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Innovations in Public Sector Services to Reduce the Traffic Volume

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Abstract: ***Coimbatore is the Second largest city of Tamilnadu with all its wealth of IT hubs, Educational Institutions, and varied business start-ups increasing the population growth of the city by which the city stands as Manchester of South India. The transport structure is in such a way that the city is confined within six arterial roads bordering the city. The city holds 265 bus transports totally with passenger capacity around 0.2 million. Other than bus transports there are many other sources for transport in the city including, auto-rickshaws, share autos, call taxies, Omni buses, self-vehicles like car, bike, and 'n' number of vehicles used by institutions and industries. Since Coimbatore is a well- planned and cleaned city among other metro cities like Bangalore, Kochi, Chennai etc., in South India, the same is destroyed due to annoying vehicular growth in last decades. The city with exaggerated students and IT hands arises a question regarding punctual travel to schools, colleges, offices and rate of accidents in peak hours besides vast transport facilities. Coimbatore ranks 23rd of the country in the fatal accidents faced by motorists and city walkers. The accidents are caused due to increase in vehicle population at the rate of 0.15 million per annum inculcating all buses, 2-wheelers and 4-wheelers. This uncertainty shift from place to place gives a gap for implementation of MRTS in the city of Coimbatore.***

***Keywords*: Traffic demand, Environmental pollution, traffic study, vehicle population and accidents.**

I. INTRODUCTION

1.1. METRO NETWORKS IN INDIA

India, as a classified sub-continent has numerous technologies occupied with it. The System of Metro networks is a part of community infrastructure development in India persists since October 24, 1984 commenced in Kolkata, West Bengal, India with a total of 38 metro networks all over the country. Metro system was also an aspect of Smart City plan to major cities of India listed recently.

1.2. METRO TO COIMBATORE

For more than a decade now, Coimbatore has fantasized for a Mass Rapid Transit System as the ever-rising vehicle population chokes the city's roads, especially during peak hours. The choking is due to the practice of using more number of own vehicles by IT professionals and many other individuals of the city (i.e) a 4-wheeler whose occupancy is numbered to 4 minimum, is utilised by a single person for his travel from his residence to the office. This creates a motorised situation causing environmental pollution and many inevitable accidents to the city side walkers behind many other traffic rules and awareness such as turn-off engines during traffic, implementation of 4-stroke and 6-stroke engines in 2-wheelers. Daily trips in Coimbatore are likely to grow from 3.5 million presently to 6.5 million by 2031. Road fatalities also are expected to multiply, not to talk of significant inequity. The above are the base for the transport evolution of the city to MRTS. The upcoming figure 1.1 shows a clear view of city traffic demand in Coimbatore city.

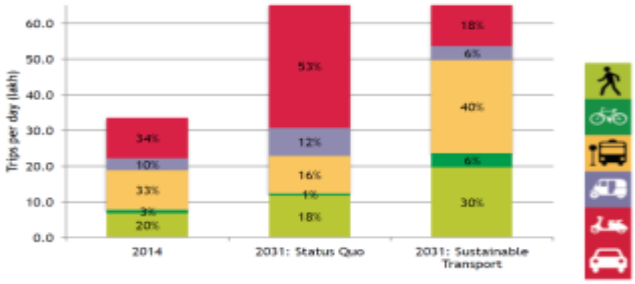

Fig 1.1 Forecast Chart for Trip frequency per day in Coimbatore City.

1.3. NEED FOR THE STUDY

The study is proposed to satisfy the problems faced by the people of the Coimbatore city in day-to-day life. The problems are,

- Undeveloped infrastructure in the city.
- Reduced safety during city side travel.
- Traffic congestion due to motor vehicles.

II. LITERATURE REVIEW

Aditya et al., (2017) – investigated the designing, implementing and analyzing Revealed and Stated Preference questionnaire surveys. The Revealed Preference (RP) survey has been conducted on commuters using the newly operational metro rail line which has provided the much needed east-west connectivity in Mumbai city, whereas an appropriately designed Stated Preference (SP) experiment has been administered on the commuters living within the catchment of a proposed additional metro rail line.

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Pengjun et al., (2017) – studied the city Beijing which is a well-known historical capital of the country China with increased urban expansion and city size are the lead role to opt for metro transit in the city. The metro passengers find difficult to access metro transits due to urbanization of the city and the study involves the investigation on use of Bi-Cycle as a travel mode to/from the metro transits.

Zhongnan et al., (2017) – examined a dynamic data from mobile applications such as Baidu Heat Map and POI to quantify the space use situation around metro stations in central city of Shanghai. A model is established on this basis to describe the relationship between space use situation and other characteristics of station areas.

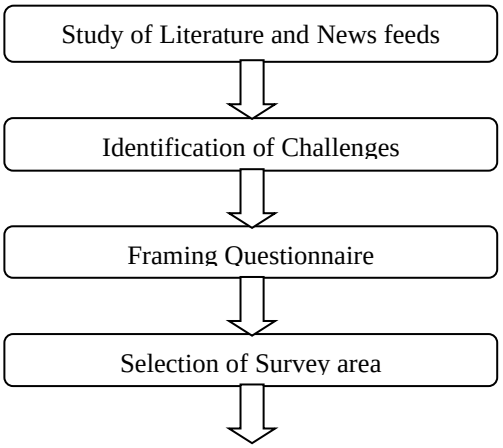
Monalisa et.al., (2016) – described the railway station infrastructure with respect to pedestrian flow characteristics both horizontal and vertical movements are studied by passageway with and without centre rail, stairway, and escalator across the people grouped based on their age, luggage, gender and direction of movement

Oleg et.al., (2016) – studied the safety metro escalators is important to determine the degree of escalators wear and the term of remaining life. To ensure safety of metro tunnel escalators it is required to assess the technical condition of escalators outspent their standard service term for potential extension of their service term until they are replaced. The article considers the methods for such assessment, the experience of its application and new methods for monitoring of the technical condition of operated escalators.

Subhajit et al., (2016) – investigated the facility development in and around metro stations are to be developed in India. The work investigates the commuter's willingness to pay for the development of facilities around the metro stations in Kolkata city, India in terms of 'facility for level change', 'visual communication', 'pedestrian crossing', and 'pedestrian environment'.

Wei et al., (2016) – studied about the passenger flow which is the foundation of making and coordinating operation plans for the metro system, and therefore, a variety of studies were conducted on transit assignment models. This paper first discusses the main route constraints of which the train schedule is the most important, that distinguish rail networks from road networks. Then, a two-step approach to generate route choice set in a metro network is proposed. Particularly, the improved approach introduces a route filtering with train operational information based on the conventional method.

III. METHODOLOGY



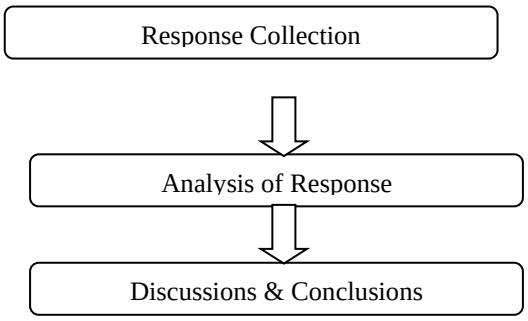


Fig 3.1 Flow Chart representing the Methodology.

IV. DATA COLLECTION

4.1. COIMBATORE CITY PROFILE

The information about population shown in table I are collected from the census details of Coimbatore city collected in the year 2011.

Table I Coimbatore City Profile

Description	Details
Area of the City	246.8 sq.km
Population of the City	1.05 million
Population of literates	0.8 million
Density of Population	4,236 per sq.km
Literates in the city	8,66,098
Vehicle Population	1.4 million
Vehicle Density	629 two wheelers/1000 population 76 cars/jeeps/1000 population
Vehicles added annually	1.5 lakhs/year

4.1.1. Arterial Roads of the City

The Manchester city was bounded by arterial roads directing city to/from other adjacent cities, districts and states. The Arterial roads are shown in table II.

Table II Arterial Roads of Coimbatore City

Arteial Roads	Direction of roads
Avinashi Road	-On the East connecting Bangalore Highways.
Marudhamalai Road	-On the West directing to Marudhamalai Temple
Mettupalayam Road	-On the North West directing to Ooty.
Pallakad Road	-On the West connecting Kochi Highways.
Pollachi Road	-On the South West directing towards Kerala via Udumalapet
Satyamanagalam Road	-On the North East directing to Mysore.
Trichy Road	-On the South East directing to the East districts of Tamilnadu.

4.1.2. Coimbatore City Borders

The urban expansion of the city extends up-to 246.8 sq.km circumference

with the borders covering the Coimbatore municipal corporation is shown in table III

Table III City Borders of Coimbatore

South West	Perur, Chettipalayam, Vedapatti
South	Kurichi, Kuniamuthur
South East	Pattanam, Vellalore
East	Irugur
North East	Vilankurichi, Kalapati
North	Kavundampalayam, Thudiyalu, Chinna-Vedampatti, Saravanampatti

4.2. COIMBATORE TRAFFIC CENSUS

The city is agglomerated with passers-by travelling across the city to/from other districts and states increased the traffic density of the city. The rate of traffic and other traffic related details are shown below in the table IV and figure 4.3.

Table IV Traffic index of Coimbatore City

Index	Values
Traffic Index	223.42
Time Index (in minutes)	50.71
Time Exp. Index	6856.30
Inefficiency Index	250.90
CO_2 Emission Index	5486.94

The above increase in traffic index due to travelling to work/school, per passenger is produced yearly 1,316.87kg of CO_2. It is needed 15.35 trees for each passenger to produce enough oxygen to cover that.

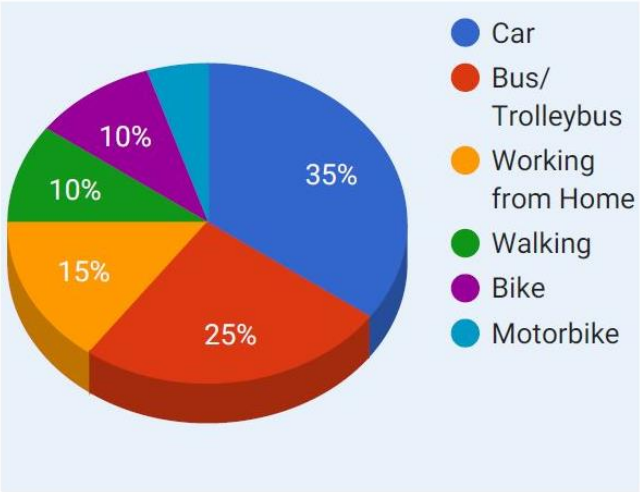


Fig 4.3 Percentage of Transport in Coimbatore city

4.2.1. Motor Vehicle Details

Population of Motor vehicle existence in the city categorised as commercial and Non-commercial are shown in table V along with yearly existence rate.

Table V Motor vehicles Registered during 2015-2016

Commercial	No. of vehicles	Non - Commercial	No. of vehicles
Auto-Rickshaws	7562	Motor Cycle	913261
Ordinary Taxi	2299	Scooter	69943
Maxi-Cab	7182	Moped	138808
Motor-Cab	4647	Tri-Cycle Auto	25
Omni Bus	324	Motor car	192694
School Bus	1687	Jeep	1982
Ambulance	538	Station Wagon	50
LCV	10793	Tractor	6051
Lorry	22057	Three Wheeler	1833
AV	160	Four Wheeler	394
Tractor	440	Road rollers	8
Total	**61114**	**Total**	**1324655**

4.3. FUEL CONSUMPTION REDUCTION BY METRO RAIL

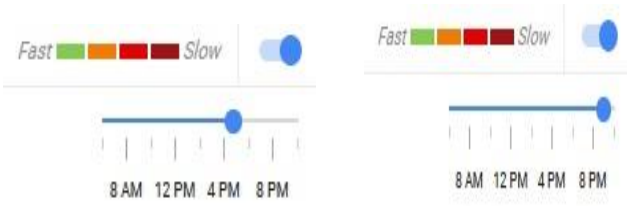
Coimbatore city is one among the other cities pertaining to have a notable benchmark of vehicle usage in South India. In the year 2011 as per the census the vehicle population accounts to 1.4 million whereas it is hiked by 0.038% to 1.56 million in 2012 and 1.84 million.

This causes an increased usage of energy per passenger per km. For the above vehicular population the total energy consumption per day accounts to 910.59 barrels costs 10.86 crores. This could be minimized by implementing metro rail since the metro rail usage and reduce the fuel consumption to 1/5th per passenger per km. On that case, the fuel consumption of 910 barrels per day can be minimized to 182 barrels per day saving 2.17 lakhs per day.

4.4. SELECTION OF STUDY AREA

The area to be studied is based on the online traffic survey for a month period of Jan 2019.

a. 8 am b. 12 pm



c. 4 pm d. 8 pm

Fig 4.4 Traffic Survey in Peak Hours

Fast and slow are the measuring parameters which means green symbolises a vacant traffic state where as the Dark Red symbolises the heavy traffic situation at which the traffic flow is very slow. Other than this area of high population are finalised for the study.

V. RESULTS AND DISCUSSIONS

5.1. RESPONSES COLLECTED

Google forms are distributed through various modes of Social media to gain the attention of people belonging to Coimbatore city. 66 responses including 50 masculine and 16 feminine, are reverted back out of 189 respondents with a response rate of 35.44%. The responses are also collected through personal interviews and the responses are compiled as an audio file with the report.

5.2. INTERPRETATION OF ANALYSIS RESULTS

The responses obtained are the inputs of analysis done using SPSS 20 software. The results obtained are the frequency of responses obtained and reliability of the responses obtained by which majority of respondent's opinion could be identified based on the significance level fixed.

5.3. RELIABILITY ANALYSIS

The below table 6.1 shows the reliability analysis for the set of questions included in the questionnaire.

Table VI Reliability Statistics

Cronbach's Alpha	N of Items
.764	20

Technically speaking Cronbach's alpha of 0.764, which is greater than 0.7 indicates that there is a high Consistency and Inter-Correlation between the dataset of 20 items.

5.4 CHI-SQUARED TEST

The test data contains not only the five point scale rating but also YES or NO answering questions like "Land acquisition for metro project is a dispute", for which Chi-Square test statistics can be used for the analyses of such rated questions. While performing Chi-Squared test it is mandatory to test the measure of association. The testing variable used here is the locality of the respondents where according to the residence location of the respondents they are grouped as Northern and Southern Region of Coimbatore city.

Table VII Land acquisition for Metro project is a dispute * Locality Cross-tabulation

			Locality		Total
			North	South	
Land availability	Yes	Count	114	97	211
		Expected	115.2	95.8	211.0
		% within	77.0%	78.9%	77.9%
		% of Total	42.1%	35.8%	77.9%
		Std.	-.1	.1	
	No	Count	34	26	60
		Expected	32.8	27.2	60.0
		% within	23.0%	21.1%	22.1%
		% of Total	12.5%	9.6%	22.1%
		Std. Residual	.2	-.2	
Total		Count	148	123	271
		Expected	148.0	123.0	271.0
		% within	54.6%	45.4%	100.0%
		% within	100.0%	100.0%	100.0%
		% of Total	54.6%	45.4%	100.0%

Inference: The table VII presents the descriptive statistics of responses collected from different parts of Coimbatore city where in population of civilians and vehicles marks high comparatively, split into north and south side of Coimbatore city based on Avinashi road as a center line to the city since the road runs as state highway across the city. The % within locality row of the descriptive table on both north and south regions carries a percentile value of 77.0% and 78.9% supportive for the statement by accepting there is a land availability problem for metro rail system in the city where as 23.0% and 21.1% percentile values signifies non supportive response to the same.

Table VIII Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.131[a]	1	.717		
Continuity Correction[b]	.046	1	.830		
Likelihood Ratio	.131	1	.717		

Fisher's Exact Test				.770	.416
No of Valid Cases	271				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 27.23.					
b. Computed only for a 2x2 table					

Inference: In the table VIII the detailed report on the dispute of land availability for Metro project by taking the Person Chi-Square technique sharpen the test without any violation to the assumption of no cells should have expected frequency less than 5 has a Fisher's extract test of 0.770 associated significance level which is considered to be larger than the alpha value of 0.05 for 5% significance level. Since continuity correction has no significance association the Fisher's extract test has been considered for the interpretation of chi-squared test.

Table IX Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.022	.717
	Cramer's V	.022	.717
N of Valid Cases		271	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Inference: The effective size statistics by Phi coefficient value = -0.022 is a very small effect using Cohen's (1988) Criteria of 0.1 for small effect, 0.3 for medium effect and 0.5 for large effect was performed in the above table. A Chi-Square test for independence indicated no significant association between locality and land availability status, $\chi 2$ (1, n = 271) =.064, P = .77, phi = -.01. This proves that the there is no significant difference between the response of north and south Coimbatore city in case of land availability for metro rail project and the null hypothesis is accepted that the there is a dispute in land acquisition for metro project in Coimbatore city.

5.5 FACTOR ANALYSIS

Table X KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling		.787
Bartlett's Test of Sphericity	Approx.	906.
	Df	190
	Sig.	.000

Inference: The table X shows two test one is the KMO for measure of sampling adequacy and other is Bartlett's Test of Sphericity. The KMO for measure of sampling adequacy is to the test for equity of variances across the samples or groups. The KMO (Kaiser-Meyer-Olkin) can also be used to detect the proportion of variance among the variables. The KMO value of 0.787 indicates that this dataset is useful for the factor analysis and it produces a middling effect of proportion of variance according to Cohen's Rule. The Bartlett's test of Sphericity is to test the hypothesis that the correlation matrix of above dataset is an identity matrix i.e the datasets are unsuited and thus not useful for the structural detection. This hypothesis has been over ruled by the significance value of 0.000 which is smaller than the alpha value 0.05 showing that the dataset is suitable for the structural detection.

Table XI Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.193	20.954	20.954	4.197	20.954	20.957
2	1.514	7.573	28.524	1.524	7.575	28.523
3	1.375	6.873	35.391	1.371	6.872	35.391
4	1.288	6.440	41.835	1.288	6.441	41.832
5	1.167	5.834	47.673	1.164	5.835	47.674
6	1.043	5.215	52.882	1.041	5.210	52.881
7	.953	4.744	57.632			
8	.892	4.476	62.106			
9	.874	4.377	66.473			
10	.823	4.165	70.647			
11	.782	3.964	74.602			
12	.754	3.767	78.374			
13	.696	3.484	81.865			
14	.644	3.246	85.106			
15	.616	3.052	88.163			
16	.574	2.884	91.057			
17	.513	2.576	93.622			
18	.472	2.365	95.994			
19	.417	2.063	98.066			
20	.383	1.932	100.02			
Extraction Method using Principal Component Analysis.						

Inference: The table 5.6 describes the loadings of factors with Initial Eigen values along with % of variance and Total Variance. This table is meant for the reduction of dataset by fixing the criteria that factors with initial Eigen values greater than 1.0 are extracted. The method used for the extraction is Principle Component Analysis. The extraction results with six components where all other factors are loaded in these six components. Below figure 6.1 is the Graphical representation for the Eigen values of test factors.

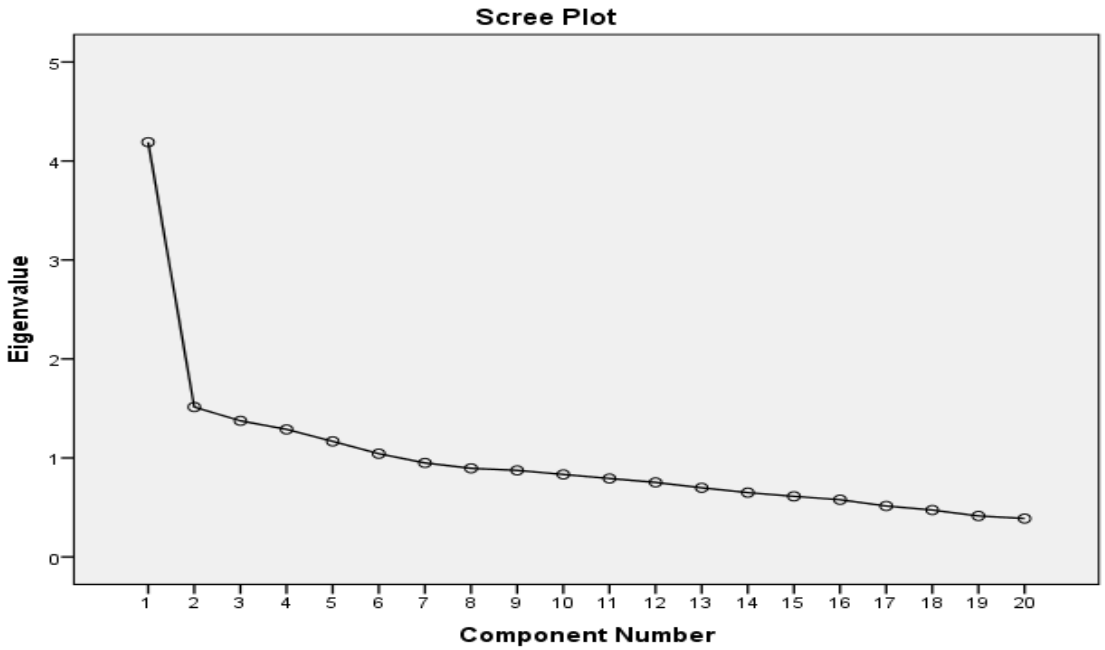


Figure 5.1 Graphical Representation of the Eigen Values

Table XII Rotated Component Matrix

	Component					
	1	2	3	4	5	6
Traffic congestion will be satisfied	.699	.132				.245
Better alternative for traffic demand	.643		.241	-.135	-.145	-.100
Minimal travel time	.563	.132	.115	.144	.113	
Increase in use of public transport	.534	.144	.375			.107
Beneficial for all class of people	.530			.158	.366	-.195
Parking availability for vehicles		.646				-.357
Ease in access to Metro stations	.167	.628	.148	.207	-.104	
Reasonable Fare Collection		.602			.184	.260
Increase in frequency of trips	.180	.543	.297			
Under-ground corridor for land issues	.111		.730	.109		.108
Immigrated residents will be benefited	.272	.180	.670	.141		
Minimized Environmental pollution	.190	.152	.615		.145	-.157
Vibrational impact is a threat			.281	.653		
Provision of monthly Smart Cards	.337	.358		.609	-.112	.103
Critical construction traffic			.387	.562	-.141	
Separate compartments for women	.257	.251		.557	.176	
Two coaches is sufficient		-.170			.737	.200
Parking fares based on daily basis	-.141	.438	.113		.640	-.132
Land availability					.109	.760
Provision of lifts	.189	.393	.221	.143	-.275	.439
Extraction Method using Principal Component Analysis. *Rotation Method: Varimax with Kaiser Normalization.*						
a. Rotation converged with 6 components in 11 iterations.						

Inference: The table 5.7 explains the loading of test factors in the six extracted components of the Eigen values i.e, transport services, socio-economic services, safety & free flow services, utility, constraints & needs. This shows that all 20 dimensions could be grouped under six major categories. The principle component analysis is done by iterating the components and in here there 10 iterations made the above see components.

On the whole the 20 items were subjected to principal components analysis (PCA). Prior to performing PCA, the suitability of data for factor analysis was assessed.

Kaiser-Meyer-Olkin value was .78, exceeding the recommended value of.7 and Bartlett's Test of Sphericity reached statistical Significance. Principal components analysis revealed the presence of six components with eigenvalues exceeding 1, explaining 20.95%, 7.57%, 6.875 %, 6.441%, 5.836% and 5.213% of the variance respectively. An inspection of the scree plot revealed a clear break after the second component.

5.6. KRUSKAL-WALLIS TEST

The following are the interpretation of Kruskal-Wallis test for the categorical variable Occupation.

Table 5.8 Kruskal-Wallis Test

Variable List	Chi-Square	df	Asymp. Sig
Traffic congestion will be satisfied	8.294	5	0.141
Better alternative for traffic demand	9.157	5	0.103
Beneficial for all class of people	8.183	5	0.146
Minimal travel time	6.369	5	0.272
Increase in use of public transport	10.397	5	0.065
Provision of monthly Smart Cards	12.649	5	0.027
Separate compartments for women	1.425	5	0.922
Minimized Environmental pollution	9.964	5	0.076
Vibrational impacts is a threat	2.782	5	0.734
Immigrated residents will be benefited	14.533	5	0.013
Two coaches is sufficient	2.414	5	0.789
Reasonable Fare Collection	4.424	5	0.490
Parking availability for vehicles	5.848	5	0.321
Parking fares based on daily basis	3.542	5	0.617
Provision of lifts	12.398	5	0.030
Increase in frequency of trips	9.380	5	0.095
Ease in access to Metro stations	16.825	5	0.005
Under-ground corridor for land issues	8.302	5	0.140
Critical construction traffic	8.969	5	0.110
a. Kruskal-Wallis Test			
b. Grouping Variable Occupation			

Inference: In the table 5.8 presented above, the significance level among the others few factors such as 0.03 (rounded) for Provision of monthly smart cards, 0.01 for Immigrated residents benefit, 0.03 for Provision of lifts, 0.01(rounded) for Ease access to Metro stations whose p value less than the alpha value 0.05 shows there is a significant difference between the occupation groups such as Proprietors=48, IT employees=51, Private Employees=91, Teachers=15, Students=63 and rests house wife=3 whose value are negligible due to very less p value and their mean ranks are tabulated in below table XII

Table XII Mean Ranks of Differing Variables

Occupation	Provision of monthly smart cards	Immigrated residents benefit	Provision of lifts	Ease access to Metro stations
Proprietors	114.73	116.76	122.76	107.55
IT Employees	130.78	128.54	123.86	142.55
Private Employees	136.12	136.56	130.59	133.13
Teachers	185.97	185.93	168.83	139.87
Students	145.57	149.10	157.83	159.33
House wife's	110.50	75.33	96.00	66.00

5.9. ANOVA Tests

Table XIII Test of Homogeneity of Variances

Metro Facilities	Levine Statistic	df1	df2	Sig.
Provision of monthly Smart Cards	.800	4	266	.526
Separate compartments for women	.428	4	266	.788
Parking availability for vehicles	2.098	4	266	.081
Provision of lifts	.590	4	266	.671

Inference: The table XIII describes the test of equality of variances across the groups. The significance value for all four dependent variables 0.526, 0.788, 0.081, 0671 appears to be greater than alpha value 0.05 and so the assumptions for test of homogeneity of variance has not been violated giving way for the ANOVA test.

Table XIV: One-Way ANOVA

Metro Facilities	Groups for Analysis	Sum of Squares	df	Mean Square	F	Sig.
Provision of monthly Smart Cards	Between Groups	.591	4	.146	.155	.954
	Within Groups	251.501	266	.942		
	Total	252.093	270			
Separate compartments for women	Between Groups	.690	4	.176	.164	.957
	Within Groups	273.521	266	1.023		
	Total	274.211	270			
Parking availability for vehicles	Between Groups	1.479	4	.368	.463	.762
	Within Groups	211.041	266	.795		
	Total	212.521	270			
Provision of lifts	Between Groups	10.485	4	2.627	2.323	.056
	Within Groups	301.423	266	1.136		
	Total	311.976	270			

Inference: The table XIV produces the result for One-way ANOVA test. Significance value for the four dependent variables are 0.959, 0.954, 0.760 0.058 respectively which are greater than alpha value 0.05 showing that there is no significant difference between the age groups for the metro facilities. This proves the need of commuters that should be satisfied when metro rail system is implemented in Coimbatore city.

5.9.2. Two-Way ANOVA

Table XV Levene's Test of Equality of Error Variances[a]

F	df1	df2	Sig.
1.096	9	261	.366

a. Design: Intercept + Age + Gender + Age *

Inference: The table XV provides the test of equality for variance across the two categorical groups with significance value 0.366 greater than alpha value 0.05 proving there is no violation to the assumptions of test of homogeneity of variances.

Table XVI Tests of Between-Subjects Effects

Dependent Variable: Ease Access to Metro stations						
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
Corrected Model	11.312a	9	1.248	1.558	.107	.049
Intercept	1744.803	1	1744.803	2171.007	.001	.888
Age	10.111	4	2.531	3.138	.013	.036
Gender	1.666	1	1.666	2.078	.146	.004
Age* Gender	3.142	4	.780	.973	.411	.013
Error	209.752	261	.801			
Total	4686.002	271				
Corrected Total	221.051	270				
a. R Squared = .051 (Adjusted R Squared = .018)						

Inference: The table XVI shows the interaction effect and main effect for categorical groups age and gender. The interaction effect is sited in the column Age*Gender with significance value 0.421 greater than alpha value 0.05 showing no difference in interaction of two groups. i.e age has no significant interaction effect on gender and vice versa. The Main effect is sited in the columns Age and Gender where significance value for age is 0.015 which is less than alpha value 0.05 showing age has a significant difference between the five groups 15-25, 25-35, 35-45, 45-55, and >55 on the dependent variable but Gender has no significant difference between its groups since the significance value 0.150 is greater than alpha value 0.05.

VI. CONCLUSION

6.1. CONCLUSION

- 76.4% reliability result shows the uniqueness of the respondents for the given dataset.
- 78.7% KMO value signifies the sampling adequacy of responses to proceed analysis further. There are 6 components extracted i.e., transport services, socio-economic services, safety & free flow services, utility, constraints & needs, by loading all the 20 items of data survey using rotated component matrix and principal component analysis methods.
- Using Chi-Squared Test for Land availability it is proved that 77.9% of respondents agree that there is a problem in acquiring land for construction of metro stations in Coimbatore city. Other 22.1% of respondents are willing to contribute lands to government for metro rail project.
- Using Kruskal-Wallis Test 80% of the datasets has no significant difference between the occupational category of respondents and 20% has a significant difference for the same.
- ANOVA tests shows that facilities like monthly smart cards, separate women compartments, lift provisions and parking for commuter vehicles are needed by the people of Coimbatore city as a commuter when metro rail is implemented in future.

6.2. RECOMMENDATIONS

- It is recommended to the Coimbatore Municipal Corporation to undertake proper maintenance of existing road networks. It is also recommended to the Coimbatore Municipal Corporation to take necessary steps for the construction of flyovers between Gandhipuram and Avinashi road to neutralize the present traffic demand and to minimize the road congestion. In market areas like Ukkadam and Cross-Cut road where the population flow is maximum throughout the day it is highly recommended to go for underground parking facility to minimize parking congestion that chokes the free flow of civilians in that area. It is recommended to the future researchers to go for more number of surveys to finalize the exact view of the civilians in the city and also perform analysis in a design perspective for further study on metro rail project to Coimbatore city.

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