

AUTOMOBILE POPULATION GROWTH IN INDIA - AN ANALYSIS ACROSS SELECT STATES

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ABSTRACT: This paper titled 'AUTOMOBILE POPULATION GROWTH IN INDIA- AN ANALYSIS ACROSS SELECT STATES', makes an attempt to highlight the increase or growth of number of automobiles in India. In this study, the numbers of vehicles registered in 12 select States and the Union Territory of New Delhi have been taken for a 15- year period from 2001 to 2015 and the data on the number of vehicles registered in various States and New Delhi have been collected from the Road Transport Year Book (2013-14 and 2014-15) released by the Ministry of Road Transport & Highways Transport Research Wing and made available on the website: www.morth.nic.in, and another website: www.data.gov.in was also referred to for the collection of necessary data. The statistical tools Percentages, Range, Standard Deviation, Co-efficient of Variation, Compound Growth Rate(CGR), Average Annual Growth Rate(AAR), Growth Index(GI) and Skewness have been applied to analyze the data.

Introduction

Eversince man began to live as civilized societies, he began to invent many things to make his life easier and add comforts to his everyday life. His inventions have paved the way for the growth and development of the economy of nations. The invention of motorized vehicles (Automobiles) is not a mean achievement of human, since it enabled the man to augment his personal mobility and his goods by means of automobiles called as 'TRANSPORTATION'. Now, the transportation has become the world order in so far as the infrastructure and development of a nation is concerned irrespective of its economic strata, size, location or any other things. Further, the activities pertaining to automobiles production and utilization have also created innumerable job opportunities to both the skilled and unskilled labourers. Thus, the transportation, more specifically the means of transportation is not matter to be done away with. Today, the motorized vehicles suiting the various needs of diverse users are manufactured throughout the world in the names of commercial, non-commercial, sports vehicles, two-wheelers and three-wheelers etc. and the Sub-continent is not an exemption to this common phenomenon. In India vehicles of all kinds are manufactured and made available for the aspirants by a number of automobile manufacturers.

Road Transportation – Indian Scenario

In India, among the all modes of transportation, the road transportation is more dominant both in terms of number of passenger traffic and movements of goods as well as its contribution to the national economy. It is preferred over the other types of transports because of its easy accessibility, flexibility of operations, reliability and upto-the- point service. The modes of road transports consist of commercial and non-commercial vehicles, motor cycles and three-wheelers. Presently, as in the other parts of the world, India is also witnessing large scale urbanization and mobility of people from rural to urban areas, consequently, the need for expanding the transportation facilities has become imperative for social, cultural and economic integration. Hence, the State Governments and the Union Government are taking many steps in providing adequate road facilities for the movement of automobiles.

Before Liberalization of the Indian economy in 1992, the people of India had limited options to purchase automobiles. But with the liberalization and the growth of Indian economy many world-renowned automobile manufacturers began to realize the India's automobile market potentiality. The high population, large scale transportation of goods, more disposable income of the people, greater urban mobility, the aspiration of the people for leisure travel, easy loans offered by banks and non-banking finance companies, nearness to the service centres and above all the middle class people's desire to own their personal transportation mode and the improvement in the highway infrastructure have resulted in the enormous increase in the automobile population surpassing population growth. In a research paper by **B. Sudhakara Reddy and P. Balachandra**¹ it is pointed out that the number of vehicles in a 25- year period between 1981 and 2005, the vehicle population in India has increased by about 15 times from 5.36 to 81.5 million vehicles, whereas, the population during the same period has increased by 1.7 times.

An Overview of the Previous Studies

Due to urbanization the increase in transport demand, hampered by resource constraints, has widened the gap between demand and supply (Srinivasan et al. 2007). The primary problem is not the increase in number of vehicles but, rather, their high

¹B. Sudhakara Reddy and P. Balachandra Indira Gandhi Institute of Development Research (IGIDR), Mumbai, 2010

concentration in a few densely populated metropolitan areas. In 2001, 32% of all vehicles were in such cities, though these places constitute only 11% of India's urban population (Ministry of Urban Development 2008). Motorizations in urban India is growing faster than the population; automobile ownership growth rates are of the order of 15–20% per annum in most cities (Indiastat.com, 2008). In calculating the car ownership pattern from 2001 to 2009 Dash et al. (2013) identified that the ownership levels of four-wheelers has doubled from 6.59 per 1,000 people to 12.68. Though the growth of vehicle acquisition has raised many concerns, its growth indicates the desire of the middle-class to lead more comfortable lives (Shirgaokar et al. 2012). Relatively low per-capita incomes also makes car ownership as a symbol of luxury and status. (Dissanayake and Morikawa 2002). The automobile seems to be the dominant transportation mode choice with at least 85% of the total share of all journey-to-the office (Schafer, 1998). In India, the share of public transportation peaks among people living in the megapolis regions, where the supply networks and systems are appropriate (World Bank, 2002).

Objectives

The study is conducted with following objectives:

1. To highlight the automobile population growth in India and in select states.
2. To ascertain the shares of the select states in India's total automobile population.
3. To identify the position of select states in terms of automobile population and on statistical parameters.
4. To estimate the automobile population growth rates.

Key Words:

1. **Select States** – The 12 States and the Union Territory of New Delhi, in which the number of automobiles registered, is considered for analysis.
2. **Other States:** The States and the Union Territories other than the selected 12 states and the Union Territory of New Delhi.
3. **Automobiles:** Motorized vehicles used for commercial and commercial purposes.
4. **Automobile Population:** The number of automobiles.
5. **Density:** The number of automobiles per 1000 people.

Methodology

The study is purely based on the secondary data available on the websites www.morth.nic.in and www.data.gov.in. The number of automobiles registered in all the Indian states and the Union Territories are available on the mentioned websites. But the data pertaining to 12 States and the Union Territory of New Delhi alone were taken for the analysis as these states, demarcated as select states, account for nearly 85% of the total automobiles registrations in India. The number of vehicles registered in each year is for the year ending 31st March.

The collected data were statistically analyzed so as to draw inferences based on the objectives of the study. The statistical tools the percentage method, estimation of trends by OLS method, Range, Standard Deviation, Coefficient of Variation, Growth Rates and Skewness have been applied. The Co-efficient of Variation is calculated by the formula

$$\text{Co-efficient of Variation (in \%)} = \frac{\text{Standard Deviation}}{\text{Mean}}$$

Three types of Growth Rates viz., Compound Growth Rate (CGR), Average Annual Growth Rate(AAR) and Average Growth Index(AGI) were also estimated by applying the following formulae.

$$1. \text{ Compound Growth Rate(CGR)} = (\text{Antilog } b-1) * 100$$

The value of 'b' is obtained in estimating the Linear Growth Curve

$$2. \text{ Annual Growth Rate (AGR)} = \frac{\text{Value of (n+1)th year} - \text{Value of (n)th year}}{\text{Value of (n)th year}} \times 100$$

Annual Growth Rate (AGR) is the yearly variation in percentages. In this method the current year's value is taken as the base and assumed to be equal to 100 percent. The change in the value in the subsequent year is estimated as a proportion to the current year's value. The AGR is estimated from the first year upto the penultimate year. The AGR for last year cannot be calculated as the value for the year after the last year is not available. The AGR obtained by applying this formula for each of the select state is added and its mean value is calculated which is termed, herein, as the Average Annual Growth Rate.

Another method of measuring the growth rate is the Growth Index. The Growth Index is calculated by applying the formula

$$3. \text{ Growth Index (GI)} = \frac{\text{Value of (n)th year}}{\text{Value of the first year}} \times 100$$

In this formula the first year's value is taken as equal to 100 and the remaining years' values are expressed as a proportion to the first year's value. The values so obtained for each of the select state are summed and the average of this sum is the Annual Growth Index.

The total number of vehicles registered in the select states and other states and all India's total during the study period are presented in Table -1.

TABLE-1

THE NUMBER OF AUTOMOBILES REGISTERED IN SELECT STATES DURING THE PERIOD (NUMBER IN '000)															
Year	Andhra Pradesh	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	New Delhi	Other States	India's Total
2001	3966	5576	1949	3537	2112	3095	6760	2910	2943	5162	4921	1690	3635	6735	54991
2002	4389	6008	2122	3636	2315	3173	7414	3103	3197	5658	5171	1690	3699	7349	58924
2003	5002	6508	2279	3738	2552	3459	8134	3308	3487	8005	5928	2366	3971	8270	67007
2004	5720	7087	2548	3977	2792	3804	8969	3529	3834	8575	6460	2548	4237	8638	72718
2005	6458	7817	2854	5436	3122	4188	9936	3876	4261	9257	7344	2681	4187	10085	81502
2006	7218	8622	3087	6220	3559	4609	10966	4035	4754	10054	7989	2827	4487	11191	89618
2007	6367	9497	3528	5486	3957	5047	12171	4294	5336	10981	9086	3198	5492	12267	96707
2008	7208	10289	3973	6217	4430	5523	13335	4573	5902	11930	9826	2762	5899	13486	105353
2009	8059	10999	4425	6953	4860	6011	14451	4832	6490	12891	10779	3044	6302	14855	114951
2010	8923	11873	4792	9044	5398	6591	15768	5274	7166	14062	11988	2747	6747	17373	127746
2011	10189	12993	5377	9930	6072	7356	17434	5274	7986	15638	13287	3261	7228	19841	141866
2012	12424	14414	5978	10910	6893	8144	19432	6263	8985	17412	15445	3861	7350	21980	159491
2013	12662	15772	6600	12662	7858	8760	21488	6263	10072	19232	17048	6111	7785	23731	176044
2014	14075	17092	7239	14075	8775	9722	23394	6263	11133	20864	19115	6745	8293	23919	190704
2015	15727	18721	7928	14785	9648	11141	25562	6263	12379	22519	21636	7403	8851	26528	209091
Total	128387	163268	64679	116606	74343	90623	215214	70060	97925	192240	166023	52934	88163	226248	1746713

Source: www.morth.nic.in and www.data.gov.in.

TABLE-2

THE PERCENTAGE TO THE TOTAL NUMBER OF AUTOMOBILES REGISTERED IN INDIA															
Year	Andhra Pradesh	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	New Delhi	Other States	Grand Total
2001	7.21	10.14	3.54	6.43	3.84	5.63	12.29	5.29	5.35	9.40	8.95	3.07	6.61	12.25	100
2002	7.45	10.20	3.60	6.17	3.93	5.38	12.58	5.27	5.43	9.60	8.77	2.87	6.28	12.47	100
2003	7.46	9.71	3.40	5.58	3.81	5.16	12.14	4.94	5.20	11.95	8.85	3.53	5.93	12.34	100
2004	7.87	9.75	3.51	5.47	3.84	5.22	12.33	4.85	5.27	11.79	8.88	3.51	5.83	11.88	100
2005	7.92	9.59	3.50	6.67	3.83	5.14	12.19	4.76	5.23	11.36	9.01	3.29	5.14	12.37	100
2006	8.05	9.62	3.44	6.95	3.97	5.14	12.25	4.50	5.30	11.22	8.91	3.15	5.01	12.49	100
2007	6.58	9.82	3.65	5.67	4.09	5.22	12.59	4.44	5.52	11.35	9.40	3.31	5.68	12.68	100
2008	6.84	9.77	3.77	5.9	4.20	5.24	12.66	4.35	5.60	11.32	9.33	2.62	5.60	12.80	100
2009	7.01	9.57	3.85	6.05	4.23	5.23	12.57	4.20	5.65	11.21	9.38	2.65	5.48	12.92	100
2010	6.98	9.29	3.76	7.08	4.23	5.16	12.34	4.13	5.61	11.01	9.38	2.15	5.28	13.60	100
2011	7.18	9.16	3.79	7.00	4.28	5.19	12.28	3.72	5.63	11.02	9.37	2.3	5.09	13.99	100
2012	7.79	9.04	3.75	6.84	4.32	5.11	12.18	3.93	5.63	10.92	9.68	2.42	4.61	13.78	100
2013	7.19	8.96	3.75	7.19	4.46	4.98	12.22	3.56	5.72	10.92	9.68	3.47	4.42	13.48	100
2014	7.38	8.96	3.80	7.38	4.60	5.10	12.27	3.28	5.84	10.94	10.02	3.54	4.35	12.54	100
2015	7.52	8.95	3.79	7.07	4.61	5.33	12.23	3.00	5.92	10.77	10.35	3.54	4.23	12.69	100

Source: Computed from Table:1

TABLE-3

THE RANKS IN TERMS OF NUMBER OF AUTOMOBILES REGISTERED TO THE GRAND TOTAL													
Year	Andhra Pradesh #	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	New Delhi
2001	5	2	12	7	11	8	1	10	9	3	4	13	6
2002	5	2	12	7	11	9	1	10	8	3	4	13	6
2003	5	3	13	7	11	9	1	10	8	2	4	12	6
2004	5	3	12*	7	11	9	1	10	8	2	4	12*	6
2005	5	3	12	6	11	8	1	10	7	2	4	13	9
2006	5	3	12	6	11	8	1	10	7	2	4	13	9
2007	5	3	12	7	11	9	1	10	8	2	4	13	6
2008	5	3	12	6	11	9	1	10	7	2	4	13	8
2009	5	3	12	6	10	9	1	11	7	2	4	13	8
2010	6	4	12	5	10	9	1	11	7	2	3	13	8
2011	5	4	11	6	10	8	1	12	7	2	3	13	9
2012	5	4	12	6	10	8	1	11	7	2	3	13	9
2013	5*	4	11	5*	9	8	1	12	7	2	3	13	10
2014	5*	4	11	5*	9	8	1	13	7	2	3	12	10
2015	5	4	11	6	9	8	1	13	7	2	3	12	10

Telangana State and Andhra Pradesh * Tied

Source: Computed on the basis of Table: 2

TABLE-4

ANNUAL INCREASE IN THE AUTOMOBILE REGISTRATION (NUMBER IN '000)													
Year	Andhra Pradesh #	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	New Delhi
2001													
2002	423	432	173	99	203	78	654	193	254	496	250	0	64
2003	613	500	157	102	237	286	720	205	290	2347	757	676	272
2004	718	579	269	239	240	345	835	221	347	570	532	182	266
2005	738	730	306	1459	330	384	967	347	427	682	884	133	-50
2006	760	805	233	784	437	421	1030	159	493	797	645	146	300
2007	-851	875	441	-734	398	438	1205	259	582	927	1097	371	1005
2008	841	792	445	731	473	476	1164	279	566	949	740	-436	407
2009	851	710	452	736	430	488	1116	259	588	961	953	282	403
2010	864	874	367	2091	538	580	1317	442	676	1171	1209	-297	445
2011	1266	1120	585	886	674	765	1666	0	820	1576	1299	514	481
2012	2235	1421	601	980	821	788	1998	989	999	1774	2158	600	122
2013	238	1358	622	1752	965	616	2056	0	1087	1820	1603	2250	435
2014	1413	1320	639	1413	917	962	1906	0	1061	1632	2067	634	508
2015	1652	1629	689	710	873	1419	2168	0	1246	1655	2521	658	558

TABLE-5

TREND VALUES FOR THE NUMBER OF VEHICLES REGISTERED IN THE PERIOD(IN '000)															
Year	Andhra Pradesh	Gujarat	Haryana	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	New Delhi	Other States	Grand Total
2001	3012.78	4442.56	1318.03	1915.76	1259.27	2193.71	5085.25	2786.87	1919.58	4483.83	3074.98	1135.83	3126.26	4761.60	40516.31
2002	3805.12	5362.84	1745.73	2752.61	1787.41	2743.40	6408.44	3055.98	2577.98	5674.14	4216.86	1477.70	3519.30	6236.11	51363.63
2003	4597.45	6283.12	2173.43	3589.47	2315.54	3293.09	7731.64	3325.10	3236.37	6864.45	5358.75	1819.58	3912.34	7710.63	62210.94
2004	5389.79	7203.40	2601.13	4426.32	2843.67	3842.78	9054.83	3594.21	3894.76	8054.76	6500.64	2161.45	4305.38	9185.14	73058.26
2005	6182.13	8123.69	3028.83	5263.17	3371.80	4392.47	10378.02	3863.32	4553.15	9245.07	7642.53	2503.32	4698.42	10659.66	83905.58
2006	6974.46	9043.97	3456.53	6100.03	3899.94	4942.15	11701.21	4132.44	5211.55	10435.38	8784.42	2845.19	5091.45	12134.17	94752.90
2007	7766.80	9964.25	3884.23	6936.88	4428.07	5491.84	13024.41	4401.55	5869.94	11625.69	9926.31	3187.06	5484.49	13608.69	105600.22
2008	8559.13	10884.53	4311.93	7773.73	4956.20	6041.53	14347.60	4670.67	6528.33	12816.00	11068.20	3528.93	5877.53	15083.20	116447.53
2009	9351.47	11804.82	4739.63	8610.59	5484.33	6591.22	15670.79	4939.78	7186.73	14006.31	12210.09	3870.80	6270.57	16557.71	127294.85
2010	10143.80	12725.10	5167.33	9447.44	6012.46	7140.91	16993.99	5208.90	7845.12	15196.62	13351.98	4212.68	6663.61	18032.23	138142.17
2011	10936.14	13645.38	5595.03	10284.29	6540.60	7690.60	18317.18	5478.01	8503.51	16386.93	14493.87	4554.55	7056.65	19506.74	148989.49
2012	11728.48	14565.66	6022.73	11121.15	7068.73	8240.29	19640.37	5747.12	9161.90	17577.24	15635.76	4896.42	7449.69	20981.26	159836.80
2013	12520.81	15485.94	6450.43	11958.00	7596.86	8789.98	20963.56	6016.24	9820.30	18767.55	16777.65	5238.29	7842.73	22455.77	170684.12
2014	13313.15	16406.23	6878.13	12794.85	8124.99	9339.67	22286.76	6285.35	10478.69	19957.86	17919.54	5580.16	8235.77	23930.29	181531.44
2015	14105.48	17326.51	7305.83	13631.71	8653.13	9889.36	23609.95	6554.47	11137.08	21148.18	19061.43	5922.03	8628.81	25404.80	192378.76
Trend Coefficients															
Constant 'a'	2220.45	3522.28	890.33	1078.91	731.14	1644.02	3762.08	2517.75	1261.19	3293.51	1933.09	793.96	2733.22	3287.09	29668.99
Intercept 'b'	792.34	920.28	427.70	836.85	528.13	549.69	1323.19	269.11	658.39	1190.31	1141.89	341.87	393.04	1474.51	10847.32

Source: Computed from Table:1

TABLE-6

STATISTICAL ANALYSIS TABLE (NUMBER IN '000)											
States / Statistical Parameters	Mean	Minimum	Maximum	Range	Standard Deviation	Coefficient of Variation (%)	CGR (%)	AAGR	AGI	Skewness	Automobile Density (Per 1000) 2014-15
Andhra Pradesh	8559.13	3966	15727	11761	3670.91	42.89	9.90	16.50	109.46	0.675	179
Gujarat	10884.53	5576	18721	13145	4175.38	38.36	9.10	14.07	165.47	0.503	300
Haryana	4311.93	1949	7928	5979	1945.90	45.13	10.90	16.42	5.61	0.528	291
Karnataka	7773.73	3537	14785	11248	3880.73	49.92	11.70	17.61	90.35	0.641	238
Kerala	4956.20	2112	9648	7536	2425.14	48.93	11.70	17.81	21.60	0.674	271
Madhya Pradesh	6041.53	3095	11141	8046	2517.42	41.67	9.70	14.95	47.35	0.652	144
Maharashtra	14347.60	6760	25562	18802	6010.91	41.89	10.00	15.51	250.93	0.523	215
Punjab	4670.67	2910	6263	3353	1218.92	26.10	6.10	8.93	13.05	0.112	216
Rajasthan	6528.33	2943	12379	9436	3013.34	46.16	11.00	16.82	59.90	0.635	171
Tamil Nadu	12816.00	5162	22519	17357	5386.02	42.03	10.40	17.69	214.95	0.393	326
Uttar Pradesh	11068.20	4921	21636	16715	5252.50	47.46	11.20	17.41	171.22	0.71	100
West Bengal	3528.93	1690	7403	5713	1773.51	50.26	9.50	19.31	-13.73	1.354	80
New Delhi	5877.53	3635	8851	5216	1778.537	30.26	7.10	10.39	42.30	0.193	424
Other States	15083.20	48256	182563	134307	42754.57	283.46	10.80	16.12	269.55	0.397	---
Grand Total	116447.50	2910	6263	3353	1218.93	1.05	10.10	15.57	2811.35	0.558	---

Source: Computed from Table:1

TABLE-7

RANKS OF THE SELECT STATES ON STATISTICAL PARAMETERS											
RANKS	STATISTICAL PARAMETERS										
	Total and Mean	Minimum	Maximum	Range	Standard Deviation	Co-efficient of Variation	Compound Growth Rate	Average Annual Growth Rate	AGI	Skewness	Automobile Density
1	Maharashtra	Maharashtra	Maharashtra	Maharashtra	Maharashtra	West Bengal	Karnataka	West Bengal	Maharashtra	West Bengal	New Delhi
2	Tamil Nadu	Gujarat	Tamil Nadu	Tamil Nadu	Tamil Nadu	Karnataka	Kerala	Kerala	Tamil Nadu	Uttar Pradesh	Tamil Nadu
3	Uttar Pradesh	Tamil Nadu	Uttar Pradesh	Uttar Pradesh	Uttar Pradesh	Kerala	Uttar Pradesh	Tamil Nadu	Uttar Pradesh	Andhra Pradesh	Gujarat
4	Gujarat	Uttar Pradesh	Gujarat	Gujarat	Gujarat	Uttar Pradesh	Rajasthan	Karnataka	Gujarat	Kerala	Haryana
5	Andhra Pradesh	Andhra Pradesh	Andhra Pradesh	Andhra Pradesh	Karnataka	Rajasthan	Haryana	Uttar Pradesh	Andhra Pradesh	Madhya Pradesh	Kerala
6	Karnataka	New Delhi	Karnataka	Karnataka	Andhra Pradesh	Haryana	Tamil Nadu	Rajasthan	Karnataka	Karnataka	Karnataka
7	Rajasthan	Karnataka	Rajasthan	Rajasthan	Rajasthan	Andhra Pradesh	Maharashtra	Andhra Pradesh	Rajasthan	Rajasthan	Punjab
8	Madhya Pradesh	Madhya Pradesh	Madhya Pradesh	Madhya Pradesh	Madhya Pradesh	Tamil Nadu	Andhra Pradesh	Haryana	Madhya Pradesh	Haryana	Maharashtra
9	New Delhi	Rajasthan	Kerala	Kerala	Kerala	Maharashtra	Madhya Pradesh	Maharashtra	New Delhi	Maharashtra	Andhra Pradesh
10	Kerala	Punjab	New Delhi	Haryana	Haryana	Madhya Pradesh	West Bengal	Madhya Pradesh	Kerala	Gujarat	Rajasthan
11	Punjab	Kerala	Haryana	West Bengal	New Delhi	Gujarat	Gujarat	Gujarat	Punjab	Tamil Nadu	Madhya Pradesh
12	Haryana	Haryana	West Bengal	New Delhi	West Bengal	New Delhi	New Delhi	New Delhi	Haryana	New Delhi	Uttar Pradesh
13	West Bengal	West Bengal	Punjab	Punjab	Punjab	Punjab	Punjab	Punjab	West Bengal	Punjab	West Bengal

Source: Computed on the basis of Table:6

Results and Discussions:

Table-1 shows that during the period of study all the select states posted an increase in the number of automobiles, with Maharashtra recording the highest number of automobiles population growth with 21,52,14,000 vehicles followed by Tamil Nadu, Uttar Pradesh, Gujarat and Andhra Pradesh in that order. The least number of registration is associated with West Bengal with 5,29,34, 000 automobiles. During the same period the number of automobiles registration in states other than the select states stood at 22,62, 48, 000. The table also reveals that the numbers of automobiles registered in all the states are increasing on annual basis but Karnataka in 2007, West Bengal in 2008 and 2009 and New Delhi in 2005 indicated a slight decline in the number of automobiles registration.

The percentage of automobiles registered in each of the select state to the total number of automobiles registration in India is presented in Table-2. The observation of the figures leads us to conclude that the state of Maharashtra holds the highest percentage of automobile registrations in all the years of the study period. This state is followed by Gujarat in the first couple of years of study period and in the subsequent years by Tamil Nadu. The lowest percentage of registration is shown by West Bengal. The year-wise comparison of each state reveals that Andhra Pradesh in 2006, Gujarat in 2002, Haryana in 2009, Karnataka in 2014, Kerala, Rajasthan, Uttar Pradesh and West Bengal in 2015, Madhya Pradesh, Punjab and New Delhi in 2001, Maharashtra in 2002, Tamil Nadu in 2003 have had the highest percentage of automobiles registration in the study period. The percentage of automobiles registration in the rest of the states almost remains same with slight variations in subsequent years. Table -3, showing the ranks of the states on the basis of percentage of automobiles registration, also discloses the same information as by Table 2. However it can be observed that Haryana and West Bengal shared the twelfth position in 2004, similarly Andhra Pradesh and Karnataka in 2013 and 2014 shared the fifth position.

The annual increase in the number of automobiles registration in the states is available in Table.-4. The annual increase is the increase in the number of automobiles registered in the current year over the previous year's number of registrations. If the highest increase in any state in any year of the study period is considered, Uttar Pradesh marked the highest increase in the year 2015 with 25,21,000 automobiles and the states of Tamil Nadu in 2003, West Bengal in 2013, Andhra Pradesh in 2007,

Maharashtra in 2015, Karnataka in 2010, respectively follow Uttar Pradesh in that phenomenon. The number of automobiles registration continues unchanged in the last three years in Punjab, and that has declined in Andhra Pradesh, Karnataka in 2007, New Delhi in 2005 and in West Bengal in 2008 and 2010. Except these states, all states have displayed increases in number of number of automobiles registration.

The trend values for the number of automobiles registered is calculated by Ordinary Least Square (OLS) method and shown in Table-5. The OLS method categorically states the tendency of the observed values. The Trend Value for any year is calculated with the formula

Trend: $Y = a + b x$, Where 'Y' is the calculated trend value: 'a' is constant: 'b' is the intercept and x is the value for the year as the difference between the base year and the year under consideration. The Table of trend values shows the calculated trend values for the number of automobiles registration in the period of study. Since the number of automobiles registration is on the increase barring negligible decrease in some states in some years, the calculated trend values are on the increase.

The data were analyzed by applying select statistical tools and the values of the results, so obtained, are presented in Table-6. The ranks assigned to the select states on the basis of statistical parameters along with the automobile density are available in Table-7. The table shows that Maharashtra and Tamil Nadu hold the first two positions (except the second rank held by Gujarat in Minimum) in so far as the Total, Mean, Maximum, Range, Standard Deviation and Average Annual Growth Index (AAGI) are considered. Even so, these two states' coefficient of variation is not the least but the coefficient of variation of either West Bengal or Punjab is the least. West Bengal clutches the first position in the Average Annual Growth Rate (AAGR) and the highest Compound Growth Rate (GCR) occurs for the values pertaining to Karnataka. The factor automobile density (Number of automobiles per 1000 people) highlights that the Union Territory of New Delhi and the states of Tamil Nadu and Gujarat occupy the top three rungs of the automobile density ladder with 424, 326 and 300 automobiles respectively and the last three (11 to 13) ranks are positioned with Madhya Pradesh, Uttar Pradesh and West Bengal with 144,100 and 80 automobiles respectively. The Maharashtra state, which ranks first place in total number of automobiles registration, the percentage of automobiles registered and in some statistical parameters slips to 8th position in automobile density with 215 automobiles.

Conclusion:

The automobile sector enables large scale personal mobility, consequently it makes a remarkable changes in the society by bringing lots of benefits to the people. The fact that the automobile sales in urban India is growing faster than the population with 15 to 20 % per annum (Indiastat.com, 2008) is a positive sign of economic development. With the launch of several automobile manufacturing units throughout the nation, many regions have become the automobile hub and, thereby, created large scale employment opportunities. In this paper an attempt has made to highlight the growth of automobile population across select states, their position in the automobile population registrations and growth. The analysis shows that the states of Maharashtra, Tamil Nadu, Gujarat, Uttar Pradesh, Andhra Pradesh and Karnataka occupy the top slots in the number of automobile registrations and these states also play key position in the statistical parameters. In so far as the density of automobiles is considered the Union Territory of New Delhi is ranked number 1 followed by Tamil Nadu.

The increased use of automobiles also causes some other problems like air pollution, road congestion and road accidents, health related problems and the large scale out-go of Indian money for importing crude oil. So it may suggested that strict implementation of traffic rules and lane discipline, effective and updated petroleum conservation measures and increasing the public transport system will play a no less role in ensuring the significance and effectiveness of the automobile sector in Sub-continent.

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