-18 has been shown in Table 1. The wages and salaries expense of automobile industry have marked an increasing trend from 2008-09 and 2016-17 which reached the mark of 401.76 indices. In the year 2017-18, the wages and salaries expenses diminished to Rs.13522.06, marking a decrease of 292.57 indices in the year 2017-18. The mean value of wages and salaries expenses was Rs. 10645.90 crores. The SD and CV values were 4763.81 and 44.75 per cent which shows the fluctuation found during the study period. The CAGR value was 11.33 per cent.

The comparison of actual value and trend value of wages and salaries expenses is represented in the Table 1 which shows that the trend values varied materially from the actual wages and salaries expenses except the year 2017-18. The actual value of wages and salaries expenses is lower than the trend value during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15 and 2017-18. The actual value is higher than the trend value in 2008-09, 2009-10, 2013-14 and 2016-17. It may be pointed out that the higher wages and salaries expenses were sustained the automobile industry. The calculated $\chi^2$ value is 38162.19 which is higher than the table value of 16.919 at 5 per cent level of
significance. It indicates that the difference between actual and trend values of wages and salaries in different years were significant.

**Trends in Manufacturing Expenses**

The manufacturing expenses comprise freight inwards and transportation, packaging materials, job work/contract/processing charges, stores consumed, repairs on plant and machinery/buildings, technical fees paid, license fee/operation charges and other operating expenses have been grouped as manufacturing expenses for the purpose of the study.

*Ho:* There is no significant difference between actual value and trend value of manufacturing expenses among different years.

The trends in manufacturing expenses of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It shows that the highest mean value of manufacturing expenses was Rs.2777.37 crores in LCV & HCV which accounts of total industrial manufacturing expenses, followed by Rs.1104.66 crores in Passenger Cars manufacturing expenses. The remaining manufacturing expenses of industry by Motor Cycles & Mopeds were Rs.388.56 crores, followed by Scooters & Three Wheelers with Rs.329.39 crores, Tractors with Rs.267.38 crores. On the basis of average wages and salaries expenses, the maximum contribution together by LCV & HCV and Passenger Cars of industrial wages and salaries expenses.

The manufacturing expenses of automobile industry for the period of study from 2008-09 to 2017-18 have been shown in Table 1. The manufacturing expenses marked a fluctuating trend throughout the study period. In the year 2011-12, the manufacturing expenses were Rs.4524.87 crores which increased to Rs.5745.53 crores in 2013-14, marking an increase of 235.90 per cent in the indices. The mean value was Rs.4867.36 crores. The CAGR value was 6.49 per cent. The SD and CV values were 1510.47 and 31.03 per cent which shows more fluctuation in the manufacturing expenses of automobile industry during the period under study.

The comparison of actual and trend value of manufacturing expenses of automobile industry has been shown in Table 1 which represents that the trend value varied materially from the actual manufacturing expenses. The original values of manufacturing expenses were lower than the trend values in the years 2009-10, 2010-11 and 2017-18. In the remaining years the original values were higher than the trend.
values. It may be pointed out that higher manufacturing expenses were sustained the automobile industry. The $\chi^2$ value comes to 691.78 which is found to be statistically significant. It indicates that the differences between the actual and trend of manufacturing expenses in different years were significant.

**Trends in Power and Fuel Expenses**

In automobile industry, electricity expenses play a vital role. For the purpose of analysis any expenses related to electricity and for other fuel have been considered under this study.

**Ho:** *There is no significant difference between the actual and trend value of power and fuel expenses among different years.*

The trends in power and fuel expenses of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It shows that the highest mean value of power and fuel expenses was Rs.800.50 crores in Passenger Cars which accounts of total industrial power and fuel expenses, followed by Rs.574.38 crores in LCV & HCV power and fuel expenses. The remaining power and fuel expense of industry by Motor Cycles & Mopeds was Rs.222.98 crores, followed by Scooters & Three Wheelers with Rs.113.16 crores and Tractors with Rs.107.65 crores. On the basis of average power and fuel expenses, the maximum contribution together by Passenger Cars and LCV & HCV of industrial power and fuel expenses.

The power and fuel expenses of automobile industry for the period of study from 2008-09 to 2017-18 have been shown in Table 1. The power and fuel expenses of automobile industry have marked a rising trend throughout the period. In the year 2008-09, the power and fuel expenses were Rs.913.42 crores which increased to Rs.2018.47 crores marking an increase of 331.46 per cent of the indices. The mean value of power and fuel of automobile industry during the study period was Rs.1818.66. The SD and CV were 732.52 and 40.28 per cent respectively which indicates that there was fluctuation found during the study period. The CAGR value was 8.25 per cent.

The actual and trend values of power and fuel expenses comparison are given in Table 1 which shows that the trend value varied materially from the actual value of power and fuel expenses except in the year 2017-18. The original values of power and fuel expenses were lower than the trend values in the years 2010-11, 2011-12, 2012-13, 2013-14 and 2017-18. In the remaining years, the original values of power and fuel
expenses were higher than the trend values. The calculated $\chi^2$ value comes to 468.58 which is found to be statistically significant. It indicates that the differences between actual and trend values of power and fuel expenses in different years were significant.

**Trends in Selling and Administrative Expenses**

Selling and distribution expenses include the amount spent during the course of sales, boosting the sales and delivery of goods sold has been termed as selling and distribution expenses. The expenses adhering to advertisement, commission to selling agents, marketing expenses, service charges, delivery charges, goods and transportation etc. are covered under the above head. The expenses relating to office and general administration of companies like the director’s remuneration, legal expenses, rent, rates, taxes and depreciation of office building and equipment have been grouped as administrative expenses.

**Ho:** There is no significant difference between actual value and trend value of selling and administrative expenses among different years.

The trends in selling and administrative expenses of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It shows that the highest mean value of selling and administrative expenses was Rs.6818.31 crores in Passenger Cars which accounts of total industrial selling and administrative expenses, followed by Rs.4032.95 crores in LCV & HCV selling and administrative expenses. The remaining selling and administrative expense of industry by Motor Cycles & Mopeds was Rs.2472.61 crores, followed by Tractors with Rs.1030.93 crores and Scooters & Three Wheelers with Rs.695.76 crores. On the basis of average selling and administrative expenses, the maximum contribution together by Passenger Cars and LCV & HCV of industrial selling and administrative expenses.

The selling and administrative expenses of automobile industry during the study period from 2008-09 to 2017-18 have been shown in Table 1. The selling and administrative expenses of automobile industry marked an increasing trend all over the period. In the year 2008-09 the selling and administrative expenses were Rs.7658.40 crores which increased to Rs.25631.89 crores in 2016-17, marking an increase of 334.69 per cent of indices and decrease of 226.36 in the year 2017-18. The mean value was Rs.15050.55 crores. The SD and CV values were 5990.71 and 39.80 per cent respectively which shows that fluctuation was deducted in the selling and administrative
expenses of automobile industry during the study period. The CAGR value was 8.51 per cent.

The actual and trend value of selling and administrative expenses comparison is depicted in the Table 1 which exhibits that the trend value varied materially from the actual value of selling and administrative expenses. The original values lower than the trend values in the years 2009-10, 2010-11, 2011-12, 2012-13, 2013-14, 2014-15 and 2017-18. It shows that the lower selling and administrative expenses growth were found in automobile industry. In the remaining years, the original values were higher than the trend values. The calculated \( \chi^2 \) value comes to 3685.16 which is found to be statistically significant. It indicates that the differences between actual value and trend value of selling and administrative expenses in different years were significant.

**Trends in Miscellaneous Expenses**

The miscellaneous expenses include donations, loss on sale of assets, loss on sale of investments, loss on revaluation of investment, expenses amortized; provision on doubtful loan/deposit/advances and other provision for contingency have been considered under this head for the purpose of the study.

*Ho: There is no significant difference between actual value and trend value of miscellaneous expenses among different years.*

The trends in miscellaneous expenses of automobile industries for the periods from 2008-09 to 2017-18 have been presented in Table 1. It exhibits that the highest mean value of miscellaneous expenses was Rs.15517.64 crores in Passenger Cars which accounts of total industrial miscellaneous expenses, followed by Rs.2948.61 crores in LCV & HCV miscellaneous expenses. The remaining miscellaneous expense of industry by Motor Cycles & Mopeds was Rs.3971.53 crores, followed by Scooters & Three Wheelers with Rs.941.87 crores and Tractors with Rs.932.74 crores. On the grounds of average miscellaneous expenses, the maximum contribution together by Passenger Cars and LCV & HCV of industrial miscellaneous expenses.

The miscellaneous expenses of automobile industry during the study period from 2008-09 to 2017-18 have been shown in Table 1. The miscellaneous expenses of automobile industry have marked an increasing trend during the year 2008-09, 2009-10, 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15 then slightly decrease in 2016-16,
2016-17 and 2017-18 finally, it shows a fluctuating trend throughout the study period. In the year 2008-09, the miscellaneous expense were Rs.5868.72 crores which increased to Rs.9402.58 crores in 2017-18. Indices value exhibits increasing year by year up to 2014-15 (1181.01) then slightly decreasing and finally an index of the study period was 160.22 per cent in the year 2017-18. The mean value was Rs.24312.40 crores. The SD and CV values were 21804.58 crores and 89.69 respectively which specify that fluctuation was noted in the miscellaneous expenses of automobile industry during the study period. The CAGR value was 4.83 per cent.

The actual and trend value of miscellaneous expenses comparison is represented in the Table 1 which depicts that the trend value varied materially from the actual value of miscellaneous expenses. The original values were lower than the trend values in the years 2008-09, 2009-10, 2010-11, 2011-12, 2015-16, 2016-17 and 2017-18. In the remaining years, the original values were higher than the trend values. The calculated $\chi^2$ value comes to 149155.15 which is higher than the table value of 16.919 at 5 per cent significant level. It indicates that the differences between actual value and trend value of miscellaneous expenses in different years were significant.

After going through the above (Table 2) discussion on production, sales and costs of automobile industry in India, it is noted that there has been an increasing trend throughout the study period except in the year 2017-18. The cost structure analysis discloses a significant increasing trend during the study period. The cost structure of automobile industry, the proportion of raw material cost with 74.09 per cent got the first place followed by miscellaneous expenses with 11.11 per cent, selling and administrative expenses with 6.88 per cent, wages and salaries with 4.86 per cent, manufacturing expenses with 2.22 per cent and power and fuel with 0.83 per cent during the study period.

**FINDINGS AND RECOMMENDATIONS OF THE STUDY**

1. The production of automobile industry has clearly marked an increasing trend throughout the period except in the year 2017-18. The mean value of production of automobile industry during the study period was Rs.214306.53 crores. The compound annual growth rate of production was 38.16 per cent. The CV value of actual value of production was 8.46 per cent which shows more gradually increase in the production of automobile industry during study period.
2. The actual sales of automobile industry have marked an increasing trend throughout the period. The mean value of sales during the study period was Rs.236506.30. The SD and CV value were 92058.39 and 38.92 per cent which point toward more fluctuation in the sales of automobile industry during the study period. The CAGR values were registered at 8.71 per cent.

3. The cost of production of automobile industry has marked an increasing trend all over the period. The mean value of cost of production of automobile industry during the study period was Rs.212649.51 crores. The SD and CV values of cost of production were 85311.11 and 40.12 per cent respectively during the study period. The CAGR value was marked 7.66 per cent.

4. The raw material expenses of automobile industry have marked an increasing trend throughout the period except in the year 2017-18. The mean value of raw material expenses was Rs.162138.59 crores. The SD and CV values were 62315.92 and 38.43 per cent respectively which designate more normally increased and some fluctuation in the raw material expenses of automobile industry during the study period. The CAGR value was 8.34 per cent.

5. The wages and salaries expense of automobile industry have marked an increasing trend from 2008-09 and 2016-17 which reached the mark of 401.76 indices. The mean value of wages and salaries expenses was Rs.10645.90 crores. The SD and CV values were 4763.81 and 44.75 per cent which shows the fluctuation found during the study period. The CAGR value was 11.33 per cent.

6. The manufacturing expenses marked a fluctuating trend throughout the study period. The mean value was Rs.4867.36 crores. The CAGR value was 6.49 per cent. The SD and CV values were 1510.47 and 31.03 per cent which shows more fluctuation in the manufacturing expenses of automobile industry during the period under study.

7. The power and fuel expenses of automobile industry have marked a rising trend throughout the period. The mean value of power and fuel of automobile industry during the study period was Rs.1818.66. The SD and CV were 732.52 and 40.28 per cent respectively which indicates that there was fluctuation found during the study period. The CAGR value was 8.25 per cent.

8. The selling and administrative expenses of automobile industry marked an increasing trend all over the period. The mean value was Rs.15050.55 crores. The SD and CV values were 5990.71 and 39.80 per cent respectively which
shows that fluctuation was deducted in the selling and administrative expenses of automobile industry during the study period. The CAGR value was 8.51 per cent.

9. The miscellaneous expenses of automobile industry have marked an increasing trend during the year 2008-09, 2009-10, 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15 then slightly decrease in 2016-16, 2016-17 and 2017-18 finally, it shows a fluctuating trend throughout the study period. The mean value was Rs.24312.40 crores. The SD and CV values were 21804.58 crores and 89.69 respectively which specify that fluctuation was noted in the miscellaneous expenses of automobile industry during the study period. The CAGR value was 4.83 per cent.

10. In the cost structure analysis reveals an increasing trend during the study period. The cost structure of the industry, the proportion of raw material cost with 74.09 per cent got the first place followed by miscellaneous expenses with 11.11 per cent, selling and administrative expenses with 6.88 per cent, wages and salaries with 4.86 per cent, manufacturing expenses with 2.22 per cent and power and fuel with 0.83 per cent during the study period.

11. The main problem before the automobile industry is of mounting trend of cost. All the components of costs are increasing continuously year by year which affects the financial performance of the Industry. Therefore, it is the need of the hour that the automobile industry should shows better performance by reducing the operating cost. In order to control the cost in industry, standard costing system should be introduced to improve their performance.

12. There has been a positive significant relationship between medicine prices and inflation of whole sale price Index. During the high inflation period, the Government asked the drug producing companies should to reduce the medicine prices, to help to control inflation. In the same way, the Government assisted with some sort of cash grants say concession of sales tax, less power tariff, reduce railway wagons charges, to revamp the already loss making units. The Government may give cash grant to those undertakings which have reduced accumulated losses and which are likely to improve their prospects in future.
CONCLUSION

After going through the above discussion on production, sales and costs of automobile industry in India, it is noted that there has been an increasing trend throughout the study period except in the year 2017-18. To Find out the difference between actual and trend values of production, sales and respective expenses. Chi-square test has been applied. The results of the analysis reveal that computed chi-square value is greater than the critical value. Hence, the hypothesis is rejected. It is concluded that “There is significant difference between actual and trend values of production, sales and respective expenses.”

References:


Table 1
ACTUAL VALUE AND TREND VALUE OF PRODUCTION, SALES, COST OF PRODUCTION, RAW MATERIAL EXPENSES, WAGES AND SALARIES EXPENSES, MANUFACTURING EXPENSES, POWER AND FUEL EXPENSES, SELLING AND ADMINISTRATIVE EXPENSES AND MISCELLANEOUS EXPENSES OF AUTOMOBILE INDUSTRY

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Computed $\chi^2$ Value = 68685.14
Critical Value of $\chi^2 = 16.919$ with Degree of freedom (n-1)=9 at 5%
Significant Level Result : $H_0$ is Rejected

Computed $\chi^2$ Value = 69223.29
Critical Value of $\chi^2 = 16.919$ with Degree of freedom (n-1)=9 at 5%
Significant Level Result : $H_0$ is Rejected

Computed $\chi^2$ Value = 67059.53
Critical Value of $\chi^2 = 16.919$ with Degree of freedom (n-1)=9 at 5%
Significant Level Result : $H_0$ is Rejected

Sources: Complied from Annual Reports of the Respective Units

Contd……..
Table 1
ACTUAL VALUE AND TREND VALUE OF PRODUCTION, SALES, COST OF PRODUCTION, RAW MATERIAL EXPENSES, WAGES AND SALARIES EXPENSES, MANUFACTURING EXPENSES, POWER AND FUEL EXPENSES, SELLING AND ADMINISTRATIVE EXPENSES AND MISCELLANEOUS EXPENSES OF AUTOMOBILE INDUSTRY

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<td>44.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.03</td>
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<tr>
<td>CAGR (%)</td>
<td>8.34</td>
<td>11.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.49</td>
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</table>

Sources: Complied from Annual Reports of the Respective Units

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Contd.……..
## Table 1

ACTUAL VALUE AND TREND VALUE OF PRODUCTION, SALES, COST OF PRODUCTION, RAW MATERIAL EXPENSES, WAGES AND SALARIES EXPENSES, MANUFACTURING EXPENSES, POWER AND FUEL EXPENSES, SELLING AND ADMINISTRATIVE EXPENSES AND MISCELLANEOUS EXPENSES OF AUTOMOBILE INDUSTRY

<table>
<thead>
<tr>
<th>Year</th>
<th>Value of Power &amp; Fuel Expenses (Rupees In Crores)</th>
<th>Indices</th>
<th>Trend Values (Yc)</th>
<th>Value of Selling &amp; Administrative Expenses (Rupees In Crores)</th>
<th>Indices</th>
<th>Trend Values (Yc)</th>
<th>Value of Miscellaneous Expenses (Rupees In Crores)</th>
<th>Indices</th>
<th>Trend Values (Yc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>913.42</td>
<td>100.00</td>
<td>870.78</td>
<td>7658.40</td>
<td>100.00</td>
<td>7269.97</td>
<td>5868.72</td>
<td>100.00</td>
<td>15549.00</td>
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<td>2009-10</td>
<td>1117.45</td>
<td>122.34</td>
<td>1081.42</td>
<td>8965.14</td>
<td>117.06</td>
<td>8998.99</td>
<td>6853.29</td>
<td>116.78</td>
<td>17496.42</td>
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<tr>
<td>2010-11</td>
<td>1197.17</td>
<td>131.06</td>
<td>1292.06</td>
<td>9965.18</td>
<td>130.12</td>
<td>10728.01</td>
<td>12085.78</td>
<td>205.94</td>
<td>19443.84</td>
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<td>2011-12</td>
<td>1359.14</td>
<td>148.80</td>
<td>1502.70</td>
<td>12410.92</td>
<td>130.12</td>
<td>12457.03</td>
<td>15388.47</td>
<td>262.21</td>
<td>21391.27</td>
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<td>2012-13</td>
<td>1553.19</td>
<td>170.04</td>
<td>1713.34</td>
<td>13617.53</td>
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<td>14186.04</td>
<td>31340.54</td>
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<td>2013-14</td>
<td>1885.50</td>
<td>206.42</td>
<td>1923.98</td>
<td>15200.47</td>
<td>198.48</td>
<td>15915.06</td>
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<td>936.79</td>
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<td>2014-15</td>
<td>2201.68</td>
<td>241.04</td>
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<td>15800.30</td>
<td>206.31</td>
<td>17644.08</td>
<td>69310.45</td>
<td>1181.01</td>
<td>27233.53</td>
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<tr>
<td>2015-16</td>
<td>2912.95</td>
<td>318.91</td>
<td>2345.26</td>
<td>23920.05</td>
<td>312.34</td>
<td>19373.10</td>
<td>26378.62</td>
<td>449.48</td>
<td>29180.95</td>
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<td>2016-17</td>
<td>3027.64</td>
<td>331.46</td>
<td>2555.90</td>
<td>25631.89</td>
<td>334.69</td>
<td>21102.11</td>
<td>11517.96</td>
<td>196.26</td>
<td>31128.37</td>
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<td>2017-18</td>
<td>2018.47</td>
<td>220.98</td>
<td>2766.54</td>
<td>17335.64</td>
<td>226.36</td>
<td>22831.13</td>
<td>9402.58</td>
<td>160.22</td>
<td>33075.80</td>
</tr>
</tbody>
</table>

| Mean   | 1818.66                                      |        |                  | 15050.55                                                     |        |                  | 24312.40                                      |        |                  |
| SD     | 732.52                                       |        |                  | 5990.71                                                      |        |                  | 21804.58                                      |        |                  |
| CV (%) | 40.28                                        |        |                  | 39.80                                                       |        |                  | 89.69                                         |        |                  |
| CAGR (%) | 8.25                                         |        |                  | 8.51                                                        |        |                  | 4.83                                          |        |                  |

Sources: Complied from Annual Reports of the Respective Units

The computed $\chi^2$ values and critical values are calculated with a significance level of 5% and a degree of freedom of (n-1)=9. The null hypothesis $H_0$ is rejected if the computed value of $\chi^2$ exceeds the critical value.
### Table 2
COST STRUCTURE OF AUTOMOBILE INDUSTRY
(2008-09 to 2017-18)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Cost Structure</th>
<th>Average Values (Rs. in Crores)</th>
<th>Percentage as Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Raw Material Expenses</td>
<td>162138.59</td>
<td>74.09</td>
</tr>
<tr>
<td>2</td>
<td>Wages &amp; Salaries Expenses</td>
<td>10645.90</td>
<td>4.86</td>
</tr>
<tr>
<td>3</td>
<td>Manufacturing Expenses</td>
<td>4867.36</td>
<td>2.22</td>
</tr>
<tr>
<td>4</td>
<td>Power &amp; Fuel Expenses</td>
<td>1818.66</td>
<td>0.83</td>
</tr>
<tr>
<td>5</td>
<td>Selling &amp; Administrative Expenses</td>
<td>15050.55</td>
<td>6.88</td>
</tr>
<tr>
<td>6</td>
<td>Miscellaneous Expenses</td>
<td>24312.40</td>
<td>11.11</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>218833.46</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Sources: Computed