A STUDY TO IDENTIFY THE FACTORS INFLUENCING PASSENGER SATISFACTION TOWARDS KOCHI METRO RAIL LTD AND ITS SERVICES

Dr. Shamsi Sukumaran Kunnathully
Assistant Professor, Amity Global Business School Kochi, Ernakulam, India
Email - shamsi.kk@gmail.com

Abstract: *The project is based on passenger satisfaction of Kochi Metro Rail Ltd. As Kochi is one of the most populated City in Kerala, there is a need for a cheaper transportation from one place to another. KMRL have been able to meet this need in the past. They must come up with new initiatives in order to retain the passenger satisfaction. The main objective of this project was to know about the passenger satisfaction towards KMRL, this include the factors that affect the customer satisfaction towards Kochi metro and to identify the level of customer satisfaction on Kochi metro service and to find out how Kochi metro can be made people favourite mode of transportation. For this purpose, a convenient sampling was undertaken on a sample size of 150 random passengers residing in Kochi using a structured questionnaire. For this study tools like factor analysis were prepared to know about the satisfaction level and the factors influencing the passengers towards continuing with metro service. For factor analysis on customer influence ,14 variables were identified and are termed as Passenger Services, Hygiene Measures, Infrastructure Facilities, Safety Measures. And also did another factor analysis on level of customer satisfaction towards metro service for which 11 variables were identified and are termed as Passenger Service and Economical.*

Key Words: *Passenger satisfaction, Kochi Metro Rail,*

1. INTRODUCTION:

Service quality and commuter satisfaction are for over a decade two necessary topics each for the tutorial world and for the researches within the field of selling. the eye directed to those 2 ideas, services quality and client satisfaction is especially because of the competition within the market, furthermore on the pressure of political factors and of the population, over organizations within the field of public administration. We reside in a very fast-developing society. each day new technology and development in our neck of the woods. The communication system and transportation mechanism connect folks round the world therefore simply with utility of less time, value and luxury. Kochi is one amongst India's necessary port and centre of upper education. Kochi being a centre of traveller attraction attracts loads of individuals across the globe. however, one amongst the foremost necessary issues long-faced in Kochi is that the lack of transportation. Here the study is that specialize in the new transit that has commercially started its construction for a traffic free space. The Kochi Metro Rail Limited (KMRL) was formed as a special purpose vehicle (SPV) by the cabinet decision of UDF government in 2011 with Elias George as the Managing Director. The Public Investment Board (PIB) has cleared the project on March 2012 that subject to the ultimate approval by union cupboard. The first section is being started at an estimated cost of Rs/-5180 core (US$820 million) completed by June 2016. As of these days, it's seen that Kochi underground had been inaugurated on the 18 June 2017 by our Honourable Prime Minister. Mr. Narendra Modi. Since then the complete pledged underground has been a link between the stations of Aluva and Edappally. The work of the underground had been divided into 2 phases, the Aluva-Pallarivattom stretch that was the one inaugurated late. The second section is that the stretch from Pallarivattom - Petta . Kochi underground may be a projected public transit system for the town of Kochi . The 25.65km underground line can run from Aluva to Petta and can embody twenty-two stations. The Kochi underground Rail Project is called as Komet or K-3C.

This is the primary railroad line project within the country that interlinks the rail, road and water transport service. Buses square measure presently the key public transit in Kochi. The new railroad line system is anticipated to scale back tie up, whereas providing safe and speedy transportation to commuters. it'll additionally scale back pollution and noise levels, also as congestion on town roads. The project creates employment opportunities for the native individuals. It additionally focuses on increasing the economic vitality of the region by up infrastructure leading to the additional development of the bigger Kochi space as an economic transportation, and commercial enterprise hub. The analysis work covers the opportunities and challenges of a railway system town with special reference to KOMET (Kochi metro). Commuter's satisfaction has become one among the most factors influencing transport trade particularly railway system rail services. thus, it becomes utmost necessary for any transport sector to produce

supreme commuter's satisfaction through quality of services. The organization should perpetually monitor and may improve the standard of services so as to produce higher commuter's satisfaction.

1.2. STATEMENT OF THE PROBLEM

The research is being carried out on the subject of " **A Study to Identify the Factors Influencing Passenger Satisfaction Towards Kochi Metro Rail Ltd and Its Services**" It is done in this manner to determine the use of metro in a city like Cochin. This also emphasizes the city's opportunities in terms of job creation, tourism, and overall development. People's living standards are expected to improve as a result of the Metro. The metro passenger service is up against a lot of competition from other modes of transportation, so it's important for it to speed up passenger origin. The views expressed about the facilities are skewed. The current research focuses on travelers' impressions of facilities and their level of satisfaction.

1.3 PURPOSE OF THE STUDY

The overall study is concerned with passenger satisfaction with Kochi Metro Rail Ltd.'s basic, new, and outstation amenities. In order to satisfy Metro passengers, the study also emphasizes the need to strengthen and improve service quality.

1.4 OBJECTIVES OF THE STUDY:

- To identify the various factors influencing Passenger Satisfaction towards Kochi Metro Rail Ltd
- To identify the level of Passenger Satisfaction towards various services provided by Kochi Metro Rail Ltd.
- To identify the mostly used payment option for Ticketing.

1.5 SIGNIFICANCE OF THE STUDY:

Change is a vital factor in the growth of a community, and with increasing demands, being technologically upgraded is a must. It is important in terms of raising people's living conditions. With this in mind, the government launched the Kochi Metro project, which included public and private participation. This research focuses on the public's effects and efficacy, as well as how people in a heavily populated region like Cochin can benefit.

1.6 SCOPE OF THE STUDY:

The study is primarily concerned with the level of passenger satisfaction with Kochi Metro Rail Ltd.'s services. At various levels of the study, every aspect of metro service is examined, including ticket accessibility, travel quality, staff conduct, safety, and timing. The sample population is drawn from Kochi Metro riders. The research is primarily undertaken to determine the quality of railway services.

1.7 LIMITATION OF THE STUDY:

- There's a good chance that respondents will complete the survey quickly.
- Some respondents may not provide the correct response and is subjected to biased opinion.

2. RESEARCH METHODOLOGY:

2.1 Research Design

- The present study is descriptive in nature. In descriptive research, data is collected in original form directly from the respondents using questionnaire.
- The Research Instrument used in this was Structured Questionnaires.
- The survey period was between February and March 2021.

2.2 Population of the Study and Sampling

- Population in my research are of two age group of between 20 to 35 and above 35. These is because metro service are usually used by students or working professionals and also by elderly people mostly women.
- Convenience Sampling method has been used in this research to collect information using the Structured Questionnaire.
- In my sample, all the respondents are residing in Kochi.
- My sample size consists of 150 respondents

2.3 Data Collection:

- Primary data was collected by way of questionnaire distribution through survey method.
- The questionnaire was prepared carefully after considering various parameters involved in the study.

2.4 Statistical tools and Software used for Analysis:

The tool used to analyse and interpret the data is SPSS and Factor Analysis was used for identifying the factors that influence customers towards KMRL service and also for identifying the passenger level of satisfaction towards KMRL service.

3. LITERATURE REVIEW:

A. Appu and S.G Balaji (2017) Transportation acts as a barometer of a community's social and cultural existence. Commuters' welfare would be harmed by an inefficient and unsanitary transportation system. The launch of the Chennai metro helps to minimise existing passenger traffic from the road to the metro.

Rahul Goel and GeetamTiwari (2016) The study looked at commuters' entry, egress, and other travel-related parameters in the Delhi Metro and its surrounding areas. In 2011, they performed an on-board inquiry of approximately 1100 metro passengers, in which passengers were questioned about their use of seven different modes for entering and exiting the metro station.

Naidu and Thomas (2016) have conducted a report on the operations of the Delhi metro rail system and concluded that metro trains have the potential to transform Indian city transportation planning if new corridors are planned based on potential demand and occupancy ratios of existing transportation models.

Mansha Swami, Manoranjan Parida, (2015), conducted research on the Delhi Metro, assessing the performance of the city's multimodal urban public transportation system. The researchers used a linear optimization technique known as Data Envelopment Analysis (DEA) to evaluate the comparative competences of its different policymaking units, also known as decision-making units (DMUs), using a variety of inputs and outputs.

Vivek kumar and Vikas Rastogi(2014) The commuters' experiences are all different. Passengers' amenities should be improved by service providers, resulting in commuter satisfaction.

Ram Kumar Balyan and Richa Pandit (2014)) have investigated and analysed the factors that influence the quality of service provided by Indian railways. The study found that while Indian railways are generally good at keeping records and keeping time, employees are often unable to provide prompt service to passengers.

Rajeswari, V. and Sanata Kumari, K (2014) have made a study to find out the passengers' perception about the quality of service in Indian railways in the area between Kerala and Delhi, and between Mumbai and Delhi. This work recommends increasing catering facilities, and safety.

Garim Malik (2014) has analysed Customer satisfaction with the standard of service offered by the Delhi metro railways. According to the results, the majority of customers are unhappy with the Delhi metro railways. This study concluded that the Delhi metro rail system could provide excellent service to its customers.

The research by Pratminingsih et al. (2014. Passenger happiness and confidence have been found to have a substantial impact on passenger loyalty.

Anand & Quack (2013) According to a study on urban logistics, the future of Indian cities is heavily reliant on their ability to create suburban connectivity with the city's core. Cities, they believe, have become compact in terms of residential accommodations.

Sudin Bag (2013) had explained in their paper "Kolkata Metro Railway and Customer Satisfaction. An empirical study of the majority of people who use metro trains to get to their destinations. As a result, the ticketing system and information about metro rail arrival and departure should be based on commuter flexibility.

Gandhimathi, S. and Saravanan, S (2013) At Coimbatore Junction, customer satisfaction with railway services was studied. The results show that passengers are at ease when travelling by train.

Devi Prasad Maruvad and Raja Shekhar Bellamkoda (2013) The impact of demographic variables on the quality of railway passenger service has been identified. The authors discovered a link between gender, income, and train service, as well as a link between travel class and employee service, punctuality, and reliability. According to the findings, upper-class passengers expect railway authorities to focus on providing personal attention from staff during the journey, as well as good catering facilities and other amenities.
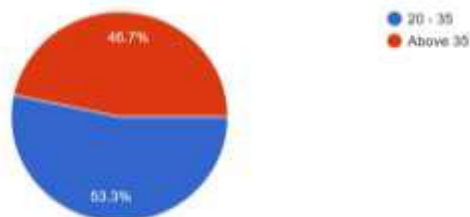
4. DATA ANALYSIS AND INTERPRETATION:
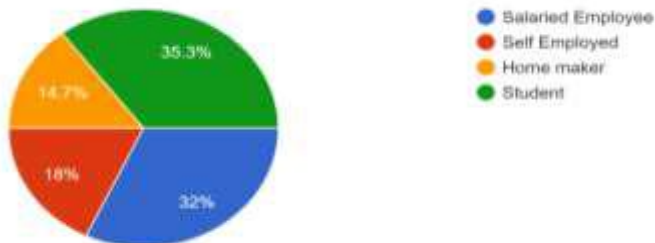**4.1 Demographic Analysis**
4.1.1.Gender
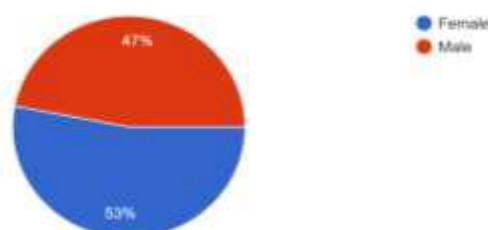
4.1.2 Age:

From the above chart it is observed that 53% respondents lies in the age group 20 – 35 and the rest 46% above 35.
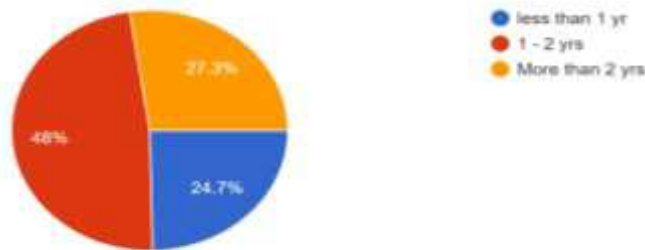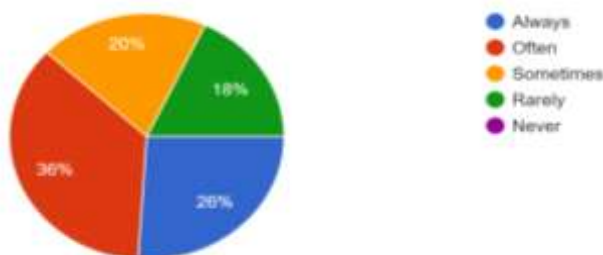
4.1.3 Occupation:

From the chart, it is observed that most of the respondents are students(35%) followed by salaried employee (33%) and self-employed with 18%.
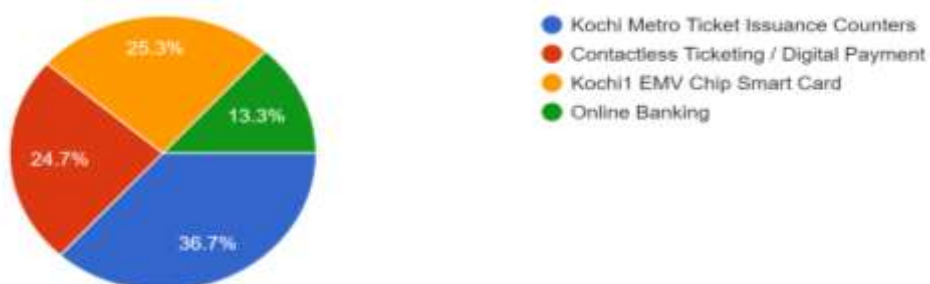
4.2 Period Of Usage:

From the chart it is observed that most of the respondents are using metro service from 1 – 2 years.

4.3 Frequency of Usage

From the chart we can observe that 36% are using metro service often, 26% using daily basis and rest 20% sometimes and a very few rarely.

4.4 Preferred Payment Options:

From the above graph, it is observed that 36.% are using kochi metro ticket issuance counters, 25% are using kochi1 EMV Chip smart card, 24% are using digital payment and the rest 13.3% are using online banking.

4.5 Factor Analysis:
4.5.1 Factors influencing passengers towards KMRL

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	850.125
	Df	91
	Sig.	.000

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.768	34.058	34.058	4.768	34.058	34.058	2.981	21.290	21.290
2	1.425	10.180	44.238	1.425	10.180	44.238	2.055	14.680	35.969
3	1.294	9.241	53.479	1.294	9.241	53.479	1.834	13.097	49.066
4	1.069	7.634	61.113	1.069	7.634	61.113	1.687	12.047	61.113
5	.895	6.394	67.507						
6	.781	5.581	73.088						
7	.763	5.452	78.540						
8	.672	4.802	83.342						
9	.616	4.400	87.742						
10	.519	3.709	91.452						
11	.500	3.570	95.022						
12	.398	2.844	97.866						
13	.251	1.794	99.660						
14	.048	.340	100.000						
Extraction Method: Principal Component Analysis.									

Scree Plot
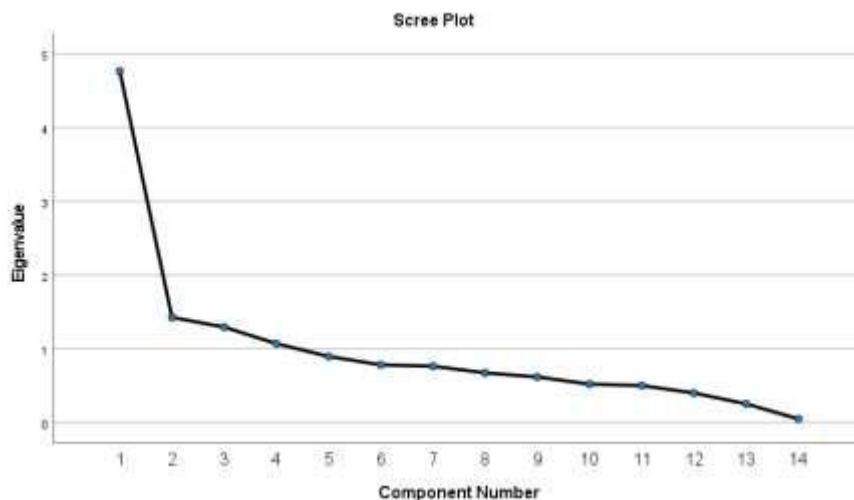
Rotated Component Matrix[a]				
	Component			
	1	2	3	4
E-Auto feeder service	.866	.074	.064	.045
Bicycles docking stand at station	.813	.033	.120	-.017
token/ smart card	.654	.178	.141	.169
comfortable board	.572	.227	.213	.264
automatic door	.533	.290	.164	.286
cleanliness in train coach	.156	.955	.106	.070

safety at platform	.222	.928	.173	.135
Air condition	.043	.042	.735	.136
Space allocation	.241	.183	.648	-.108
safety at train coach	.429	.050	.468	.264
cleanliness in platform premises	.319	.140	.450	.301
cleanliness in ticket counter	.107	.008	.224	.773
Lighting Condition	.317	.121	-.269	.629
safety at parking area	.001	.187	.422	.544
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 5 iterations.				

Interpretation

The KMO value is .783 and Bartlett's test is significant. This indicate that factor analysis is permissible with given data.

14 variables have been reduced to 4 factors which account for 63.13% of the variance in the data.

Factor 1 consists of E-Auto feeder service, Bicycles docking stand at station, token/ smart card, comfortable board, automatic door.

Factor 2 consists of cleanliness in train coach, safety at platform.

Factor 3 consists of Air condition, Space allocation, safety at train coach, cleanliness in platform premises.

Factor 4 consists of cleanliness in ticket counter, Lighting Condition, safety at parking area.

Factor 1 is termed as Passenger Services.

Factor 2 is termed as Hygiene Measures.

Factor 3 is termed as Infrastructure Facilities.

Factor 4 is termed as Safety Measures.

4.5.2   Factors influencing passengers' level of satisfaction

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.816
Bartlett's Test of Sphericity	Approx. Chi-Square	399.380
	Df	55
	Sig.	.000

Total Variance Explained										
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings			
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	3.824	34.766	34.766	3.824	34.766	34.766	3.804	34.584	34.584	
2	1.271	11.555	46.321	1.271	11.555	46.321	1.291	11.737	46.321	
3	.973	8.843	55.164							
4	.884	8.036	63.200							
5	.754	6.853	70.053							
6	.742	6.747	76.801							
7	.699	6.351	83.152							
8	.638	5.800	88.951							
9	.505	4.595	93.547							
10	.434	3.949	97.495							
11	.276	2.505	100.000							
Extraction Method: Principal Component Analysis.										

Scree Plot
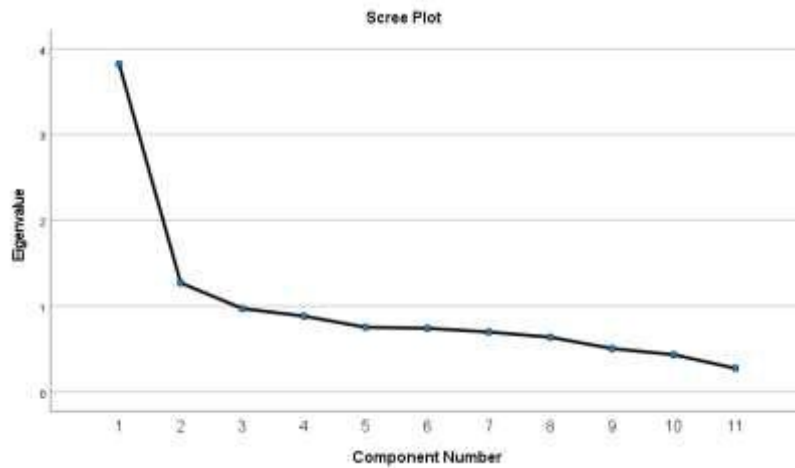
Rotated Component Matrix^a		
	Component	
	1	2
Kochi metro ensures passengers with announcements at right time	.778	.268
Kochi metro provides with better space allocation	.704	.039
[I'm satisfied with the lighting, Airconditioning at train & station]	.652	-.065
Kochi metro ensures passengers cleanliness in station, platform and train	.650	.324
[Metro can offer safe travel by reducing accidents]	.595	.226
Metro service reduces traffic issues such as congestion	.588	.003
[Kochi metro service provide with convenient payment options for ticket]	.580	-.076
[Metro Service enhance mobility of women, aged & differently abled]	.520	-.029
Metro Service ensures safety of women]	.485	-.194
Kochi metro service is affordable	.214	.780
Metro Service will help reduce pollution due to traffic in kochi]	.518	-.636
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

Interpretation
The KMO value is .816 and Bartlett's test is significant. This indicate that factor analysis is permissible with given data.

11 variables have been reduced to 2 factors which account for 46.32% of the variance in the data.
Factor 1 consists of Kochi metro ensures passengers with announcements at right time, Kochi metro provides with better space allocation, I'm satisfied with the lighting, Airconditioning at train & station, Kochi metro ensures passengers cleanliness in station, platform and train, Metro can offer safe travel by reducing accidents, Metro service reduces traffic issues such as congestion, Kochi metro service provide with convenient payment options for ticket, Metro Service enhance mobility of women, aged & differently abled, Metro Service ensures safety of women
Factor 2 consists of Kochi metro service is affordable, Metro Service will help reduce pollution due to traffic in Kochi.
Factor 1 is termed as Passenger Convenience and services.
Factor 2 is termed as Economical.

5. FINDINGS:
- It is observed that 53% of the respondents are female and the rest 47% are male. This shows that women are more into using metro service due to convenience and safety.
- Majority of the respondents lies in the age group 20 – 35 and the rest 46% above 35. This indicate that metro service is more used by students and working professionals.
- From the occupation chart we could find that most of them are students (35%) followed by Salaried employee (32%) and self-employed with (18%) and the rest Homemaker (14%)

- It is observed that 48% of the respondents are using metro service from 1 – 2 yrs., 27% are using for more than 2 yrs., and the rest 24% are using for less than 1 yr.
- From the frequency of usage chart, we could find that 36% are often using metro service, 26% are using on Daily basis and rest 20% use it sometimes and a very few (18%) rarely
- It is observed that majority of the respondents (36%) use Kochi metro ticket Issuance counters for payment option, 25% are using Kochi1 EMV Chip Smart card, 24% are using digital payment and the rest 13% are using online banking.
- The main factors which influence passenger satisfaction towards Metro service can be termed as Passenger Services, Hygiene Measures, Infrastructure Facilities, Safety Measures
- The main factors which influence passenger level of satisfaction can be termed as Passenger Convenience and Service, Economical.

6. SUGGESTIONS:
- Separate washrooms must be made in all stations and should be ensured with all Hygienic measures.
- More offers must be given to Kochi1 EMV Chip Smart Card holders who use on daily basis.
- Some concession on fare can be made on students who use metro service on daily basis.
- Proper lighting and other infrastructure facilities should be ensured.
- They must come up with initiatives to improve customer satisfaction.
- ATM service must be provided with all metro stations
- Airport feeder bus service need to be improved and also bus service for metro passengers to info park
- Bicycles Docking Stand must be made available at all metro stations
- KMRL must come up with taxi, auto rickshaws and buses that run through electric or CNG at different metro stations to utilise an eco-friendly transportation system.

7. CONCLUSION:
Since metro is one of the most modern infrastructure facilities in any region, we discovered that many people are optimistic about the upcoming Metro in our analysis of its effects. Some argue that the Metro's construction should proceed at a much faster rate. They also recommend that planning should be conducted in such a way that all socioeconomic groups are taken into account, as well as the community. Metro rail systems outperform buses because they have a much higher carrying capacity, use about a fifth of the energy per passenger km as road-based systems, do not pollute the air, and take up no road space if underground and only about 2 metre width if elevated. A metro system can handle the same amount of traffic as seven lanes of bus traffic or twenty-five lanes of private motor vehicles, and it is more efficient, convenient, and healthier than road-based systems, reducing journey time by 50 to 75 percent depending on road conditions. When a city's population expands, so does the use of public transportation, whether by road or rail. Experience has shown that in cities like Kochi, where roads are narrow and cater to mixed traffic conditions with slow- and fast-moving vehicles, road transport can carry 8,000 people per hour in each direction. As traffic density reaches this amount, average vehicle speed decreases, journey time rises, air population increases, and commuters are subjected to greater levels of inconvenience. In any case, operating bus transportation above 10,000 people in a mixed transport scenario on Kochi city roads is not feasible. Travel demand is expected to rise sharply as the city's population grows and mega development plans are announced. Passengers can switch to private modes of transportation if public transportation is insufficient, as shown by the region's high ownership rates. This will not only worsen traffic congestion on city streets, but it will also boost pollution levels. As a result, road-based public transportation would be unable to satisfy this demand. A light Metro system is urgently needed in the city to provide a quick, safe, cost-effective, and environmentally friendly mode of mass passenger transportation. The Light Metro System has a carrying capacity of up to 25,000 passengers, which would be sufficient to address traffic congestion in the Greater Cochin region for the next 25 years.

REFERENCES:
1. Bag, S. (2013, August 15). KOLKATA METRO RAILWAY AND CUSTOMER SATISFACTION. KOLKATA.
2. Kumar, V., & Rastogi, V. (2014, April 24). An Empirical Study on Commuters Satisfaction Towards Chennai Metro Rail Limited. CHENNAI.
3. Maruvad, D., & Bellamkoda , R. S. (2013, November 20). AN EMPIRICAL STUDY ON SERVICE QUALITY AT MUMBAI METRO -ONE CORRIDOR. DELHI.
4. Swami, M., & Parida, M. (2015, September 25). PERFORMANCE EVALUATION OF MULTIMODAL TRANSPORTATION SYSTEMS. DELHI.

5. A. Appu, & S.G Balaji. (2017, April 30). Comprehensive Detailed Project Report for Chennai Metro Phase-II.
6. Anand & Quack. (2013, May 20). City public transportation developments in India. MUMBAI.
7. Balyan, R. K., & Pandit, R. (2014, August 11). The factors that influence the quality of service provided by Indian railways. DELHI.
8. Gandhimathi, S, & Saravanan, S. (2013, January 20). PERCEPTION AND SATISFACTION TOWARDS SERVICES OFFERED BY SOUTHERN RAILWAYS IN COIMBATORE JUNCTION. COIMBATORE.
9. Goel, R., & Tiwari, G. (2016, March 16). Access-egress and Other Travel Characteristics of Metro Users in Delhi and its Satellite Cities. DELHI.
10. Pratminingsih. (2014, June 3). Factors Influencing Customer Loyalty Toward Online Shopping. JAKARTA.
11. V, R., & Kumari, S. (2014, June 12). Satisfaction and Service Quality in Indian Railways - A Study on Passenger Perspective. Mumbai and Delhi.