

A Study on Automobile Industry Growth in India and Its Impact on Air Pollution

Sujeet Kumar Yadav¹, Mridula Sahay²

¹*Amrita School of Business, Amrita Vishwa Vidyapeetham (University), Coimbatore, India, ysujeet47@yahoo.in*

²*Amrita School of Business, Amrita Vishwa Vidyapeetham (University), Coimbatore, India, s_mridula@cb.amrita.edu*

Abstract

The average growth rate of GDP of India from 1947 to 1991 has been of order 2.5 to 3%. This slow rate was due to protectionism policy followed by the government of India. The introduction of liberalization policy in 1991, many industries started flourishing including the automobile sector and the average growth rate of India jumped to high level ranging from 5 to 8%. At present India is sixth largest country in production of motorized vehicles with the turnover of 38.3 billion USD which is nearly 8% of India's GDP. Employment wise, this sector employs 19 million people. The Automobile industry is the major contributor to the growth of the Indian economy but increase in the number of vehicles has also created enormous pressure on environment that resulted in air pollution. Air pollution causes many health problems like: respiratory and cardiovascular diseases. The levels particulate matter such as PM2.5 and PM10, also the concentration of dangerous carcinogenic like Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) have reached alarming proportions. The secondary data on automobile sector in India and the air pollution level is collected from the multiple sources and a linear correlation technique is used to test the relationship between automobile growth and air pollution. This paper is a study on growth of automobile industry in India and its impact on Air pollution.

Keywords

Air pollution, Automobile Industry, GDP, Growth rate

I. Introduction

The average growth rate of GDP in India from 1947 to 1991 has been of the order of 2.5 to 3%. This slow rate of growth was mainly due to policy of protectionism followed by the central government during its five-year plans. The main emphasis was given to Public Sector Undertakings (PSUs) and as a result hundreds of central PSUs and thousands of state PSUs were step-up in the country. Through these PSUs huge manufacturing capacities were created in various fields like: steel manufacturing, cement manufacturing, machine tools including heavy machine tools manufacturing, ship building, electricals including heavy electricals manufacturing, oil refining, telecommunications, automobile including heavy duty, passenger and commercial vehicles, mining industries, etc. Similarly, in the service sector also, the main emphasis was in the public-sector institutions. The banking institutions were mainly set up in the public-sector domain. Electricity supply, water supply, railways, transport sector which includes both passenger and commercial segments, insurance sector and educational sector were mainly in the public sector. Return on investment in PSUs was low. The Indian goods and services were not competitive enough and thus the exports were not of the high volume. These goods and services were not able to meet the world class standards of price and quality. The Public-sector undertakings created lot of jobs in the organized sector. It is through these jobs, a sizeable number of the middle population emerged in India who enjoyed much better standard of living as compared to the common man in India. While the Indian government followed the policy of public sector and protectionism, the other developing countries like China, Singapore, South Korea, Malaysia, etc. opened up their economy to the international competition encouraging private investments by local and foreign industries. The growth rate of these economies accelerated much faster and these countries overtook India's economy by leaps and bounds. As a result of prolonged continuation of protectionism practiced by India, it faced huge crisis of balance of payment in 1990. Pushed to the wall, India introduced big reforms in 1991 under the leadership of PV Narsimha Rao's government. These policy changes

brought good results and India's GDP growth rate started moving upwards. The tight government control and the license raj was given up. The government opened gates to private sector in many fields like Transportation, Banking, Telecommunication, IT, Education and many more. The norms for FDI were also relaxed and as a result many international companies' setup their manufacturing plants in India. They include companies like Suzuki of Japan, Honda of South Korea, Nokia of Finland, National Instruments of US and many more. The reforms started by PV Narsimha Rao were continued by the subsequent governments also. Due to the continuous emphasis laid by the various governments during the last 25 years, the average growth rate of India jumped to high level ranging from 5 to 8%. Contribution of various segments in India's GDP has undergone major changes during the reforms period. Contribution of the service sector has seen high growth rate whereas the contribution manufacturing and agriculture sectors come down drastically. The present figures are: Service sector (57%), manufacturing sector (25%) and agriculture sector (18%) [1].

II. Automobile Industry in India

India's automobile industry is one of the largest in the world. It has seen very high growth rates during the last three decades. Up to the year 1975 or so, India was having 3 or 4 manufacturers of cars, scooters and commercial vehicles. Hindustan motors, Premier Automobiles and Standard motors were producing cars. The famous makes for two wheelers were Vespa and Lambretta. The commercial vehicles were manufactured by Tata motors and Ashok Leyland. Automobile industry has experienced very high growth rates during the last three decades. The order of the growth rates was from 9 to 18% depending on the type of vehicle. For example, the average growth of two wheelers was about 10%, whereas the passenger vehicles grew at 13 to 18%. At present India is third largest country in production of motorized vehicles. Almost all international automobiles companies like: Suzuki, Honda, Hyundai, Ford, Toyota, Volvo, etc. have setup their plants in India. The present level of turnover of various types of vehicles put together comes to 38.3 billion USD which is nearly 8% of India's GDP. Employment wise, this sector employs 19 million people [2]. The accelerated growth of the automobile sector has benefitted the Indian economy by creating enormous employment opportunities. Side by side, this sector has also created enormous pressure on environment that resulted in air pollution and global warming. Air pollution causes many health problems like: respiratory and cardiovascular diseases. According to World Health Organization (WHO) report, on an average half a million deaths are caused by air pollution in India every year. For many years, air quality of many Indian cities has failed to meet WHO guidelines for safe levels. The levels of PM2.5 and PM10 (Air-borne particles smaller than 2.5 micrometers in diameter and 10 micrometers in diameter) also the concentration of dangerous carcinogenic substances like Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) have reached alarming proportions. According to WHO, among the world's 20 top polluted cities in the world, 13 are in India and Delhi tops the list [3]. The growth in the production of the automobiles has also increased the emission of carbon Dioxide (CO₂) and hydrocarbons (HC) which in turn increased global warming and caused climate change. Climate change is a big issue which is being coordinated at the level of United Nation. Paris agreement has been signed in this regard in 2016 by all the members of United Nations. The government of India took steps to tackle air pollution problem by introducing Bharat stage emission Standards (BS) for vehicles in 2000. The norms were further tightened in 2005 and 2010. BS IV norms will be applicable to all vehicles throughout India in 2017. The government has also decided to adopt BS VI norms from the current BS IV for all the vehicles by 2020. BS V norms will be bypassed [4].

III. Objective of the Study

- To study the growth of automobile industry in India
- To study the impact of automobiles on air pollution

IV. Research Methodology

4.1. Review of Literature

Jatinder Singh (2014) explained automobile industry in India has undergone serious restructuring since reforms initiated in 1991. The contribution of automobile industry reached about 8% of GDP of India. Because of increase of income of the middle level households in India. Easy loan policies for buying two wheelers and cars followed by the banks helped rapid growth of automobile sector. The rapid growth is also as a result of heavy FDI inflows, around 48% of total FDI between the period 2000-2011 [5].

Jimmy Corton Gaddam (2013) explained that the increase in the trend of production and sales of automobile industry was due to the increase growth of the Indian economy and also the increase of high income level of the consumers. There is immense future potential for automobile industry as there is still a low penetration of automobile in India [6].

Dr. MA Lokhande, et.al (2013) explained about the historical trend of the automobile industry in India. The Indian automobile industry has opened up after the liberalization (1990) and now the automobile market had become a highly competitive one. To sustain in this competitive, market the organizations have to be creative & bring innovations [7].

M. Krishnaveni, et.al (2015) explained that production and exports trends of the automobile in India has been rising year by year. The rise in demand and increase in the inflows through 100% FDI has contributed to the rise in the production and exports of the automobiles in India [8].

Dr. Alpana Roy (2016) explained that the increase in transport sector has contributed to the climate changes in major cities across the world. The author has taken Delhi and Kolkata as the location for study to show how the increase in the growth of vehicles is correlated with the increase in the average mean temperature in the city [9] [10].

Shrivastava R. K, et.al (2013) explained that rapid urbanization and growth of motor vehicles has serious effect on environment and human life. Most of the cities in South Asia including India are suffering from the high air pollution. The pollutants like CO, SO₂, NO₂, PM, etc. mainly comes from the emissions of the transport sector [11].

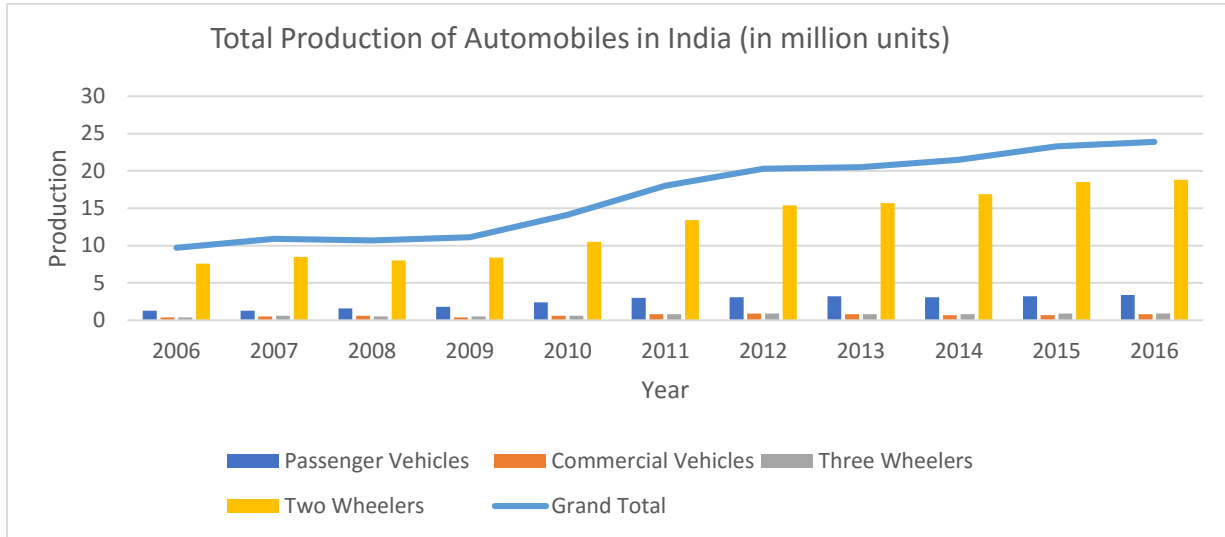
Geetha P, et.al (2015) explained that all the major cities in the world due to rapid urbanization and increase in population resulted in rapid growth of number of vehicles which in turns resulted in air pollution and issues related to health & environmental damage. The pollutants are analyzed with the simulation software Hysplit4. Path of the pollutants are traced. The trajectory of the pollutants is dependent on the local wind speed, temperature and wind direction. The collected data plotted from the simulation is used by the environmentalists for the setting up the roads, industrial site, etc. [12].

Kokila M, et.al (2016) explained that the air pollution contamination in a region is result of its own zone's air pollution and also from the nearby regions because of certain factors like wind speed and wind direction. The metrological data is collected and with the help of the hysplit4 simulation the scattering pattern of the pollutants from the vehicles and its scattering territory is mapped [13].

4.2. Data Collection

The secondary data on automobile sector in India and the air pollution level is collected from the multiple sources and a linear correlation technique is used to test the relationship between automobile growth and air pollution.

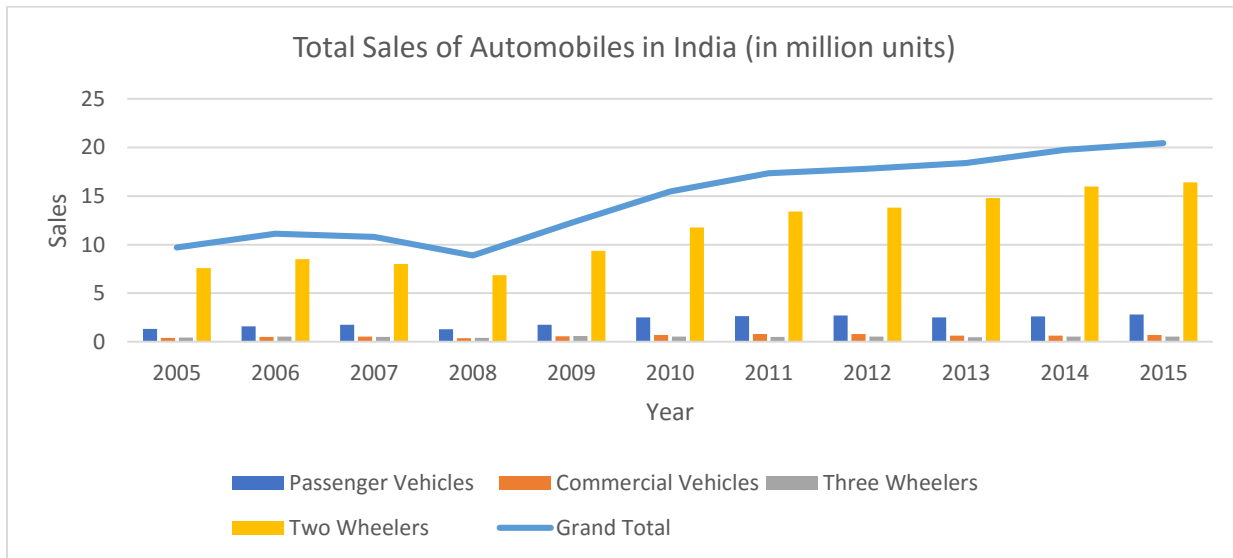
Figure 1: Production Trend of Automobiles



Source: Society of Indian Automobile Manufacturers [14]

In the figure 1, the total production of the automobiles industry from the year 2006-2016 is given. The detailed category wise – Passenger vehicles, Commercial Vehicles, Two Wheelers and Three Wheelers are all mentioned. From the data it is evident that the production of the automobiles is in increasing trend and the Two Wheelers segment is the major contributor. It is also noticed that the small Passenger Four Wheelers are also the major contributor.

Figure 2: Sales Trend of Automobiles

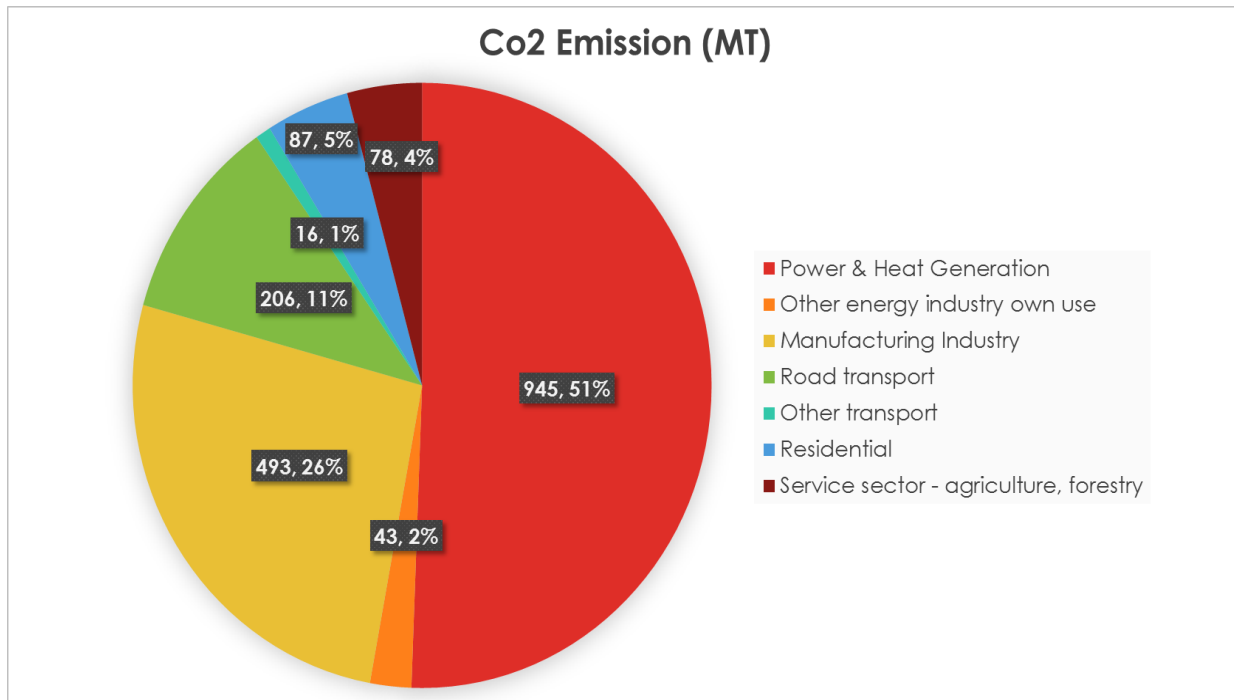


Source: Society of Indian Automobile Manufacturers [15]

In the figure 2, the total sales of the automobiles industry from the year 2006-2016 is given. The detailed category wise – Passenger vehicles, Commercial Vehicles, Two Wheelers and Three Wheelers are all mentioned. From the data it is evident that the sales of the automobiles are in increasing trend and the Two Wheelers segment is the major

contributor. It is also noticed that the small Passenger Four Wheelers are also the major contributor. It is also inferred that the export level is increasing substantially in the past decade.

Figure 3: Carbon-di-Oxide Emission in India sector wise



Source: International Energy Agency (2015) [16]

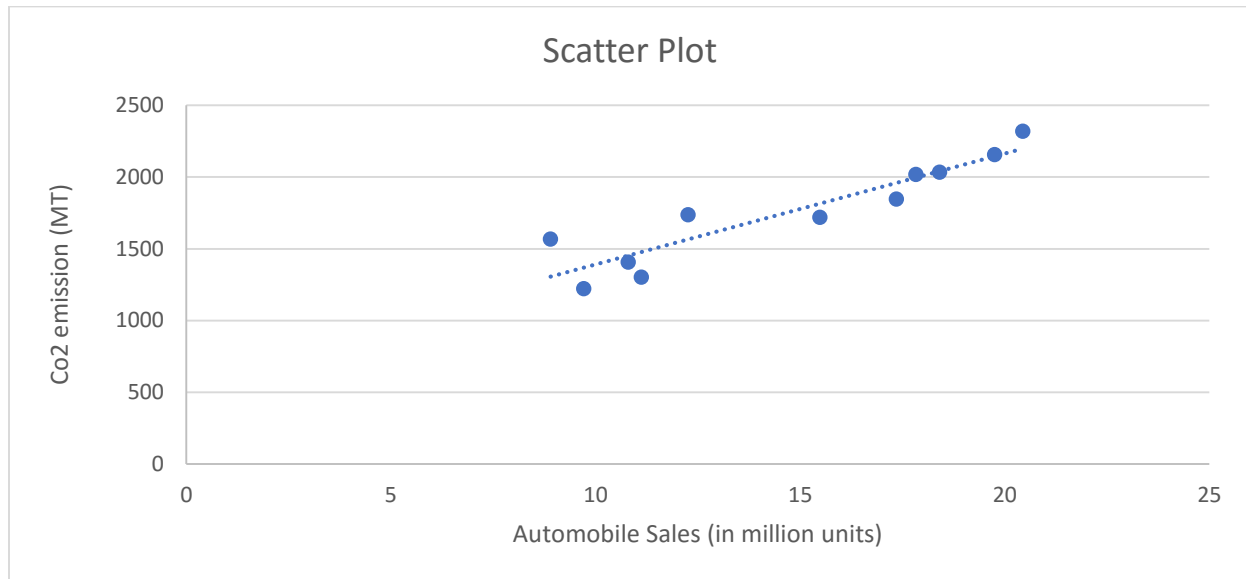
The production trends of the automobile show that India is 6th largest automobile manufacturer in the world and it is expected to become the 3rd largest by the year 2020. But it also has increased the air pollution levels in India. Burning of fossil fuels has increased the CO₂ emissions and annually 2000 MT (metric ton) of CO₂ emissions is released by India in that 11% comes from the road transport. CO₂ is one of the major components in the greenhouse gases, it constitutes of around 55% and hence increase in the carbon level will increase the global warming affect. Air quality index of many Indian cities have failed to meet the safety guidelines of WHO. About 620,000 premature deaths occur in India as a result diseases related to air pollution and it is the 5th largest killer in the country.

V. Findings and Discussions

The automobile industry sales and production trend showed the study growth rate and the automobile industry became a major contributor towards the GDP of the country, it's about 8% of GDP. The automobile industry also contributes to 30% to the total manufacturing sector of the country. This increase in the automobile industry has also increased the concerns for air pollution and hence the effect of the automobile growth on air pollution is studied.

A linear correlation between Automobile sales (independent variable) and annual average Co₂ emission of India (dependent variable) is done and the Pearson correlation value is 0.9229, this show there is a positive correlation.

Figure 4: Correlation between Automobiles sales and CO2 emission



Source: World Bank data [17]

The correlation between the automobiles sales and the CO2 emissions shows a very high positive relation. This means that the increase in the number of automobile sales contributes towards the increase in the emission of carbon di oxide level. That means, the automobile industry contributes towards air pollution and hence it is affecting the environment. It is evident from the research done by the World Health Organization (WHO), that out of the top 20 most polluted cities around the world 13 Indian cities are there in the list. The emission levels and the air quality standards and much poorer than the levels set by the WHO. Such a high level of air pollution causes the risk of getting many respiratory diseases and the carcinogenic substances like particulate matter can cause cancer. Also, the increase in the greenhouse gas components such as Carbon di oxide, Nitrous oxide, Sulphur di oxide, Particulate Matter and Hydrocarbons which comes from the burning of the fossils fuels are the reason between behind the increase in global warming. The effect of the air pollution is seen as the average maximum mean temperature and the average minimum mean temperature of many cities & towns in India had gone up over the years.

VI. Limitations and Scope for further study

This study only gives the overall generic study of Indian automobile industry and its impact on the air pollution. The data collection is done mostly from the secondary sources and the analysis is done on these secondary data. The analysis is done mostly on the overall average value like Carbon emission, number of automobiles, etc. are taken commonly for the country India as the whole since the detailed analysis is possible only when careful and accurate region wise data are considered for the analysis. More detailed analysis on the data part can be done by considering the region/cities wise data on the number of vehicles, area size, population, rapid urbanization, forest cover, geography, economy, etc. But this process can be highly complicated and needs lots of time and considerations. Tackling the air pollution can be more affective when more detailed analysis is done, accuracy, time consuming are the challenges. Also the data are taken based on the current scenarios like current automotive and fuel technology but there are many possibilities of the advancement in technology like solar powered vehicles, electric vehicles, the more environment friendly fuels or the disruptive innovation in the automobiles can completely replace the present way of functionalities.

VII. Conclusion

The automobile industry in India flourished after the trade liberalization of 1991. Before the liberalization India had very few industries especially very few automobile manufacturers and also the GDP growth rate were very slow, between 2-3%. The trade liberalization brought many new industries and many Foreign Direct Investments (FDI)

inflows happened. The local automobiles manufacturer rose and also many foreign automobile manufacturers started their manufacturing hub in India. The accelerated economy growth and increase in the population created many demands and the India market flourished. India also started to exporting automobiles and it became one of the leading exporter in that sector. India is the major player in the two wheelers, three wheelers and small model four wheelers segment. The increase in the population and the increase in the economic condition will increase the demand and supply. And also the automobile sector is further expected to increase as the income level of the people is expected to improve. As the disposable income increase the sales of the automobiles are also expected to increase. Hence, the increase in the automobile will increase the consumption of fossil fuels and will in turn increase the rate of air pollution.

References

- [1] Database on Indian Economy, RBI's data warehouse, Retrieved from <https://dbie.rbi.org.in/DBIE>
- [2] Society of Indian Automobile Manufacturers, Retrieved from <http://www.siamindia.com/>
- [3] World Health Organization, The Global Burden of Disease Study Report, 2015, Retrieved from <http://thelancet.com/gbd>
- [4] Central Pollution Control Board, Ministry of Environment, Forest and Climate Change, Government of India, Retrieved from http://cpcb.nic.in/Vehicular_Exhaust.php
- [5] Singh, Jatinder, (2014), India's automobile industry: Growth and export potential, Journal of Applied Economics and Business Research, JAEBR, Vol.4, Issue No. 4, Pg. 246-262
- [6] Gaddam, Jimmy Corton, (July-August 2013), Production and Sales Trend of Automobile Industry in India, Global Journal of Commerce and Management Perspective, Vol. 2, No.4, Pg. 24-33
- [7] Dr. Lokhnade, M.A; Rana, Vishal Sunil, (February 2013), Marketing Strategies of Indian Automobile Companies: A Case Study of Maruti Suzuki India Limited, Prathibha: International Journal of Science, Spirituality, Business and Technology, (IJSSBT), Vol. 1, No.2, Pg. 40-45
- [8] Krishnaveni M; Vidya R, (February 2015), Growth of Indian Automobile Industry, International Journal of Current Research and Academic Review, Vol. 3, No. 2, Pg. 110-118
- [9] Dr. Roy, Alpana, (2016), The Impact of Vehicular Explosion in Changing the Annual Mean Temperature of Urban Environment – A Case Study of Delhi, Indian Journal of Spatial Science, Vol. 7, No. 2, Pg. 30-37
- [10] Dr. Roy, Alpana, (March 2014), The Impact of Vehicular Explosion in Changing the Annual Mean Temperature of Urban Environment – A Case Study of Kolkatta, IOSR Journal of Humanities and Social Science, Vol. 19, No. 3, Pp. 01-10
- [11] Shrivastava R.K; Saxena, Neeta; Gautam, Geeta, (September 2013), Air Pollution Due to Road Transportation in India: A Review on Assessment and Reduction Strategies, Journal of Environmental Research and Development, Vol. 8, No. 1, Pg. 69-77
- [12] Geetha P; Kokila M, (2015), Estimation of air pollution using remote sensing technique in Coimbatore - A case study, International Conference on Communication and Signal Processing, (ICCSP), Melmaruvathur, 2015, pp. 0794-0798
- [13] Kokila M, Geetha P, (2016), Air Pollution Estimation in Coimbatore District Using Local Meteorological Data in Hyspilt4, Journal of Chemical and Pharmaceutical Sciences, Vol.9, No.1, Pg. 515-518
- [14] Society of Indian Automobile Manufacturers, Automobile Production Trends, Retrieved from <http://www.siamindia.com/statistics.aspx?mpgid=8&pgidtrail=13>
- [15] Society of Indian Automobile Manufacturers, Automobile Domestic Sales Trends, Retrieved from <http://www.siamindia.com/statistics.aspx?mpgid=8&pgidtrail=14>
- [16] International Energy Agency (IEA), Recent trends in the Organization for Economic Co-operation and Development (OECD): Energy and CO₂ emissions, 2016, Retrieved from <http://www.iea.org/statistics/topics/CO2emissions/>
- [17] World Bank Data on CO₂ Emissions (MT), World Bank Database, Retrieved from <http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>