

Measuring Commuters Problems, Traffic Management and Causes and Consequences of Peak Hour Traffic through Quantitative Technique - A Study with Respect to Bengaluru

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Abstract

The age old commuters transport related problems are not solved and those problems are aggravating day by day. Commuters blame the traffic management authorities for their delayed services and many a times traffic jams are becoming quite common. It was felt the introduction of metro in Bengaluru covering 42 km may reduce the problem of traffic but rather it might have reduce journey timings. Unprecedented vehicles on the road further adds to the agony of commuters and commuters are unable to reach the office in time. 8-5 million population with a heavy decadal growth an account of various socio economic and political reasons with nearly 70 lakh vehicles on the road are putting problems on the heads of traffic engineers, planners and police. Around 25% of Bengaluru population will be on the roads for different purposes. Travelers, professionals, students shopping goers, hospital going, entertaining, searching job, attending religions places are the various purposes behind population movement. It usual the road users curse the traffic and police due to missed appointments, missed emergencies, missing the bus and reaching the office late are the common usual features of traffic in Bengaluru. It is horrible to travel in some techno savvy areas which consumes hours together. The volume of traffic being large and roads being small and creates constant unsolvable problems. The present volume of traffic at Bengaluru is threatening and anxious and creating depressed attitude among motorists in Bengaluru. In spite of construction of fly areas, grade separators accidents are increasing.

KEYWORDS : Traffic Management, helplessness, heavy goods vehicle, flyovers, grade separators.

Introduction

Innumerable commuters belonging to different professions and travelers travel either for the business, education, marriage, reaching an office. The commuters are strongly related to the various modes of intra transportation and they are highly depending upon different modes of intra transportation agendas who are talking the responsibility of carrying from one to another area. Managing commuter relationship is assuming significance at Bengaluru. Simply it states about the establishment of good relationship between commuters and different agencies who are involved in the city intra transportation. Hence the need arises to safeguard the commuters by providing best services.

In the course of travel from one to another areas the commuters at present faces innumerable problems waiting for a local bus or waiting for an auto rickshaw is

common in Bengaluru. Refuse and charge extra is a big problem at Bengaluru which is experienced by commuters at the time of travel in a rickshaw. BMTC buses never follow a time schedule due to heavy mad traffic in Bengaluru. Further the commuter pays highest charge in India but poor services are offered by the buses. Uncleaned, window glassless, seat less, heavy sound making are some of the common problems faced by commuters at Bengaluru. The road conditions at Bengaluru is not to the expected level often becomes unmotorable during rainy season and Bengaluru has the rainy season and Bengaluru has two rainy season are at May - June and another at November and December. Heavy rains during the above seasons makes the travel very difficult. The existing narrow roads with high vehicular traffic makes difficult to reach the destiny in time. There is an urgent need of addressing the traffic management drivers, otherwise further industrialisation in and abroad Bengaluru may not take place at a predicted rate and the existing units may be relocated.

A. Statement of the problem

There are more than 3 lakh auto drivers directly depending auto driving profession. Namma Metro a joint venture of government of India and government of Karnataka is operating in Bengaluru and covers a distance 42.3 km and touches 41 stations and carried 4,00,000 commuters daily. Namma Metro is providing services in two line and by the end of 2023 its phase 2 may provide connectivity to the city's important technical hubs of Electronic City and Whitefield. Namma Metro is the 7 largest metro network in the world and 83rd ranked metro system in terms of length at present. At Bengaluru Mahanagara Transport Corporation is operating 6390 buses and 34 bus stations with three major bus stations as on November 27, 2017 (Naveen Menezes, 2018). There are nearly 50 lakh people uses BMTC every day. The auto drivers with little margin are unable to lead a better life. These drivers fight hard to get a seat in private school and the monthly earnings are not sufficient to meet children's education, health checkup a food expenditure. The autorickshaw drivers are not burdens are to be government as they are self employed.

The employees working in Namma Metro and BMTC are not government workers and they are corporation employed. The autorickshaw are common man's taxi and provide services to the doorstep of passengers. Further, Ola and Uber provide independent pool service to the commuters. Different stakeholders in the society are equating "Criminality with poverty" and slums and outskirts are viewed as nurseries of crime and the trend of concluding that bad character in poor quarters is growing. The same is the case with autodivers who are rendering valuable services to the commuters.

The existing situation of BMTC bus maintenance is not to the expect extent. Seatless, window glass less, dirt on all seats and maximum sound making fibre body buses are not liked by commuters. They are noise producing agents. The peak hour traffic is putting pressure to the commuters and travelers and buses move 3-4 km speed in certain high traffic areas. With the growing influx of migrants from different parts of the country is making very difficult to transport to their workplace and residential users. The commuters severely remarks on the traffic jam which is growing day by day.

1.3 Objective of the Study

- (1) To study the commuters demographic profile.

- (2) To analyse various problems faced by commuters.
- (3) To analyse the issues relating to traffic management.
- (4) To analyse causes and consequences of peak hour traffic at Bengaluru.

Hypotheses

- (1) The demographic profile of customers is not supporting the study.
- (2) Commuters are not facing any problems.
- (3) There exist no drivers of traffic management.
- (4) There are no causes and consequences of peak hour traffic at Bengaluru.

2. Research Design

The present study the researcher has used both descriptive and analytical type. Under descriptive analysis the research has described the state of affairs as it exist at present and afterwards analytical type of study was performed to analyse the existing facts from the data collected from the commuters.

A. Sample of the study

Using the formula suggested by Bill Godden the sample of the study was decided.

SS = infinite where population is > 50,000

$SS = Z^2 \times (P) \times (i-p)/c^2$

Z = Z value A (e.g. 1.96 for a confidence level)

P = Percentage of population picking a choice, expressed as decimal B.

C = Confidence interval, expressed as decimal.

(e.g. 0.04 = +/- 4 percentage points)

AZ values (Cumulative Normal Probability Table)

1.645 = 90% Confidence level

1.96 = 95% Confidence level

2.576 = 99% Confidence level

$SS = 3.8416 \times 0.5 \times 0.5 / 0.0016 = 0.9604 / 0.0016$
 = 600.25 or 600.

Sampling Table

Commuters means of transportation	Number of respondents
Autorikshaw	150
BMTC	150
Namma Metro	150
Volo / Uber	150
Total	600

B. Universe of the study

The study is confined to Bengaluru Urban. Bengaluru is nicknamed as ‘silicon city’, ‘airconditioned city’ and ‘global garment hub’ and a heaven to migrants who come to Bengaluru to earn and to lead better life.

C. Sampling Technique

Convenient sampling technique was adopted and data has been collected using a structured questionnaire. 600 sample was fixed for the study as suggested by Bill Godden (2004).

D. Sources of data

The present researchers both primary and secondary data. The primary data collected from primary source through a well prepared pretested questionnaire administered as schedule after taking issues like completion of questionnaire at one stage and to save time and financial resources. Totally 640 questionnaires were used for the purpose of data collection and out of 640 only 600 were usable one. Secondary sources were journals, books and different websites.

E. Questionnaire design

The questionnaire framed for this purpose is a structured one and all questions to be asked is known in advance. The scales used to evaluate questions are:

- 1) Descriptive scale (yes or no)
- 2) Likert 3 and 4 point of scale.

F. Statistical tools and techniques

Chi-square and ANOVA statistical tools were used to interpret the data. These two quantitative metrics measures the variation in the data and also assist in testing the data scientifically.

3. Review of literature

Harish (2013) conducted a research on urban traffic and transport management in the city of Mysore and furnished the traffic management aspects related to time delay, congestion, parking and framework of operations, identifying clear vision and mission statements for the future. The research work mainly focused on identifying traffic management, that is accessibility and mobility safety, security and economy and environment.

Puneet (2007) conducted a study on customer relationship management practices implemented by organisations and experiences with technology, people and processes to enhance existing business. Customer management can stimulate business improvement and can benefit both a company and a customer. The author in his study recognised that customer relationship management is a solution which an deliver quality, consistent and personalised care to the customers.

Kalyankar (2009) stated the traffic management consist of amalgamation of number of activities such as traffic management, traffic analyssts, management techniques, result evaluation and find result.

Rao (2009) provided an insight into the customer experience management. He has stated that it has driven many companies to attain success. The intention of customer experience management is to more customers from satisfied to loyal and address the solutions for customers problems through cross channels, cross touch points and cross life cycle.

Survey Findings

Table-1A to 1D reveals information about demographic profile of commuters. Table 1A show that 210 respondents belongs to the age group of 36-45 years followed by 160 belonging 26-35 years, 90 belongs to 46-55 age group, 80 to the age group of 18-25 years and 60 to the age group above 56 years. Chi-square test fails to accept H₀ and accepts H₁ and it is concluded here that there exists significant variation in the data. Table 1-B reveals data about qualifications of commuters. 180 respondents are post graduate degree holders followed by 150 general degree, 100 professional, 90 PUC and 80 10th standard Chi-square fails to accept H₀ and accepts H₁ and hence it is concluded here that there exist significant variation in the data. Table 1-C speaks about occupation details of commuters. 180 respondents are private employed followed by 130 government service. 90 each self employed and home maker, and 80 doing business. Chi-square test fails to accept H₀ and accepts H₁. Therefore it is concluded here that there exist significant variation in the data. Table 1-D reveals commuters monthly income. 180 commuters are getting an income in between Rs. 30K to 40K followed by 120 getting in between 20K - 30K. 90 each in between 15K to 20K and 40K-50K, 70 respondents getting Rs. 60K & above. Chi-square quantitative metric fails to accept H₀ and accepts H₁ and hence it is concluded here that there exist significant variation in the data.

Table-2 reveals information about problems faced by commuters at Bengaluru, 360 Commuters strongly agree over the statements influencing the problems followed by 180 agree and 60 some what agree. Out 360 commuters who said strongly agree 70 said about bad maintenance of BMTC buses, 68 about high transport cost, 62 about misbehaviour of autodrivers, 60 each about no schedule time of arrival and too much rash in the metro, 40 about aged persons can not get down in the metro. 180 commuters who said agree 40 said about bad maintenance, 38 each about high transport cost and misbehaviour of autodrivers, 28 about too much rush in the metro, 24 about aged persons can not get down on the metro station, and 22 said about no schedule time for arrival of BMTC buses. Out of 60 who said some about a majority of 15 said about high transport cost, 11 about misbehaviour of autorickshaw drivers 10 about too much rush in the metro and 9 about bad maintenance of BMTC buses. ANOVA test fails accept H₀ and accepts H₁ and hence it is concluded here there exist significant variation in the data.

Table-3 highlight information about issues relating to Bengaluru's traffic management. 330 commuters strongly agree about stated different statements influences different issues of traffic management followed by 200 agree, 40 disagree and 30 strongly disagree. Out of 330 who said strongly agree 63 said about irreparable roads and traffic, 60 about bad roads, 57 about allowing heavy goods vehicles, 55 about technology not applied in the road construction, 50 about improper grade separators and 45 about unscientific flyovers. Out of 200 who said agree, 38 said about improper grade separators, 35 each about bad roads and allowing HGV, 34 about unscientific flyovers and 30 about irreparable roads. Out of 40 commuters who disagree, 10 said about improper grade separators, 9 about bad roads, 7 about allowing HGV vehicles 5 each about irreparable roads 8 heavy traffic and unscientific fly overs. Out of 30 who said some what agree a majority of 7 said about technology not applied. 6 each about bad roads and allow HGV. ANOVA quantitative metric fails to accept H₀ and accepts H₁ and hence it is concluded that there exist significant variations in the data.

Table-4 highlights data about causes and consequences of peak hour traffic. 336 commuters strongly agree over factors contributing towards peak hours traffic followed by 118 agree and 66 some what agree. Out of 336 commuters who said strongly agree, 65 said about blaming, chasing getting angry, helpless situation and karma, 62 and about unscientific construction of flyovers, 60 about bus stops not modernised, 54 about narrow roads, 50 said about slow traffic movement during rain and after rain and 45 said commuters treated traffic at metro station while getting down. Out of 118 commuters who said agree, 40 said about blaming and cursing, 36 about narrow roads, 35 about unscientific construction of flyovers, 28 about slow traffic movement during before and after rain. Out of 66 who said some what agree 15 said about bus stops are not modernised, 13 about narrow roads, 11 about unscientific flyovers, 10 about slow movement of traffic during and feeling of helplessness attitude. ANOVA fails to accept H₀ and accepts H₁ and hence it is concluded here that there exist significant variation in the data.

4. Conclusion

Bengaluru is growing at a faster at the global level. Innumerable software, garment units and manufacturing and service industries are presently working in Bengaluru. Employment opportunities are growing and innumerable migrant workers are working at construction industry. But unfortunately the mobility of labour has become a problem. Unless and until the problem of mobility is addressed properly traffic management becomes a hellish and commuters will be helpless. It is horrible to commute during traffic hours where in the traffic moves at 2 km speed. Government has already started road construction by applying latest technology and white topping is in progress and in such areas traffic moving speed has increased. Scientific grade separators, flyovers may be constructed protect our environment and insist upon “steel bridge” from high ground police station to Hebbal is not a best strategy and government has to think other strategies which involves lower costs and best services.

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Table-1 : Demographic Profile of Commuters

A. Age of the Respondents	No. of respondents	%	χ^2
18-25	80	13	131.6666*
26-35	160	27	
36-45	210	35	
46-55	90	15	
56 and above	60	10	

Total	600	100	
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Source: Field Survey

*Significant @5% level

Hypotheses

H0	There exists no significant variation in the age data	Reject
H1	There exists significant variation in the age data	Accept

Chi-square Table

Calculated value = 131.6666, df = 4, Sig. Level 5%, TV = 9.488

Chi-square Analysis

The calculated value being 131.6666 higher than the TV = 9.488 with df = 4, fails to accept H0 and accepts H1. Therefore it can be concluded here that there exists significant variation in the data.

B. Qualification	No. of respondents	%	x ²
10th Standard	80	13	
PUC	90	15	
General Degree	150	25	60.6666*
Post graduation	180	30	
Professional degree	100	17	
(Advocates, Engineers, Accountants, Doctors, Professionals etc.)			
Total	600	100	

Source: Field Survey

*Significant @5% level

Hypotheses

H0	There exists no significant variation in the data	Reject
H1	There exists significant variation in the data	Accept

Chi-square Table

Calculated value = 60.6666, df = 4, Sig. Level 5%, TV = 9.488

Chi-square Analysis

The calculated value being 60.6666 higher than the TV = 9.488 with df = 4, fails to accept H0 and accepts H1. Therefore it can be concluded here that there exists significant variation in the data.

Demographic Profile of Commuters - Occupation Details

C. Occupation Details	No. of respondents	%	x ²
Government service	130	22	128*
Private	180	30	
Business	80	13	
Self employed	90	15	
Farm owners	30	05	
Home makers	90	15	

Total	600	100	
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Source: Field Survey

*Significant @5% level

Hypotheses

H0	There exists no significant variation in the age data	Reject
H1	There exists significant variation in the age data	Accept

Chi-square Table

Calculated value = 128, df = 5, Sig. Level 5%, TV = 11.070

Chi-square Analysis

The calculated value being 128 higher than the TV = 11.070 with df = 5, fails to accept H0 and accepts H1. Therefore it can be concluded here that there exists significant variation in the data.

Demographic Profile of Commuters - Income Details

D. Income Details	No. of respondents	%	χ^2
10,000 - 15,000	50	8	128*
15,001 - 20,000	90	15	
20,001 - 30,000	120	20	
30,001 - 40,000	180	30	
40,001 - 60,000	90	15	
60,000 > above	70	12	
Total	600	100	

Source: Field Survey

*Significant @5% level

Hypotheses

H0	There exists no significant variation in the age data	Reject
H1	There exists significant variation in the age data	Accept

Chi-square Table

Calculated value = 104, df = 5, Sig. Level 5%, TV = 11.070

Chi-square Analysis

The calculated value being 104 higher than the TV = 11.070 with df = 5, fails to accept H0 and accepts H1. Therefore it can be concluded here that there exists significant variation in the data.

Table - 2 : Problems faced by commuters at Bengaluru

Problems faced	HA	A	SWA	T
High transport cost	68	38	15	121
No schedule time in the arrival of BMTC buses	60	22	8	90
Aged can not get down in the metro and lifts are security less	40	24	7	71
Too much risk in the metro	60	28	10	98

Bad maintenance of BMTC Buses	70	40	9	119
Misbehaviour of autorickshaw drivers	62	38	11	101
Total	360	180	60	600

Source: Field Survey

*Significant @5% level

Hypotheses

H0 There exists no significant variation in the age data Reject

H1 There exists significant variation in the age data Accept

ANOVA Table

S/v	ss	df	ms	F-ratio	5% limit (from F-Table)
Between the sample	7600.0002	(3-1)=2	7600.0002/2	3800.0001/62.67	
			=3800.0001	=60.635	
Within the sample	9400000	(18-3)=15	940/15=62.67		(2, 15) =3.68
Total	8540.0002	18-1=17			

ANOVA Analysis

The calculated value being 60.635 higher than the TV = 3.68 @ 5% level of significance with df = v1 = 2 and v2 = 15 fails to accept H0 and accepts H1. Therefore it is concluded here that there exists significant variation in the data.

Table - 3 : Issues relating to Bengaluru’s traffic managements

Different issues of traffic management	SA	A	DA	SDA	T
Bad road conditions	60	35	9	6	110
Irreparable roads & heavy traffic	63	30	5	4	102
Technology not applied in the road construction	55	28	4	7	94
Improper grade separators	50	38	10	3	101
Unscientific flyovers & consequent increase in traffic	45	34	5	4	88
Allowing heavy goods vehicles in the populated areas	57	37	7	6	105
Total	330	200	40	30	600

Source: Field Survey

SA - Strongly Agree, A - Agree, DA - Disagree, SDA - Strongly Disagree

Hypotheses

H0	There exists no significant variation in the age data	Reject
H1	There exists significant variation in the age data	Accept

ANOVA Table

S/v	ss	df	ms	F-ratio	5% limit (from F-Table)
Between the sample	10232.2668	(4-1)=3	10232.2668/3	3410.7556/16.4833	
			=3410.7556	=206.92	
Within the sample	329.6668	(24-4)=20	329.6668/20		(3, 20)

