

A Comprehensive Study on analysing the impact of technological advancements During Bus Travel in Mumbai.

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Abstract

This comprehensive study investigates the transformative impact of technological advancements specifically within the realm of bus travel in the bustling metropolis of Mumbai. As one of the lifelines of the city's public transportation system, buses play a crucial role in connecting diverse communities and facilitating the daily commute for millions. The study focuses on discerning the multifaceted implications of technological interventions on the efficiency, accessibility, and overall experience of bus travel in Mumbai.

Key technological components such as GPS navigation, mobile applications, contactless payment systems, and real-time transportation data are scrutinised to understand their role in optimising bus routes, reducing travel times, and enhancing the overall reliability of the bus network. By analysing the integration of smart technologies in bus operations, the study aims to uncover the ways in which these advancements contribute to a more seamless and efficient public transportation system.

Moreover, the research delves into the impact of technology on the user experience for commuters. Mobile applications providing real-time bus schedules, route information, and contactless payment options have not only simplified the process of using public transportation but have also influenced commuter behaviour and choices. The study investigates how these technological conveniences contribute to increased ridership, improved passenger satisfaction, and a more sustainable urban mobility paradigm.

In addition to the logistical aspects, the study explores the broader socio-economic and environmental implications of technological advancements in bus travel. research aims to provide a holistic understanding of the intricate relationship between technological progress and bus travel in Mumbai. The findings contribute to urban planning strategies, policy formulation, and technological innovations geared towards enhancing the efficiency and sustainability of public transportation systems in rapidly evolving urban landscapes.

Key Words : Travel, Bus, Technology, Passengers

Introduction

Technological developments have been essential in determining the travel environment in the dynamic metropolis of Mumbai, where the pace of life is as fast-paced as the cityscape itself. A complex network of cutting-edge technology that have revolutionized how people travel through and interact with the city connects the busy streets, well-known sites, and various populations. This extensive study explores the various ways that technological breakthroughs have affected travel in Mumbai, not just by streamlining transportation but also by improving the experience of travel for both locals and tourists.

Literature Review

(Subbaraoab, 2014) The study focuses on household activity and travel patterns in the Mumbai Metropolitan Region (MMR) in India. It introduces a new survey instrument called an activity-travel diary to collect detailed information on individual activities and travel behaviour. The study reveals insights into the relationships between socioeconomic attributes, activities, and trip-making behaviour. The paper emphasises the importance of understanding household activity and travel patterns in developing countries like India. The study provides valuable insights into the design of a survey instrument for collecting activity-based data and the implications for transportation planning and technology in the context of a developing economy like Mumbai.

(Vaishali Gijre, 2019) This study examines the urban transport governance challenges in rapidly growing India, highlighting fragmented authority, limited institutional support, and coordination issues between land use planning and transport development. It offers insights into global best practices in urban transport governance and recommends their potential adoption in developing countries like India. Emphasising the significance of a robust urban transport policy and suitable institutional framework, the study underscores their role in enabling effective governance

The article by **K Chandrashekhar Iyer et al.** explores the breakeven passenger traffic for regional Indian airports, highlighting the importance of understanding subsidy requirements and revenue streams. The study computes the breakeven passenger traffic for three consecutive years, providing insights into the profitability position of these airports. It also emphasizes the role of the nature of agreements with airlines in airport profitability and capacity utilization. The authors acknowledge the support of the Airport Authority of India in providing airport databases for their case studies on Mangalore and Chennai International airports

(Konstantinos Gkoumas*, 2019) This study examines the research and innovation capacity of connected and automated transport (CAT) in Europe. The authors use a methodology to identify and monitor new and emerging technologies and trends in transport. They find that spending on CAT research through framework programs has increased over time, with road transport receiving the greatest interest in terms of funding and a number of organizations researching CAT. Most CAT research organizations are located in the proximity of car manufacturers, as well as in large urban centres in Western Europe and university cities. The study emphasizes the importance of foresight and monitoring tools in anticipating the future impacts of transport innovation on society

(a, 2019) The Study examines the traffic congestion causes and impacts to transport sector and causes massive increases in transportation costs. Congestion cost estimates are done by considering the factors including, delay traffic, volume, passenger occupancy, and value of travel time of different vehicle types. The study shows the changes from private vehicles to public vehicles.

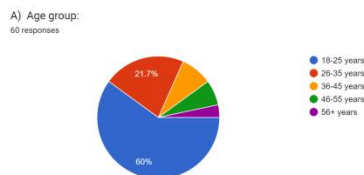
The Study Area

The study area is selected as Maharashtra which has more number of commuters travelling all over. The city selected is Mumbai which has the majority of the travellers using Public and Private modes of transport for commuting. It is the most populated city with a good infrastructure for commuting.

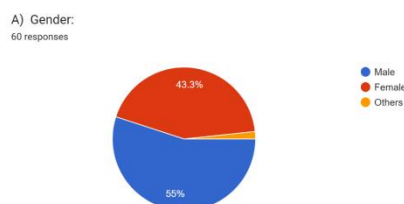
Conceptual Framework

Technology is improving the travellers in the daily commute on the bus. The speed of the ticket process has even made it convenient for

Data Collection

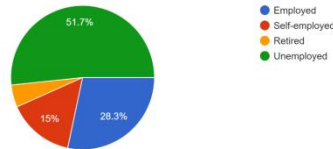


From the data collected from the sixty respondents 60% of the population falls under the age group of 18 to 25 years of age.



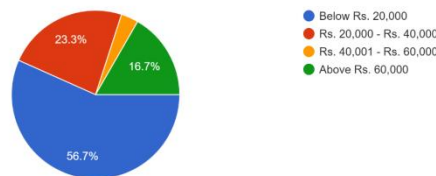
The above data represents the demographic profile of the commuters out of which more male represents the population size contributing to 55% of the respondent.

A) Occupation:
60 responses



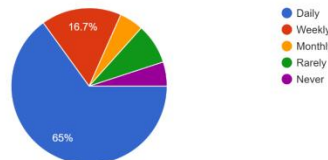
From the above respondents, 51% are are unemployed college-going students and 28.3% are employed, students.

Monthly income
60 responses



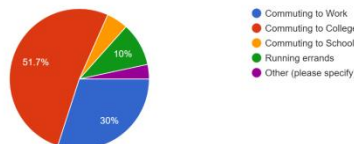
The data represents the income level of the students which shows the level below 20,000 income.

a) How frequently do you use bus services in Mumbai
60 responses



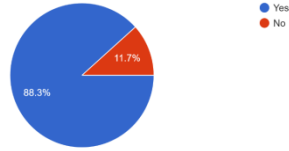
The above data represents the daily bus service use in Mumbai. The respondents are daily commuters of the bus.

What is the primary purpose of your bus travel?
60 responses



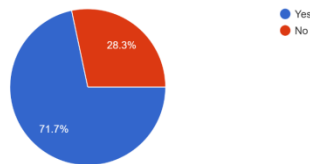
The data represents the commuters reasons of travels which is daily commute to work place and college.

Are you aware of the technological advancements introduced in Mumbai's bus transportation system?
60 responses



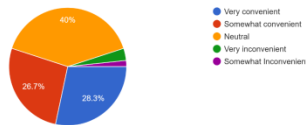
The data represents the awareness of technological advancement among commuters. Majority of the commuters are aware of the technology advancement.

Have you used any technological features/services while travelling on Mumbai's buses? (e.g., real-time tracking, mobile ticketing)
60 responses



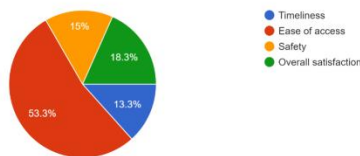
The data represents that majority of the commuters are using technology while travelling on the bus.

How do you rate the overall convenience of using technological features/services in Mumbai's bus travel?
60 responses



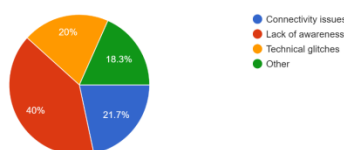
The above chart shows that the majority of the population size finds it very convenient while using the technology.

Has the adoption of technology improved your bus travel experience in terms of
60 responses



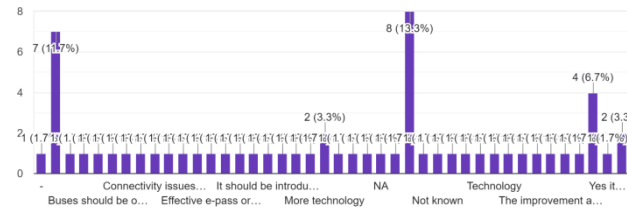
Most of the population finds it ease while using the technology while travelling.

What are the main challenges you face while using technological features/services during bus travel in Mumbai?
60 responses



The majority of the population finds it a lack of awareness while using the technology.

How do you think the bus transportation system in Mumbai can further enhance the use of technology to improve passenger experience?
60 responses



Most of the respondent says that there should be more developed technology with and effective with use.

Data Collection and Analysis

The data collected is by the daily passengers who commute in the city by their user experience and user interface while using the application provided by the BEST Bus services. The interview questions were asked to the daily travellers and users of the application which are provided by the transport service providers.

The analysis of the study states that travellers are more convenient with the technology which is being used in the daily commute. The overall convenience level is high. Starting from paper tickets to machine tickets and now the trend of application-based tickets through the Chalo app has made it easier to travel.

Conclusion

The Study explains the technological advancement from the paper ticket process to the machine-made ticket process and application-based booking process. The number of users has increased due to the traceability and tracking of the bus it has saved time and more convenience to commuters. It helps to boost the cash-less transaction which helps in the promotion of digital payments. User-friendly interface makes it easy for commuters to navigate and use the booking system. Through the study, it can be concluded that the use of technology is more user-friendly and provides more convenience to daily commuters.

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