Streamlining Dhaka's Daily Journey: The E-Ticketing Revolution

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ABSTRACT

The report's main objective was to offer a technology solution to the serious problems that Dhaka city's commuters confront when utilizing public transportation, a problem that is urgent for the city's citizens. The implementation of an electronic ticketing system was proposed as a solution to this. For commuters, this system offers financial and time savings. Data was gathered through a survey that explored various facets of public bus transportation in Dhaka. The findings from the survey indicate that the proposed E-Ticketing solution could substantially reduce the difficulties experienced by the public and has been met with widespread approval. Furthermore, feedback from survey participants provided valuable insights for further development of the system. Looking ahead, coordinated measures to increase public awareness will be necessary for the successful adoption of this E-Ticketing system. If the system is correctly understood and put into place, it has the potential to totally change Dhaka's public bus transit and give its residents a more practical and efficient means to commute.

1. Introduction

Public transportation in Bangladesh, particularly in the bustling capital city of Dhaka, faces significant challenges stemming from high population density and frequent traffic congestion. Despite making up only 1% of the nation's land area, Dhaka is a significant metropolis, producing 44% of all jobs in the nation and providing more than 36% of its GDP (Abir et al., 2018). Dhaka, a megacity bustling with millions of residents, faces a daily struggle to accommodate its vast ridership. According to (Ali et al., 2023) approximately eight million working hours is lost every day in 2023. The fact that roadways only make up 9% of Dhaka's total land area is a key contributor to the city's traffic congestion (Sakib et al., 2013). Dhaka's rapid growth in population and number of vehicles is putting pressure on the city's transport system. This immense pressure on the transportation system results in gridlocked streets and significant travel delays. The inefficiencies within the traditional ticketing methods exacerbate these issues, resulting in longer wait times, overcrowded stations, and overall inconvenience for commuters. The process of buying tickets adds to the complexity of an already complex system since it usually involves lengthy lines, cash payments, and the possibility of fake tickets. These traditional methods not only contribute to delays but also hinder the ability of transportation authorities to manage and optimize routes and schedules effectively.

Improving Dhaka's overall commuter experience necessitates a comprehensive approach that addresses these inefficiencies in the current transportation system. A revolutionary solution lies in an electronic ticketing system, capable of transforming the way Dhaka's residents navigate public transportation. In addition to facilitating real-time data collecting and streamlining the ticket purchase process, e-ticketing may also minimize the need for paper tickets and give authorities important information about passenger trends and system performance. By leveraging technology to modernize the ticketing process, Dhaka can take a significant step towards alleviating traffic congestion, reducing delays, and enhancing the overall efficiency of its public transportation network. This study explores the potential

benefits of e-ticketing and its capacity to transform Dhaka's public transportation landscape, offering a more convenient, efficient, and reliable commuting experience for its residents.

2. Literature Review

According to (Susanto et al., 2019), The e-ticketing system differs from traditional offline methods by utilizing cards to enhance convenience and reduce entrance queues. Despite these advantages, many people struggle with adopting the new system and prefer cash payments, resulting in suboptimal performance. Research employing the Unified Theory of Acceptance and utilize of Technology (UTAUT) has shown that effort expectation has a significant impact on the behavioural intention to utilize e-ticketing. This suggests that more study is necessary to increase acceptance and usage of e-ticketing. A study by (Singh et al., 2022) develops an online ticketing system for booking and managing tickets via an internet application with QR codes for secure entry and real-time crowd predictions. E-ticketing reduces physical queuing, offers 24/7 accessibility, enhances security, and prevents ticket misuse, improving user convenience and efficiency.

A study conducted by (Subramanya, Kermanshachi, & Pamidimukkala, 2022) explores the adoption and implementation challenges of e-ticketing in highway and bridge construction projects, highlighting its benefits such as reducing cost overruns, minimizing schedule delays, and enhancing safety and efficiency. E-ticketing offers real-time tracking and automated data collection, which significantly improves project management and material handling.

This study by (Qteishat et al., 2014) explores how e-ticketing technology affects customer satisfaction among Jordanian airline passengers, emphasizing aspects like data security, customer support, and user experience. It examines their influence on customer decisions and loyalty in adopting e-ticketing services, reflecting on the evolving dynamics of digital transactions and customer relationships in the airline sector.

This analysis by (Wahyuningsih & Iksan, 2019) examines Indonesia's experience with an electronic traffic ticketing system. It explores the system's effectiveness in curbing traffic violations, considering both its strengths and weaknesses. It explores how technological innovations enhance administrative efficiency for law enforcement, alongside obstacles such as public unfamiliarity with the system and issues related to technological access.

This research by (Tanrikulu & Celilbatur, 2013) explores the factors that impact how consumers purchase tickets online and perceive trust in e-ticketing services. It examines various demographic groups' perspectives on e-ticketing, highlighting factors like security considerations, transactional convenience, and the role of customer support in influencing consumer choices within the online ticketing industry.

This study by (Mut-Puigserver et al., 2012)examines the adoption and impact of electronic ticketing (e-ticketing) systems in transportation and related services. It explores how e-ticketing enhances efficiency, reduces costs, and improves user convenience, while also addressing privacy and security issues inherent in electronic transactions and mobility services. Examining e-ticketing patterns in Kuala Lumpur's urban districts is the study's objective by (Sulaiman et al., 2008). It will specifically look at usage trends, consumer perceptions of features like security and usefulness, and the impact of demographic factors on adoption. It investigates how online ticketing, particularly for airline tickets, is perceived and utilized by Internet users in Kuala Lumpur, highlighting convenience and demographic trends among e-ticket purchasers. This study by (Lübeck et al., 2012)explores the impact of electronic ticketing systems on public transport efficiency in major cities of southern Brazil. It investigates how these systems enhance information management and operational control, assessing whether they qualify as innovations. Using qualitative methods like interviews and document analysis, the study analyses data from cities where electronic ticketing was mandated, aiming to contribute to the understanding of technological advancements in urban transport management and their economic implications.

This research conducted by (Kos-Łabędowicz, 2014) examines the implementation and outcomes of integrated e-ticketing systems in public transportation, with a focus on the European Union. It evaluates the potential benefits, challenges, costs, and risks associated with integrating various modes of transportation under a single e-ticketing system, aiming to provide insights into enhancing convenience and efficiency for travelers and service providers alike.

This study by (Al Jalaliya & Singh Ahirwar, 2018) looks at how e-ticketing systems are implemented and how valuable they are, especially for Indian Railways. It also looks at how these systems affect consumer happiness, cost savings, and operational efficiency. In addition, it discusses the shortcomings and opportunities for development in the current e-ticketing infrastructure and investigates how cutting-edge technologies like Bluetooth, RFID, and QR codes might be used to improve the system even more.

The adoption of e-ticketing in highway construction gained momentum during the COVID-19 pandemic, moving from initial stages to partial implementation where inspectors began receiving tickets in image format. As technology advanced, e-ticketing evolved to produce machine-readable data (CSV files) and integrated with state DOT management software via APIs, paving the way for future enhancements through GPS, GIS, and BIM technologies(Subramanya, Kermanshachi, Pamidimukkala, et al., 2022).

These studies provide insights into the widespread benefits and adoption of e-ticketing systems globally. They highlight how e-ticketing enhances efficiency, convenience, and security by reducing queues, offering 24/7 accessibility, and preventing misuse. Research using frameworks like UTAUT examines factors influencing adoption, emphasizing user-friendly design. Through improved procedures and real-time data integration, case studies from the transportation industry demonstrate how e-ticketing enhances operational management, reduces expenses, and increases customer happiness. Studies in construction and traffic enforcement sectors demonstrate e-ticketing's role in efficiency gains, cost savings, and enhanced safety via automated data collection and digital integration. Overall, these findings underscore e-ticketing's transformative impact and potential for broader adoption worldwide.

3. Methodology

3.1 Research Questions

This study will primarily focus on examining opinions about the existing transportation system, the traditional ticketing system, and the newly implemented e-ticketing system. The following research questions will guide this study:

- How often do you use public transportation to commute in a week?
- What are the main challenges you face during your daily commute?
- How much time does it take to get on public transport usually?
- What kind of problems do you kindly face when making payments for bus rides in Dhaka city?
- What specific features or advantages of an educating system do you find most appealing?
- Do you have any concerns about using E-ticketing for commuting?
- What benefit would encourage you to start using e-ticketing for your daily commute?
- How do you perceive the cost effectiveness of E-ticketing compared to traditional ticketing methods?

3.2 Data Collection

We collected primary data through online surveys and interviews with a diverse group of individuals and stakeholders in Bangladesh. This involved engaging with university students and researchers.

4. Data Analysis, Results and Discussion

The figure shows the preferred modes of commuting in Dhaka city. It can be seen from the figure that 71.4% people use public bus which is the most.

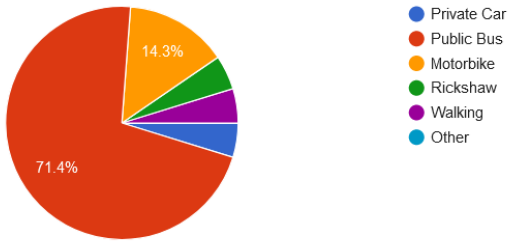

Fig.1: Preferred Modes of Commuting in Dhaka City.

Figure 2 highlights that it generally takes 10-20 minutes for half of the individuals to board public transport.

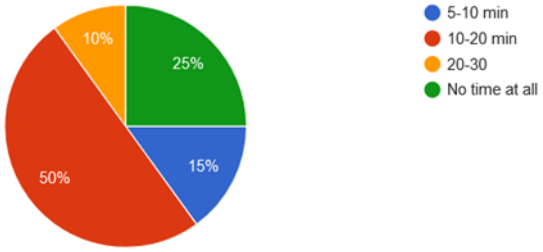

Fig.2: Typical Duration for Boarding Public Transport in Dhaka City.

Figure 3 illustrates the challenges people face when paying fares for public buses in Dhaka city. Here most of the people highlighted the problem of limited availability of small denominations for exact fare of bus communication. Also included paying fare fares, unsafe environment for carrying money and overcrowding.

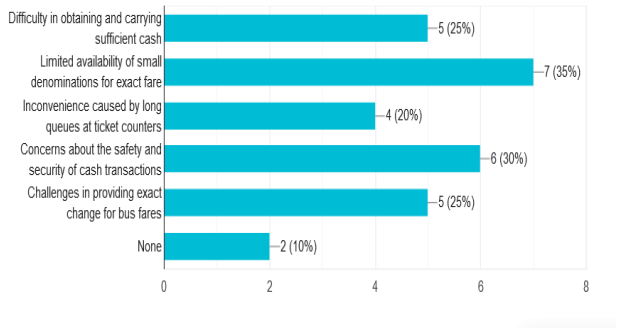

Fig.3: Current Challenges in Dhaka's Bus Ride Payment Systems.

Figure 4 shows the features or benefits of this E-Ticketing system that people find attractive. Among the benefits of this ticketing system, the people gave special importance of getting bus on time and transferring money online safely.

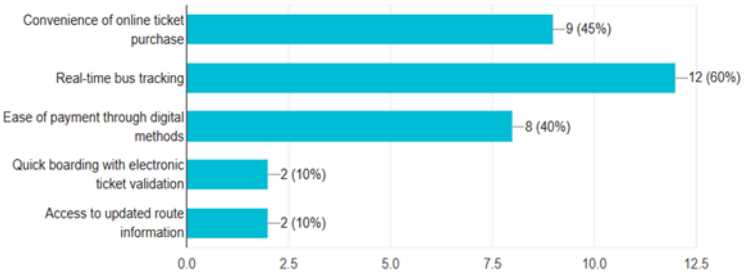

Figure 4: The benefits of E-ticketing system have attracted people.

Figure-5 indicates the extent to which the E-Ticketing system gained public acceptance had been revealed. Many people liked the functionality of this system. But a large part of them expects more updates of this system. This system has not reached the list of people's dislikes yet.

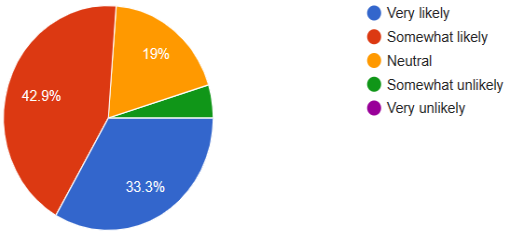

Figure 5: People's acceptance of using E-Ticketing system.

From the data in the result section, it can be said that the solution to the problem of sufferings of people in public bus travel can be reduced if E-Ticketing systems are introduced. Most people use public buses for communicating in Dhaka city and the problems such as the issue of proper fare exchange, unavailable environment to carry money safely, traveling with extra passengers, not getting the bus on time etc. they face in this regard. So, to remove these sufferings of the people should be bought under the E-Ticketing system were knowing the exact fare, paying online, knowing the bus timings and locations are available in an organized manner.

A majority of the public preferred this E-Ticketing system over the current system. Some of the features of E-Ticketing system are attractive to the people. Interest in implementing this system is seen among the public. There is public opinion that this system should be updated further. To ensure its implementation, awareness must be created among the public. Government and various development organizations should come forward to implement it.

5. Conclusion

In conclusion, the sufferings of traveling by public bus is one of the major problems of the people of Bangladesh. Due to this mismanagement of public bus communication, people face various problems such as wasting time for the buses at the bus stop, trouble with the bus helper about the correct fare, carry extra people inside the bus, unsafe environment inside the bus to save money etc. These problems can be solved through E-Ticketing. Although there are some limitations in this regard, it has gained acceptance to reduce human suffering. If the suggestion given by the people to develop it for convenience can be implemented, then it will create an impact on this problem. Disseminating this system to the masses is now the main challenge. People must be properly

made aware of the benefits of this system. To implement this system, measures should be taken to impart the minimum knowledge required among the people.

This research needs to be introduced more widely. The government and various welfare organizations should come forward to implement this system and create awareness among the people.

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