

**A Comparative Case Study On Development With Traffic Congestion,  
Accidents And Emission Of Harmful Gases**

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**ABSTRACT**

As the topic we are talking about is not new for us but some issues connected to it are unspoken. Traffic congestion has been one of the burning issues that most metropolitan cities are facing in spite of measures being taken to reduce and mitigate it. Modern social and economic configurations, shaped by car – oriented urban development & rapid Development in vehicle ownership, have build congestion as an inevitable reality of urban life. The growing impact of congestion is replicated in terms of deteriorating urban air quality besides other adverse effects on quality of urban living. Traffic monitoring and traffic management is the need of the hour. To eliminate road accidents and to save precious human life it is essential to find proper solution for traffic congestion.

**KEYWORDS**

Discuss, Analyze, Examine, Describe, Investigate , Explore , Review, Development, Happiness, Traffic

**ABSTRACT**

Development rate measurement can use in many ways. For example alayman also want to identifies his progress in contrast to past or with others, a firm or companies also regulate and analyze their growth every year, any society also look back to its past to see its evolution era

and like all a nation or any country also want to measure and examine its Development rate so that it can see its current situation in the world and can make evaluation with other nations.

### **So What Actually DevelopmentRate Is?**

If we see the literal meaning of Development is “a process of growing and developing” or “anrise in something”. So we can assume the meaning of Development as a progressive change in its current state. But in some condition it may be negative as well and we can call it de-Development. When we compare Development of something with its historicalDevelopment, the difference between two conditions is called Development rate. It also may be progressive or negative.

As topic of study is related to Development and Traffic congestion, and both are related to method of Development rate measurement of a country, focus of the study will be on Development rate measurement of a country. There are other alternative of Development rate measurement as well. Like in 1970, Professor Adam Drenowaski from the University of Washington (born in Poland) started his research on the measurement on living and welfare including social well-being and development. But it was Morris David Morris’ *physical quality life index* or PQLI that got some responsiveness in this concept. After that Nobel laureate Dr. Amartya Sen developed a theoretical basis deriving from PQLI for the use of social indicators that can be used in assessing well-being (Daga, 2014). And later in 1990 Amartya Sen with Mahbub Ul Haq developed Human Development Index (HDI) for UNDP. It was emerged as an alternative of GDP method of progress. HDI also includes life expectancy and education with monetary factor.

### **INTRODUCTION**

Development rate measurement is helpful to see the tendency of way on which we are moving. Essentially it gives us anupcomingvision by scrutinizingformer trends. It’s also help full for comparisons perspective. Assessments not only with others but with own self as well. By comparison with others one can find its position in competitive world and can make strategies about outside opportunities and threats. By comparison with own self help to determine own strength and weakness so that work can be done to improve the positive area and recover the weak spots (Sharma, 2015).

Traffic congestion is a critical problem which happens on roads which makes traffic busy because road full of cars and buses. Traffic congestion challenges traffic flow in urban area and is disallowed smooth traffic. a growing urban area creates difficult problems in daily life with traffic . Application of physical constructions such as: build bridge, motorways and increasing road capacity cannot terminate congestion occurrence. It is necessary to build technology system for transportation management. Traffic control arrangements have direct influence on traffic problems. Generally works in roads, road maintenance and incidents are the causes of traffic jam . Approximately traffic congestion happens at peak times in the morning or evening when people are travelling to work.

## **LITERATURE REVIEW**

If we look back at the history of the Development We will find its way after World War 1. When economy of countries shattered and there was shortage of products weather it is for industrial purpose or for daily consumption. “At that time Keynesian economics highlighted the importance of strong system of measuring the National Income” (Ukai 2016, p.4). At that time Kuznets (eminent economist) was also working on national income measurement process. Then US Government hired Kuznet through Department of Commerce to help standardized their calculation process. After publishing the accounts by US Government in 1940 other nations followed the growing movement. “The standards have gradually shifted over time, with the most recent version released in 2008” (Ukai 2016, p.4).

According to Bureau of Economic Analysis, 2000 GDP was intended to help politicians with the circumstances of World War II. It was a guide to post-war economic policy and it is hard to underestimate its success. Zohan also discussed about the narrow uses of GDP in his paper GDP and its enemies. He wrote down that it’s a manipulative agenda of govt. for his political purpose. He quoted “ In fact, a strong argument for sticking with GDP is that it is narrow in scope and value free. It tells us what we can do, but not what we should do, and does not even try to define well-being” (Norberg 2015p.1).

GDP methodology had firstly initiated in US and UK after World War 1. GDP was firstly introduced in 1930 as a methodology with the aim of overcoming of economy from World War 1 destruction. After world war 11 shattered the economy all over the world. “GDP estimates were used to show that the economy could provide sufficient supplies The use of

GDP globally as a measure of economic progress was further strengthened as a result of the Bretton Woods Conference for fighting WWII while maintaining adequate production of consumer goods and services” (Baletka, 2009p.8). So we can say that GDP was initially used as a measure of production, adequate supply of goods, availability of raw material and other supplements which can help the economy to overcome.

Beltaka in 2009 discussed about most famous Bretton Woods Conference held in 1944, for the stability of currency exchange rate and discriminatory trade practice, strengthened the concept of GNI. In Bretton Woods Conference 44 allied together to speedn economic, international corporation on trade and currency exchange, aid political stability and foster peace. India also participated in this conference as original member. The main assumption of conference was increasing in world trade create jobs which results in incresing income followed by consumption and ultimatelty result in production. And that condition would allow anyone to obtain adequate food, clothing, medicale facelities and other facilities which were supposed not to be available easily because of world war destruction. Means the biggest objective of the world war 11 was to be focus on production. Growing economy and production was seen as a path to well being (Beltaka, 2009 p.8).

K .Macmillan invented the first car had proper shape and wooden frame in 1839 which includedany types of advantages such as motion , speedcomfort , control , economy , furniture and safety . The automobile industry became more popular and necessary for the life and it aimed to improve car’s industrial design and create more cars by companies . In the end of 18th century , the first traffic congestion appeared on the old London Bridge which created a serious problem .After that the London govt . decided to find way out for this phenomena which led to the invention of control system to solve traffic congestion by installing traffic lights on the old London Bridge . In addition, the London govt. added another control system by dividing the London Old Bridge into two paths, one for vehicles and another for pedestrians .

Control system is an approach to remedy traffic phenomenon by applying technology, programming and tolls. In the end of 18<sup>th</sup> century, the first control system was applied in London by traffic light which was used to organize traffic motion on London Old Bridge . A growing in urban area encouraged govt.to invent and apply a new technology to reduce traffic problems which is called traffic control system .

The relationship between control system and traffic congestion was investigated in 1994 by Shefer which had divided volume over capacity ratio which was used to measure level of traffic congestion. Then after in 1997 the relationship between traffic congestion and control system was studied by Shefer and Rietveld, further studied by Noland and Quddus in 2005.

## **RESEARCH OBJECTIVES**

1. To discuss the causes of traffic congestion
2. To throw light upon some problems caused by traffic congestion
3. To find out some solutions for traffic jam

## **CAUSES OF TRAFFIC CONGESTION**

1. Saturation
2. Construction
3. Car crashes
4. Weather
5. Distracted driving
6. Double parking
7. Too many pedestrians
8. Inadequate green time
9. Rally lovers
10. Encroachment

## **PROBLEMS OR EFFECTS OCCURRING DUE TO TRAFFIC CONGESTION**

1. Higher level of anger and frustration
2. Increase in air pollution due to emissions
3. Increase in noise pollution
4. Wastage of time
5. Decrease in productivity
6. Less pleasant environment
7. Higher motoring cost

**METHODOLOGY & MEASUREMENT**

In this research secondary data are used for the purpose of the study. This research is analytical and descriptive in nature. Secondary data has been collected through structured literature review and also taken from published material available online or through libraries in the form of books, reports and accessed journal etc. Based on literature, hypotheses were generated regarding the relationships between Development and Traffic Congestion issues. The data has been collected through online or personal data collection method and the hypotheses will be tested through various statistical tools.

**MAJOR FACTS AND FINDINGS**

Vehicular population projections in New Delhi are given in table no. 1 .

| YEAR | TWO – WHEELER | CAR     | BUS    |
|------|---------------|---------|--------|
| 2015 | 4918777       | 2512234 | 64748  |
| 2018 | 5608980       | 2885110 | 74713  |
| 2020 | 6033646       | 3127639 | 84643  |
| 2023 | 6634911       | 3461118 | 89259  |
| 2025 | 7013511       | 3693622 | 93971  |
| 2027 | 7402890       | 3908506 | 99580  |
| 2030 | 8056069       | 4236245 | 109330 |

Cost projections - Marginal cost of congestion (INR / vkm ) is given in table no. 2

| YEAR | CAR   | BUS   | TWO -WHEELER |
|------|-------|-------|--------------|
| 2015 | 11.16 | 21.69 | 2.61         |
| 2018 | 13.93 | 23.20 | 3.89         |
| 2020 | 16.08 | 24.79 | 4.99         |
| 2023 | 19.61 | 25.55 | 7.11         |
| 2025 | 22.51 | 26.35 | 8.88         |
| 2027 | 25.57 | 27.32 | 11.18        |
| 2030 | 31.07 | 29.08 | 16.47        |

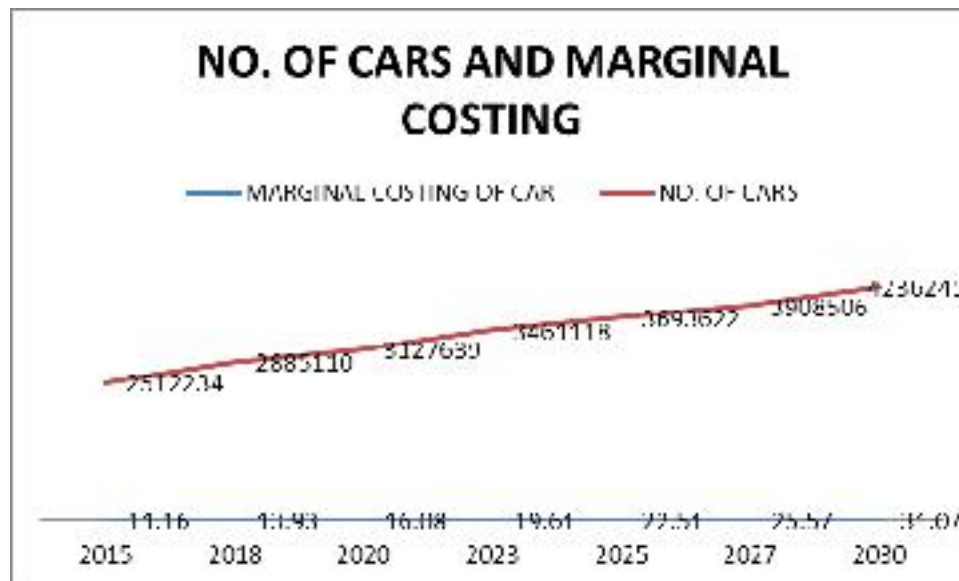


Figure shows an actual and projected trends of no. of cars and marginal cost of traffic congestion. It depicts that no. of cars are 2512234 in 2015 where as it 4236245 in 2030 which is almost double in 15 years. Marginal cost is 11.16% in 2015 and increases to 31.07% in 2030 which is more than the rising rate of the cars. It means there is a magnifying effect between both of them. That condition bring adverse effect for environmental and social factors.

#### CORRELATION ANALYSIS: NO. OF CAR AND MARGINAL COSTING OF CONGESTION

|                            | MARGINAL<br>COSTING<br>OF CAR | NO. OF<br>CARS |
|----------------------------|-------------------------------|----------------|
| MARGINAL COSTING<br>OF CAR | 1                             |                |
| NO. OF CARS                | 0.988533                      | 1              |

$H_0$ : There is not any significant difference between no. of cars increase and marginal cost rising of congestion

$H_1$ : There is significant difference between no. of cars increase and marginal cost rising of congestion.

Analysis reveals the  $r$  – value 0.988533 there is Negative correlation between no. of cars increase and marginal cost rising of congestion. Hence null hypothesis was rejected and alternative hypothesis that significant difference between no. of cars increase and marginal cost rising of congestion accepted.

**TOTAL COST OF CONGESTION IN NEW DELHI IS GIVEN IN THE TABLE NO.**

| MODE           | TOTAL COST (in million US \$ PER YEAR ) |
|----------------|-----------------------------------------|
| CAR            | 911                                     |
| BUS            | 6980                                    |
| TWO – WHEELERS | 258                                     |
| ACCIDENTS      | 64                                      |
| FUEL WASTAGE   | 699                                     |
| TOTAL          | 8912                                    |

**POLICY RECOMMENDATIONS AND LIKELY IMPACT COST IS GIVEN IN TABLE NO.**

| POLICY RECOMMENDATION                   | COST IMPACT             |
|-----------------------------------------|-------------------------|
| Dedicated Bus Lanes                     | 6300 million US \$ / yr |
| Strict Vehicular Emission Control Norms | 730 million US \$ / yr  |
| Safety and Accident Prevention Features | 65 million US \$ / yr   |
|                                         |                         |

**DATA ON DEVELOPMENT WITH TOTAL NO.OF ROAD ACCIDENTS, NO. OF PERSON KILLED AND NO. OF PERSON INJURED (2006 – 2015)**

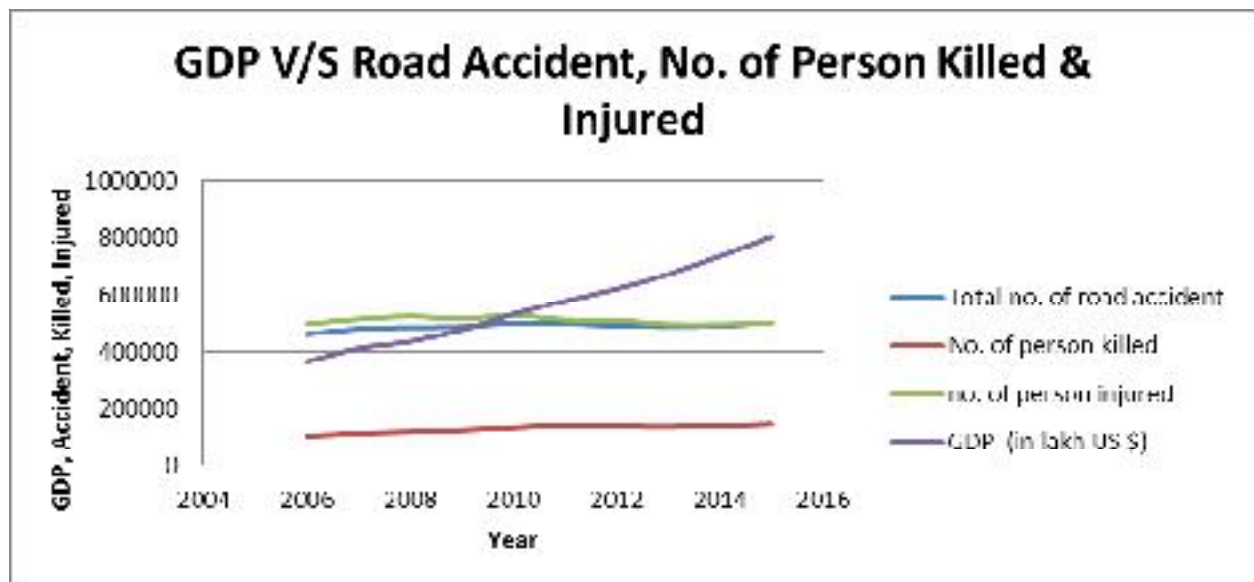
| Year | Total no. of road accident | No. of person killed | no. of person injured | GDP (in lakh US \$) |
|------|----------------------------|----------------------|-----------------------|---------------------|
| 2006 | 460920                     | 105749               | 496481                | 364700              |
| 2007 | 479216                     | 114444               | 513340                | 411110              |
| 2008 | 484704                     | 119860               | 523193                | 435480              |
| 2009 | 486384                     | 125660               | 515458                | 475990              |

|      |        |        |        |        |
|------|--------|--------|--------|--------|
| 2010 | 499628 | 134513 | 527512 | 531240 |
| 2011 | 497686 | 142485 | 511394 | 578200 |
| 2012 | 490383 | 138258 | 509667 | 621450 |
| 2013 | 486476 | 137572 | 494893 | 672730 |
| 2014 | 489400 | 139671 | 494474 | 736250 |
| 2015 | 501423 | 146133 | 500279 | 803630 |

(Source: Road Accident in India, 2015/ Ministry of Shipping Road Transport and Highway)

As shown in the above table GDP (in lakh US \$) is 364700 in 2006 that increased to 803630 in 2015. Total no. of road accident increased from 460920 to 501423 in 2015 as no. of person killed out of total road accident increased from 105749 in 2006 to 146133 in 2015, simultaneously no. of person injured from 496481 in 2006 to 500279 in 2015.

### DEVELOPMENT V/S ROAD ACCIDENT, NO. OF PERSON KILLED & INJURED



Above diagram showing the trends GDP for 12 years with total no. of road accident including no. of person killed and injured. It reveals that GDP is increasing as well as total no. of road accident, no. of person killed and injured also increased during this period.

### REGRESSION ANALYSIS – GDP V/S ROAD ACCIDENT

#### SUMMARY OUTPUT

##### Regression Statistics

|                   |       |
|-------------------|-------|
|                   | 0.681 |
| Multiple R        | 3     |
|                   | 0.464 |
| R Square          | 2     |
|                   | 0.397 |
| Adjusted R Square | 2     |

SUMMARY  
OUTPUT

|                |       |
|----------------|-------|
|                | 9119. |
| Standard Error | 5     |
| Observations   | 10    |

ANOVA

|            | <i>Df</i> | <i>SS</i>  | <i>MS</i>  | <i>F</i>   | <i>Significance F</i> |
|------------|-----------|------------|------------|------------|-----------------------|
| Regression | 1         | 576374258  | 576374258  | 6.93044689 | 0.030058              |
| Residual   | 8         | 665324204  | 83165525.5 |            |                       |
| Total      | 9         | 1241698462 |            |            |                       |

|                     | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> |
|---------------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|
| Intercept           | 456677              | 12103.10742           | 37.7322407    | 2.67151E-10    | 428767.5         | 484587.2         |
| GDP (in lakh US \$) | 0.055               | 0.020875467           | 2.63257419    | 0.03005781     | 0.006817         | 0.103095         |

H<sub>0</sub>: There is not any significant difference between GDP Growth Rate and increasing no. of Road Accident

H<sub>1</sub>: There is significant difference between GDP Growth Rate improvement and increasing no. of Road Accident

Regression analysis was carried out to identify death rate reduction. Analysis reveals that there is significant positive relationship between the GDP Growth rate and increasing no. of Road Accident as  $r(8) = 0.6813$ ,  $p = .003005$  and  $df = 8(9-1)$ . Hence null hypothesis was rejected that no significant difference between GDP Growth Rate improvement and increasing no. of Road Accident.

(Regression Analysis – GDP V/S Person Killed in Road Accident)

| Regression Statistics |        |
|-----------------------|--------|
| Multiple R            | 0.9004 |
| R Square              | 0.8106 |
| Adjusted R Square     | 0.787  |
| Standard Error        | 6164.4 |
| Observations          | 10     |

| ANOVA      |    |             |             |             |                |
|------------|----|-------------|-------------|-------------|----------------|
|            | Df | SS          | MS          | F           | Significance F |
| Regression | 1  | 1301440936  | 1301440936  | 34.24838137 | 0.000382       |
| Residual   | 8  | 304000570.8 | 38000071.35 |             |                |
| Total      | 9  | 1605441507  |             |             |                |

|                     | Coefficients | Standard Error | t Stat      | P-value     | Lower 95% | Upper 95% |
|---------------------|--------------|----------------|-------------|-------------|-----------|-----------|
| Intercept           | 83935        | 8181.207842    | 10.25952618 | 7.00809E-06 | 65069.42  | 102801.2  |
| GDP (in lakh US \$) | 0.0826       | 0.014110966    | 5.852211665 | 0.000381819 | 0.05004   | 0.11512   |

$H_0$ : There is not any significant difference between GDP Growth Rate and increasing no. of Person Killed in Road Accident

$H_1$ : There is significant difference between GDP Growth Rate improvements and increasing no. of person killed Road Accident

Regression analysis was carried out to identify impact of GDP Rate on no. of person killed in Road Accident. Analysis reveals that there is significant positive relationship between the GDP Growth rate and increasing no. of Road Accident as  $r(8) = 0.9004$ ,  $p = .003818$  and  $df = 8(9-1)$ . Hence null hypothesis was rejected that no significant difference between GDP Growth Rate improvement and increasing no. of person killed in Road Accident.

## CONCLUSION

Finally it is high time we were aware of the disadvantages as well as the solutions to the traffic congestion. With great effort from each individualist and government, our society will be definitely cleaner and well organized. The effectiveness of such measures depend to a great extent on us, the public, the road users, the police and, of course proper enforcement of the laws.

As humans enter a new era in which we have drastically altered the climate and ecosystems across the globe and misbehaved four of the nine planetary boundaries connected to earth-

system processes, the need for development alternatives is crucial (O'Neill 2012). Happiness provides important alternative avenues for engaging with such pressing issues. The dangerous importance of increasing and excavating Happiness consciousness for the benefit of human and sentient beings has never been more important. Bhutan is the only nation in the world that is carbon neutral, absorbing three times more carbon than it emits (Verma 2016b; Nelson 2015). This is reinforced by its constitution that stipulates sixty per cent of its land must be under forest cover in perpetuity (RGoB 2008).

## SOLUTIONS

1. Parking lots
2. Adaptive traffic signals
3. V 2 I smart corridors
4. Autonomous Vehicle technology
5. Real time traffic feedback
6. Tracking pedestrian traffic
7. Car sharing and multi modal solutions
8. Replacing vehicles with Drones
9. Designing a well – maintained and well developed public transport system
10. Promoting traffic safety and traffic rules through education , advertising and strict enforcement
11. Introduction of cost effective , environment friendly and efficient new modes of public transport
12. Last but not the least, encouraging walking and bicycling .

## LIMITATIONS OF THE STUDY

1. The projections may change due to increase in the understanding level of people .
2. If people start becoming empathetic, definitely the data forecasted in the table may decrease.

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