



## **5. Digital Transformation and Users Satisfaction Towards CMRL - Chennai Metro Rail Limited**

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### **ABSTRACT:**

*The focus, on advancement has grown within transportation systems, including the Chennai Metro Rail Limited (CMRL) aiming to enrich services and enhance user happiness. This research investigates the digital transformation initiatives, impacts and user satisfaction with CMRL utilizing a blend of methods like surveys, interviews and data analysis of user input. The study's mainly discovers the efforts in transformation like implementing ticketing systems, real time information displays and mobile applications have a positive effect on user satisfaction levels. Commuters value the ease and effectiveness of these offerings resulting in overall satisfaction scores. Furthermore the research highlights areas that could be improved such as integration of services enhanced user interfaces and stronger links, with other modes of transportation. The study suggests that CMRL's digital transformation initiatives have had a positive impact on user satisfaction.*

### **KEYWORDS:**

*Digital transformation, CMRL, user satisfaction, smart ticketing, real-time information, transportation..*

### **Introduction:**

Chennai Metro Rail Limited (CMRL) is a rapid transit system serving the city of Chennai, India. It was established in 2007 as a joint venture between the government of Tamil Nadu and the government of India. The first line of the Chennai metro system was opened in 2015 and has since expanded to cover a total length of over 50 km, with over 50 stations.

CMRL operates two lines, the Red Line and the Blue Line, providing efficient, safe and reliable transportation services to the people of Chennai. The company aims to provide an eco-friendly and cost-effective mode of transportation to reduce traffic congestion and air pollution in the city.

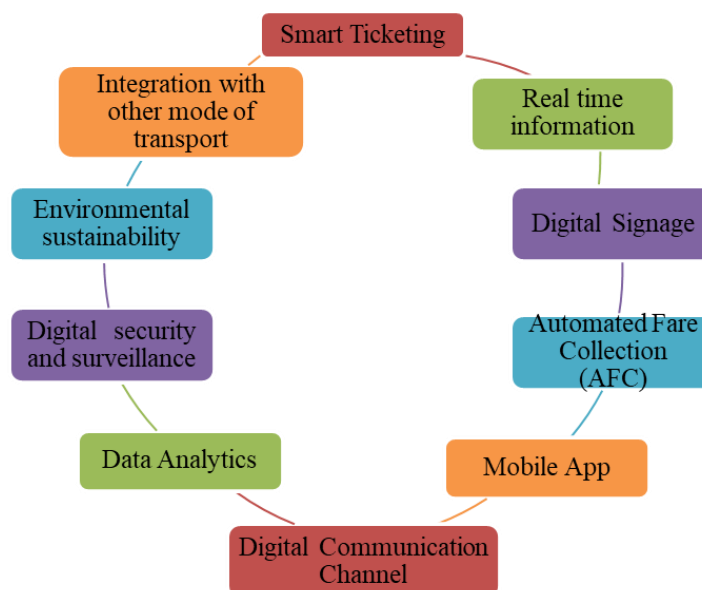
The services offered by CMRL include daily train operations, maintenance of metro rail infrastructure, and passenger services such as ticketing, customer service, and security. The company is committed to providing high-quality services and regularly invests in upgrading its facilities and technology to enhance the customer experience.

Overall, CMRL plays a vital role in the development of Chennai and its surrounding regions, contributing to the economic and social growth of the region by providing efficient and sustainable transportation services. In addition to its daily operations, CMRL also focuses on environmental sustainability and has taken several measures to reduce its carbon footprint. For instance, the company has installed rooftop solar panels at several metro stations to generate renewable energy, and has implemented a solid waste management system to reduce waste and promote recycling.

CMRL is also committed to providing accessible services to people with disabilities, and has made provisions for disabled-friendly infrastructure, such as ramp access, elevators, and audio announcements, at all metro stations. To ensure the safety and security of its passengers, CMRL has implemented several measures, including CCTV cameras, fire alarms, and emergency evacuation procedures. The company also has a well-trained security team that works round-the clock to ensure the safety of passengers and staff.

In conclusion, Chennai Metro Rail Limited is a well-established and respected organization, providing essential transportation services to the people of Chennai. The company's focus on providing high-quality services, environmental sustainability, and passenger safety has made it a leader in the metro rail industry in India.

### **Digital Initiative by CMRL:**



**Smart Ticketing:** CMRL's smart ticketing includes contactless smart cards, mobile ticketing options in which user can scan QR Code and pay through online banking services.

**Real Time Information:** It can be provided through digital displays in stations, in its website and in mobile app. This includes alerts, train timings, and updates.

**Digital Signage:** It represents symbols or route map or safety instructions to identify or to give directions to the users.

To improve overall Users experience, CMRL has introduced **Automated Fare Collection**. It not only reduces the queues time, it also enhance commuter's satisfaction.

Every customer are time oriented, they need to be informed about train timings, delay or disruption in train services as well as they need real time information. To sort out this problem, CMRL introduced **Mobile App** which provides specific function and services needed by the customers.

To engage with passengers and deliver important information, CMRL use **Digital Communication Channels** such as social media, email, and SMS.

To evaluate passenger movement, discover trends, and increase operational efficiency CMRL use **Data Analytics** tool. This tool also helps to optimize train schedules and improve overall service quality.

**Digital Security and Surveillance** systems were introduced at stations to improve passenger safety and security.

**Environmental Sustainability** is one of the key objectives of our government, to do so CMRL use digital technology and optimize engine consumption and reduce carbon emissions.

CMRL is working **To Integrate its Services with other Means of Transportation**, including buses and auto services, to give passengers more seamless and convenient travel options.

### **Objectives of the Study:**

- To study digital transformation used in CMRL and analyze users satisfaction.
- To identify the areas where Chennai Metro Rail Limited can improve its services to increase customer satisfaction.

### **Literature Review:**

A survey of literature for a study report on customer satisfaction and service analysis of Chennai Metro Rail Limited would involve reviewing existing research and studies related to the topic. This can include:

**Studies on customer satisfaction and service in metro rail systems:** These studies can provide an understanding of the factors that influence customer satisfaction in metro rail systems and how these factors have been measured in previous studies.

**Studies on customer satisfaction and service in the Indian railway sector:** These studies can provide context and background on customer satisfaction and service in the Indian railway sector and how it compares to other countries.

**Studies on the Chennai Metro Rail Limited:** These studies can provide specific information on the operations, service, and customer satisfaction of CMRL, and can provide valuable insights for the current study.

The survey of literature can be conducted using various sources, such as academic journals, conference papers, government reports, and online databases. The literature review should aim to synthesize the existing knowledge on the topic, identify gaps in the existing research, and provide a foundation for the current study.

The results of the literature review should be used to inform the research design, data collection methods, and data analysis for the study report on customer satisfaction and service analysis of Chennai Metro Rail Limited.

**Mechinda and Patterson (2011) Han et al., (2021)** Current research on service delivery concentrates on the traditional focus on the contact between the client and the provider.

**Elangovan, Senthil Kumar CB and Nallusamy (2017)** in the existing situation due to machine life and contemporary development, commuters are more reliant on the latest steering system of metro rail. Such a system works well to prepare their routine and helps them to reach their terminus on time. In this study, an attempt was made to focus on the future of Chennai metro rail limited and its future development along with the parallel growth of metros that boost people's lifestyle at metros.

The factors that support Chennai metro rail limited project are addressed with the overall impact of it for an area grows with before and after the impact of the projects. This research article also addressed the innovative growth of area about how nearby areas are deeply enjoying the impact of such a project by knowing the overall outcome of the project. The development of the project is also addressed with all the necessary growth factors which support the lifestyle of the general public.

**Vivek Kumar and Vikas Rastogi (2014)** reveal metro conveyance is one of the major means of transportation, so it must offer high well-being level for the commuters and the staff. However, the cosiness that commuters experience is a highly complex and individual phenomenon. The enhancement of passenger comfort while travelling has been the subject of a strong interest in metro train services providers. They also summarized Metro City Railway services need to be rationalized to provide world-class passenger amenities and services to the large crowd of passengers using these stations.

**Sudin Bag (2012)** has narrated that the maximum number of the respondents avail the metro services for getting the final destination, so it should be a prerequisite smoother and better system of ticketing and data regarding the arrival and departure of the train. It is also important to improve the excellence of security at the time of the journey to lessen pickpocket and others.

**Som Sankar Sen (2012)** in their paper “Kolkata Metro Railway and Commuters Fulfillment: An Empirical Study” concluded that in today’s modest state customer fulfillment is the first sign. For this, the commercial is to meet the anticipation of its customers.

The organization should aim not only at satisfying the commuters but also focus on the relishing them. Thus it has become prerequisites for an organization to recognize the factors that distress commuter’s satisfaction level and determinedly measure them to try and bring about the required changes based on commuter’s insight and necessities.

**Anderson and Sullivan (1993)** Service quality is commonly used by practitioners as well as researchers to assess customer satisfaction. It is widely acknowledged that customer happiness is dependent on the excellence of the product or service provided.

### **Research Methodology:**

The study is based on the survey method which uses both primary and secondary data. The study included the public survey with the users of Chennai Metro Rail Limited. The study adopts convenience sampling method with the sample size of 50 respondents, residing in Chennai District.

Questionnaire were formed with two parts, part I determine demographic profile of the respondent and part II determine the digital transformation and users satisfaction towards CMRL . Five point Likert scale was used by the respondents.

The data were analyzed by using percentage analysis, descriptive statistics - frequency statistics - and one-sample t test to test the reliability. Statistical Package for Social Sciences (SPSS) was used to analyze and interpret the data.

### **Analysis and Interpretation:**

**Table 5.1: Results of Frequency Distribution with respect to GENDER (N=50)**

	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>
<b>Male</b>	30	60.0	60.0
<b>Female</b>	20	40.0	40.0
<b>Total</b>	50	100.0	100.0

**Source: Primary Data**

### **Interpretation:**

In the samples of 50 respondents 60% of the respondents are male and 40% of the respondents were female. Majority of the respondent were male.

**Table 5.2: Results of Frequency Distribution with respect to AGE (N=50)**

	Frequency	Percent	Valid Percent
Below 25	11	22.0	22.0
25 to 34	27	54.0	54.0
35 - 44	6	12.0	12.0
45 and above	6	12.0	12.0
Total	50	100.0	100.0

**Source: Primary Data**

**Interpretation:** In the samples of 50 respondents 54% of the respondent’s age falls in between 25 to 34 years of age, 22% were below 25 years of age, 12% were between 35 - 44 years of age and 12% of the respondents age falls above 45 years of age. The majority of the respondents using CMRL were in the age group of 25 to 34 who may be business persons or employees.

**Table 5 3: Results of Frequency Distribution with respect to EDUCATION (N=50)**

	Frequency	Percent	Valid Percent
Students	8	16.0	16.0
Graduate	12	24.0	24.0
Post Graduate	20	40.0	40.0
Professionals	10	20.0	20.0
Total	50	100.0	100.0

**Source: Primary Data:**

**Interpretation:** In the samples of 50 respondents 40% of the respondents were holding post graduates, 24 % were graduates, 20% were professionals like doctors, lawyers etc, and 8% of the commuters are students who travel for their education purpose. The majority of the respondents are holding post graduate degree.

**t - Test**

**Table 5.4: Results of t-test with respect to Digital Transformation (N=50)**

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean	t	P Value
ST	50	4.40	0.639	0.090	48.699	0.000
RTI	50	4.32	1.019	0.144	29.977	0.000
DS	50	4.16	0.792	0.112	37.151	0.000

<b>One-Sample Statistics</b>						
	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>	<b>t</b>	<b>P Value</b>
AFC	50	3.92	1.175	0.166	23.585	0.000
MA	50	4.64	0.485	0.069	67.667	0.000
DCC	50	4.72	0.454	0.064	73.586	0.000
DA	50	4.24	0.716	0.101	41.873	0.000
DSS	50	4.28	0.834	0.118	36.289	0.000
ES	50	4.72	0.454	0.064	73.586	0.000
IOMT	50	4.08	0.900	0.127	32.060	0.000

**Source: Primary Data**

**Interpretation:**

From the above table it is inferred that the respondents rated the smart ticketing system highly, indicating that they find it convenient and efficient. The real-time information provided by CMRL is well-received by passengers, suggesting that it helps them plan their journeys better. Digital signage at stations is positively perceived, indicating that it effectively communicates important information to passengers. While still rated above average, the automated fare collection system could be further improved to enhance user satisfaction. The CMRL mobile app is highly rated, suggesting that it provides passengers with valuable features and functionality. Digital communication channels, such as social media and email, are well received by passengers, indicating effective communication by CMRL. The use of data analytics by CMRL is positively perceived, suggesting that it contributes to improved services. Decision support systems are rated highly, indicating that they assist management in making informed decisions. CMRL's efforts towards environmental sustainability are highly appreciated by passengers. While still rated positively, there is room for improvement in integrating CMRL with other modes of transport to enhance connectivity for passengers.

Overall, the data indicates that passengers are generally satisfied with the digital transformation efforts of CMRL, particularly in areas such as digital communication, mobile app functionality, and environmental sustainability. However, there are areas, such as automated fare collection and integration with other modes of transport, where further improvements could enhance user satisfaction.

**Findings and Suggestions:**

**Findings:** Majority of the respondents were male (60%) compared to female (40%). The largest age group of respondents using CMRL was between 25 to 34 years (54%), followed by below 25 years (22%). Post graduates constituted the highest education level among respondents (40%). Smart ticketing, real-time information, and digital signage were highly rated by respondents, indicating their convenience and effectiveness. The CMRL mobile app was highly rated, suggesting it provides valuable features to users. Digital communication channels were well received, indicating effective communication by

CMRL. Data analytics and decision support systems were positively perceived, suggesting they contribute to improved services. Environmental sustainability efforts by CMRL were appreciated by passengers. Integration with other modes of transport and automated fare collection could be further improved.

### **Suggestions:**

CMRL should continue efforts to enhance digital transformation initiatives, focusing on areas like automated fare collection and integration with other modes of transport. Further improve the CMRL mobile app to provide more features and enhance user experience. Strengthen digital communication channels to provide timely and relevant information to passengers. Continue efforts towards environmental sustainability to reduce carbon footprint and promote eco-friendly practices. Conduct regular surveys and feedback sessions to understand user needs and improve services accordingly. Collaborate with other transportation providers to enhance connectivity and provide seamless travel options for passengers. Invest in technology and infrastructure to support digital transformation initiatives and improve overall service quality.

Overall, the study suggests that CMRL's digital transformation initiatives have had a positive impact on user satisfaction, but there are areas where further improvements could enhance the overall commuter experience

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