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The Impact of E-Ticketing System on Bus Transportation Service in Tanzania

ATHUMAN M. ATHUMAN

A Dissertation Submitted in Partial fulfilment of the requirements for a Master's Degree in Transport and Supply Chain Management from Dar es Salaam Maritime Institute.

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CERTIFICATION

I, the undersigned certify that I have read and hereby recommend for acceptance by the Dar es Salaam Maritime Institute (DMI), a dissertation entitled "The impact of e-ticketing system on bus transportation service in Tanzania" in partial fulfillment of the Requirements for Master's Degree in Transport and Supply Chain Management offered by the Dar es Salaam Maritime Institute (DMI).

Dr. Lucas Mwisila
(Supervisor)

Date

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DECLARATION AND COPYRIGHT

I, **Athuman M. Athuman** hereby declare this dissertation titled: **"The impact of e-ticketing system on bus transportation service in Tanzania"** has not been submitted to any other higher learning institution for any academic award.

Signature

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With deep appreciation, I would like to thank everyone who made this dissertation a success. First and foremost, I would like to express my sincere gratitude to Dr. Lucas Mwisila, whose direction, knowledge, and constant support have been invaluable to me during this research project. He gave supportive encouragement, and priceless insights that greatly improved this work.

My sincere gratitude goes out to my family and friends for their tolerance, comprehension, and unwavering support during this academic endeavor. Their unwavering faith in my abilities and support have been a continual source of inspiration.

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I sincerely thank all of these people and organizations for their invaluable contributions, which have greatly influenced this dissertation.

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DEDICATION

My professional path has been defined by God's guidance, which has helped me develop into who I am today. With their trust in me, I feel more responsible and committed to what I do. My friends have brought joy and companionship as they laughed with unwavering support throughout. They also help me to appreciate the diversity of views which comes from genuine relationships.

Finally, the love of my parents knows no bounds; it is always there as an encouragement to keep going no matter what comes my way. As well, they have taught me how not to give up and maintain consistency in line with what I believe.

In this tapestry of faith, guidance, friendship, and family, I am deeply grateful for the roles my supervisors, friends, and parents play in shaping my life's journey. Each contributes differently to my growth, happiness and purpose thus forming a basis on which all that I choose to aspire or dream about will exist.

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LIST OF ABBREVIATIONS

- LATRA - Land Transport Authority of Tanzania
- TRA - Tanzania Revenue Authority
- UTAUT - Unified Theory of Acceptance and Use of Technology
- TAM - Technology Acceptance Model
- TPB - Theory of Planned Behavior
- VAT - Value Added Tax

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ABSTRACT

This study investigates the impact of the e-ticketing system on bus transportation services in Tanzania. The main objective of the research is to assess how the e-ticketing system influences various aspects of bus transportation in Tanzania. Specific objectives include examining the role of e-ticketing, identifying the challenges it poses, and exploring strategies for its improvement.

Primary data were collected through well-structured questionnaires and in-depth interviews, providing both quantitative and qualitative insights into the effectiveness of the e-ticketing system. The findings reveal that the e-ticketing system has significantly enhanced revenue management, passenger convenience, sustainability, and fraud prevention, with significance levels of .02, .01, .02, and .02, respectively. These results highlight the system's valuable contribution to improving service quality.

However, the study also identifies several challenges, including technical issues, connectivity problems, resistance to change, and security concerns. To address these challenges, the study proposes strategies such as increasing awareness and educational campaigns, upgrading technology and infrastructure, implementing offline options, and enhancing feedback and support mechanisms. These recommendations aim to optimize the e-ticketing system's effectiveness and address its limitations, ultimately improving the overall bus transportation service in Tanzania.

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CHAPTER ONE
INTRODUCTION

This chapter provides a comprehensive overview of the background of the study, including the relevant historical precedents and contextual framework that have influenced the research focus. It presents the problem statement, outlining the main concern or knowledge gap that the investigation seeks to fill. The chapter also describes the research's general and specific objectives, outlining its more general and focused goals. Furthermore, limitations and delimitations are acknowledged to provide a transparent account of the study's scope and constraints, ensuring a balanced interpretation of the findings.

A. Background of the Study

Transportation is the key component of regular community activities. The existence of several types of transportation leads the community to be selective in choosing the suitable means of transport to be used. In the domain of transport services, several factors, such as ticket accessibility, seat reservation and service quality, affect the quality of transportation service. The introduction and increasing use of electronic tickets has been the majority option for them to obtain quality service in three factors like safety and security, proper payment gateway options and customer experience. Research conducted by Ayare, Lohiya, Gulhane, and Kumar (2023) demonstrates that the rapid urbanization witnessed in cities has resulted in an increased reliance on public buses for transportation. Consequently, it becomes imperative to modernize the ticket booking system for public transportation within a specific city. According to Liang & Shiau (2018) As technology changes the way we live, work, play, and travel, modern information and communication technologies play an important role in our daily lives Globally, in the transport sector especially in the airline, e-ticketing has become very popular as a self-service technology.

The study carried out by Soegoto et al., (2020) concerning bus transportation, e-ticketing systems are not simply payment instruments but also a means of processing enormous amounts of information that can facilitate the implementation and management of public transport without giving rise to making it difficult for traditional payment tools to introduce integrated pricing structures which cannot be implemented easily. As described by Sutandi (2021), the electronic ticketing system is the entry of tickets into a wide variety of transport modes, including air, rail and public bus with paperless, easy and quick procedures.

In Africa, the bus is the favorite mode of intercity transport as they are generally cheaper and more flexible unlike trains (Oforiwaa, 2023). As described by Oforiwaa (2023), bus transportation is regarded as the common mode of transportation. There are buses in almost every city in Africa so bus transportation is an incredible method for meeting local people and finding out about their way of life, as well as seeing the countryside. With the advancement of technology, not to mention the increase in the number of mobile phone users and internet subscribers, various sectors consider it to be an opportunity to link sectorial operations with such trends. Such being the case, e-ticketing systems are being employed in almost every country from Ghana, Nigeria, Kenya, Uganda and Tanzania, to mention a few. As by Soegoto et al. (2020); E-ticketing has developed into an issue of concern among organizations in recent years as efforts to develop e-ticketing make it simple for users of public transport services to find information about travel schedules and the price of the ticket. Furthermore, users can make reservations for tickets anytime and anywhere without having to come directly to the terminal or other conventional ticket booking places.

B. Statement of the Problem

The bus transportation sector in Tanzania, an essential component of the nation's public transportation system, has significant challenges with online ticketing systems. Manual ticketing systems have historically been plagued by challenges like fraud, inefficiency, lengthy wait times, and a dearth of real-time data. These issues not only compromise the bus services' operational effectiveness but also have an impact on the general traveler experience by causing delays, inaccurate fare collection, and decreased customer satisfaction.

In recent years, the implementation of electronic ticketing systems has been advocated as a potential remedy for these problems. E-ticketing promises greater convenience, more accurate fare collection, and better data management. It entails using digital platforms for both ticket purchase and validation. Notwithstanding the potential advantages, there is limited empirical research regarding how e-ticketing systems have practically impacted bus transportation services in Tanzania. According to (Marfo & Quansah, 2020) Information technology has had an impact on the different sectors of the global economy; including transport. In public transport, an e-ticketing system is not simply a payment instrument but also a means of processing enormous amounts of information that can facilitate the implementation and management of public transport without giving rise to making it difficult for traditional payment tools to introduce integrated pricing structures which cannot be implemented easily (Soegoto et al., 2020).

This study aims to close the gap by investigating how the level of transportation service is impacted by the use of e-ticketing in Tanzania's bus transportation sector. In the process, the study expectations to shed light on the advantages and disadvantages of this technological revolution by evaluating how e-ticketing systems affect user experiences, financial transactions, and operational performance. In order to maximize the advantages of e-ticketing and resolve any new problems, stakeholders including transportation authorities, service providers, and passengers must have a thorough understanding of these effects.

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C. Objectives of the Study

➢ *General Objective*

The main objective of the study was to determine the impact of e-ticketing system on bus transportation service in Tanzania.

➢ *Specific Objectives*

To achieve the main objective of the study, the researcher used the following specific objectives:

- To examine the role of e-ticketing system on bus transportation service in Tanzania.
- To determine the challenges of e-ticketing system on bus transportation service in Tanzania.
- To examine strategies for improving e-ticketing system on bus transportation service in Tanzania.

D. Research Questions

- What is the role of e-ticketing system on bus transportation service in Tanzania?
- What are the challenges of e-ticketing system on bus transportation service in Tanzania?
- What are the strategies for improving e-ticketing system in bus transportation service in Tanzania?

E. Significance of the Study

A study on e-ticketing in bus transportation services is important because it has the potential to revolutionize the industry by improving accessibility and convenience for users, optimizing operational procedures, and producing financial gains through improved revenue management and cost savings. In addition to helping with resource optimization and demand forecasting, it provides insightful information about passenger behavior and encourages environmental sustainability by lowering paper use.

The study offers useful insights for policymakers, advocating easily accessible e-ticketing systems that promote fraud prevention and safety for all users, including those with disabilities. To optimize infrastructure investments, it proposes strategic integration across transportation networks and highlights the efficiency and convenience benefits of e-ticketing implementation in public transportation. It also emphasizes the need for regulatory standards to guarantee legal compliance and uphold the integrity and security of e-ticketing operations, which will ultimately improve dependability and safety, build public trust, and encourage broader use of public transportation.

In addition, the study emphasizes the role of e-ticketing systems in promoting sustainable development. By reducing the need for physical ticketing materials and minimizing operational inefficiencies, e-ticketing can contribute to a more environmentally friendly transportation system. Policymakers can leverage these insights to support broader sustainability goals, making bus transportation not only more efficient but also more sustainable in the long run.

F. Limitation and Delimitation of the Study

This section provides a detailed examination of both the limitations and delimitations of the study. Along with the particular parameters the researcher set to focus the study, it addresses the inherent limitations and boundaries that could affect the research findings. Potential biases, methodological restrictions, and outside variables outside the researcher's control are examples of factors that could affect the validity or generalizability of the results. Alternatively, the delimitations describe the deliberate decisions taken to reduce the study's scope, such as the choice of specific variables, populations, or regions. The objective of this section is to offer a comprehensive understanding of the study's scope and the factors that could impact its results by going over these aspects in detail.

➢ *Limitations of the Study*

The limitations of this study arose from its narrow focus on customer experience and economic impact while neglecting other pertinent aspects. These limitations include a failure to analyze social impacts like operational efficiency, environmental impact, and security and fraud prevention, regulatory and policy implications, user adoption and technical problems, technological integration challenges. Also, the study shows better customer experiences and economic impact on certain operators and passengers, but it doesn’t account for differences between regions or demographic groups. In a similar vein, it emphasized the economic benefits but ignored setup costs and environmental implications beyond paper reduction.

➢ *Delimitation of the Study*

Within the context of e-ticketing systems in Tanzanian bus transportation, the study's delimitations were identified in its specific focus on operational efficiency, customer experience, economic impact, environmental impact, security, and fraud prevention. The research dropped out more comprehensive factors by focusing only on these specific areas, like difficulties with integrating technology, social effects that go beyond the digital divide and accessibility, policy and regulatory ramifications, long-term sustainability issues, and regional variances. Although this narrow focus made it possible to analyze important details in

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great detail, it naturally restricted knowledge of the full extent to which e-ticketing systems have affected Tanzania's bus transportation services.

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CHAPTER TWO
LITERATURE REVIEW

This chapter presents previous research and theoretical points of view that are pertinent to the research topic as it dives into the thorough theoretical literature review that is crucial to the study. It analyses empirical research critically, pointing out important conclusions, approaches, and knowledge gaps. By identifying these gaps in knowledge, the study demonstrates its validity and reliability to the field. In addition, the chapter clarifies the theoretical and conceptual framework supporting the research, offering a methodical foundation for comprehending and evaluating the phenomenon being studied. Additionally, the conceptual framework defines key concepts, relationships, and variables, facilitating a coherent and systematic approach to addressing the research objectives.

A. Theoretical Literature Review: Definition of Important Terms:

➢ *E-Ticketing System*

A study of the literature examining the reported definitions of e-ticketing attempts to explain the entire range of e-ticketing for the benefit of the organization and the customer. E-ticketing is an abbreviation of electronic ticketing which involves offering ticketing services with the use of electronic instead of printed tickets. As defined by Megawati et al. (2020) e-ticketing refers to the method of detailing the sale procedure from the customer's travel activity without the physical use of a paper ticket. Alfawaer et al. (2011) defined an e-ticket as "a paperless electronic document used for ticketing travellers, mainly in the commercial airline industry" (p. 848). According to Hanna (2022), e-ticketing is a paperless electronic ticket that is used to purchase things like airline or concert admission. Electronic tickets are kept in a database and can be printed at home or at the event ticket counter. Due to its affordability, ease of use, and environmental friendliness, this practice is becoming more and more of a preferred choice for travel agencies and event locations. Another benefit is that it does away with the chance of misplacing a paper ticket and missing the flight or venue entrance.

➢ *Bus Transportation*

As described by Oforiwaa (2023) bus transportation is regarded as the common mode of transportation. There are buses in almost every city in Africa so bus transportation is an incredible method for meeting local people and finding out about their way of life, as well as seeing the countryside. In Africa, the bus is the favorite mode of intercity transport as they are generally cheaper and more flexible unlike trains (Oforiwaa, 2023). Bus transportation service is an essential part of intercity and urban transport, offering millions of people around the world an accessible and reasonably priced form of mobility. Route planning, service frequency, ticketing systems, and customer support are just a few of the variables that affect how efficient and effective these services are. The use of paper tickets and cash transactions in traditional ticketing systems has been gradually supplanted by electronic ticketing or e-ticketing. By streamlining processes and cutting expenses, these innovations seek to improve the traveler experience.

Currently, in bus transportation service practice, e-ticketing systems offer several advantages compared to traditional ticketing methods. They minimize boarding times and the need for physical ticket counters by allowing passengers to purchase tickets online or through mobile applications. Increased ridership and improved passenger satisfaction may result from this convenience. Better data collection and analysis are also made possible by e-ticketing, giving bus companies important information about passenger behaviour, peak travel periods, and revenue trends. By using this data to optimize schedules and routes, service dependability and efficiency will eventually increase.

➢ *Intercity Bus Companies*

These involve bus companies offering transportation services travelling from one city to another or between cities. Intercity transport is a fundamental element in any country and the efficiency of moving labour, consumers and goods from one destination to another plays an important role in productivity; linking people, making places accessible as well as improving social, economic and cultural interactions (Ihionkhan & Chibuzor, 2022). The number of intercity bus passengers is increasing day by day due to the development and gradual industrialization of the country, including personal interests, business matters, visits with friends and family members or education (Rahman et al., 2017).

B. Empirical Literature Review

Qteishat et al. (2014) investigated the impact of e-ticketing techniques on customer satisfaction; a convenient sample of Jordanian travellers who had used e-ticketing companies to book flights within the past year was obtained. The results show that all of the independent variables examined data security, customer and technical support, and user-friendliness had a significant impact on customers' satisfaction with e-ticketing services. It was therefore concluded that it is evident that the four independent variables evaluated in the investigation account for over 76 per cent of the variance in customer satisfaction with e-ticketing. Thus, the research confirms the inclusion of infrastructure, data security, user-friendliness, and technical and customer support as essential elements of e-ticketing services to guarantee customer satisfaction.

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Soegoto et al. (2020) investigated the impact of e-ticketing applications on bus transportation in Bandung to determine the impact of the e-ticketing application system on bus transportation for the people of Bandung. The research was aided by the use of a qualitative method. The findings indicate that the e-ticketing system's implementation has had some positive effects, one of which is raising public interest in using public transport to lessen the traffic congestion that frequently happens at this time of day. This is because the use of e-ticketing systems on public transportation offers comfort and convenience in ticket booking for both users and transportation service providers. Of course, the ease and comfort of using public transit can motivate people to do their everyday tasks there.

Some previous studies were done on this topic such as the study done by Qteishat et al. (2014) which focused more on the impact of the e-ticketing technique on increasing the single aspect of the dependent variable namely customer satisfaction; and Soegoto et al. (2020) who investigated the impact of e-ticketing application on bus transportation in Bandung focusing on the contribution of e-ticketing to emphasize the use of public transport to discourage the use of private vehicles hence to reduce the traffic jam that occurs in the City of Bandung. Therefore, this study has called to fill the gap by investigating the influence of e-ticketing system on bus transportation service in Tanzania with more focused independent variables of the effect of payment gateway to the revenue generation in the sector, safety and security level on bus transportation service and the customer experience on enhanced quality transportation service in Tanzania.

C. Research Gap

E-ticketing systems have revolutionized the public transportation sector by enhancing operational efficiency and customer experience. Numerous studies have explored the economic and operational impacts of e-ticketing in various contexts. Ayare et al. (2023) researched the development of an Online Bus Ticket Reservation System which aims at alleviating the challenges faced by bus conductors by streamlining fare collection and introducing a transparent financial process. Additionally, the study by Nzakizwanimana (2021) determined that there is a significant relationship between the e-ticketing system and fare revenue collection improvement.

The study by Adducul and Adducul (2020) regarding mobile bus ticketing system: development and adoption found that when it comes to bus ticketing systems, integrating state-of-the-art mobile technology with advanced application infrastructure has the potential to significantly enhance service quality, reduce expenses and turnaround times, and protect data stored in each company's system. These findings align with this study's findings as traced on the roles that e-ticketing system play as far as bus transportation service is concerned.

The study conducted by Scărișoreanu (2020) regarding integrated e-ticketing: Solution to make public transport more attractive than personal cars besides describing challenges associated with the system found a lot of benefits of the system for both passengers and transport companies where it was declared that "e-ticketing is definitively one of the important future directions of transport ticketing. Online booking and purchasing a travel ticket offers a lot of benefits, not only for passengers but also for passenger transport companies and responds to the current needs of society, one of them being the need to travel." which is consistent with the findings of this study.

However, there is limited research on the general economic impacts, customer experience and environmental impacts of e-ticketing systems, particularly in the context of bus transportation services in developing countries like Tanzania. Some studies touch on the customer experience addressing the contribution of e-ticketing systems to improved customer satisfaction.

Understanding the customer experience, and economic and environmental impacts of e-ticketing can inform sustainable practices and policies in public transportation. It can also provide insights into how such systems contribute to broader customer experience, and economic and environmental goals, such as enhanced communication, improved security and fraud prevention, accessibility and real-time updates; improved revenue and government levy and taxes collection; and reducing paper use and waste generation. This study aims to fill this gap by investigating the economic impact, customer experience and environmental impacts of e-ticketing systems on bus transportation services in Tanzania. By doing so, it will provide a more holistic understanding of the benefits and challenges associated with e-ticketing, contributing to both academic knowledge and practical applications in the field.

D. Theoretical Framework

Bus transportation services with an e-ticketing system were selected as the dependent variable for this investigation. According to a review of the literature, revenue generation, customer satisfaction, and on-time performance are the two metrics used to measure the quality of transportation services with e-ticketing. To accomplish the objective of this study, the researcher will use the Technology Acceptance Model (TAM) as explained in the next section.

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➢ *Technology Acceptance Model*

There are many models for finding out the behavior patterns of consumers. Common examples include the Theory of Reason Action (TRA), the Theory of Planned Behavior (TPB), and the Technology Acceptance Model (TAM). The researcher will use The Technology Acceptance Model (TAM) to investigate the factors affecting the implementation of online bus ticketing technology. The model describes how users decide to receive and use a particular technology. As described by Mugo et al. (2017) when users come into contact with a new technology, their decision to use it, when and how is influenced by factors namely perceived usefulness, perceived ease of use as well as attitude of a user towards the use of that technology. However, user attitude towards a particular technology is highly influenced by perceived usefulness and perceived ease of use. Other dimensions have been also introduced to the model to study how users tend to adopt a particular technology. Such dimensions include subjective norms or social influence and demographic variables (Islam 2023; Marfo & Quansah, 2020).

E. Conceptual Framework

E-ticketing systems have a big impact on bus transportation services because they improve revenue management, security, convenience, and sustainability of the environment. By using unique codes and digital encryption to improve fraud prevention, they lower the possibility of fake tickets. E-ticketing systems help green initiatives and lessen the environmental impact of bus operations by doing away with the need for paper tickets. Because they can buy, store, and manage their tickets via websites or mobile apps, passengers can purchase tickets with greater convenience and experience shorter wait times. Furthermore, sophisticated revenue management features like dynamic pricing and real-time analytics that are provided by e-ticketing systems assist bus operators in maximizing pricing tactics and increasing revenue.

However, in order to maximize the advantages of e-ticketing, obstacles like technological problems, the digital divide, integration with current systems, and customer adaptation need to be overcome. A balance between transformative benefits and the need to get past implementation roadblocks in order to improve overall efficiency and user experience characterizes the relationship between e-ticketing systems and bus transportation services.

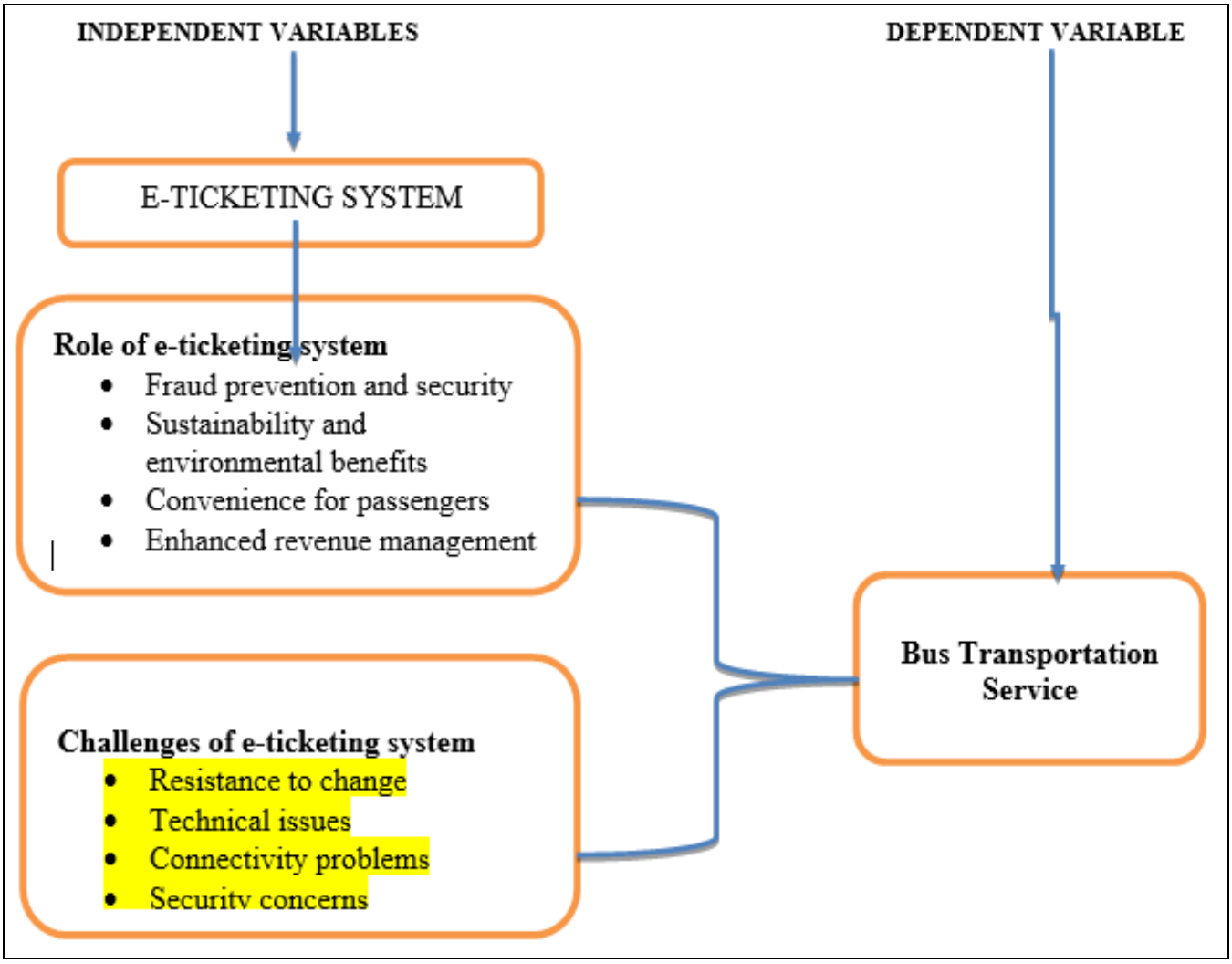

Fig 1: Conceptual Framework

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CHAPTER THREE
RESEARCH METHODOLOGY

This section outlines the study's methodology, including the research area and design. It goes into detail about the number of participants and the selection procedure, as well as the sample size, sampling design, and targeted population. It also covers data analysis techniques used to interpret the results, as well as data collection methods like surveys and interviews. Informed consent, confidentiality, and potential conflicts of interest are among the ethical issues covered. The study's validity and reliability are also examined to guarantee accuracy and consistency.

A. Area of the Study

The study was conducted in Dar es Salaam, Tanzania, and focused on the use of e-ticketing platforms by bus operators and passengers. This location was selected because it has a sizable and diverse population that uses buses, which offers a rich context for obtaining accurate and pertinent data. As a significant urban center with a high proportion of e-ticketing system adopters and users of public transport, Dar es Salaam provides important insights into the challenges and efficacy of these platforms in practical settings. The area chosen for the study increases the likelihood that it will produce thorough and accurate data regarding the use of e-ticketing in public transport in this particular urban setting.

B. Research Design

Saunders et al. (2015), well-defined research design as an arrangement that provides direction to the researcher on unfolding answers to the research problem. So, a research design incorporates procedures on how data will be obtained and analyzed to attain economy. In this study, the researcher used a mixed-method approach gathering both quantitative and qualitative simultaneously. Furthermore, data were gathered in a single instance hence cross cross-sectional study was done.

C. Sampling Design

➢ *Study Population*

Population is the totality of objects under investigation. As per the nature of this study and data requirements, the targeted population included respondents from staff of the sampled bus company specifically bus company owners and managers and ticketing staff along with passengers using the transportation service from the company. This broad group provided a comprehensive understanding of the impact of e-ticketing system on bus transportation service in Tanzania.

➢ *Sampling Techniques*

The researcher employed a combination of purposive and random sampling methods to guarantee representativeness and a comprehensive understanding of the impact of e-ticketing on bus transportation services. Purposive Sampling was suitable for gathering qualitative data on policies, practices, and diverse stakeholder perspectives, essential for understanding the regulatory and management context of pollution (Cahoon, 2021). This dual approach allowed the researcher to balance the generalizability of findings with targeted insights from key stakeholders. In addition to the random sample of passengers, purposive sampling was used to select key informants who are expected to have in-depth knowledge about the e-ticketing system and its impact. These key informants included bus company owners, managers and ticketing staff.

➢ *Sample Size*

Because the total study population was known, the researcher used the formula put forward by Yamane (1967), to arrive at a sample size; calculated as follows:

$n = N/ (1+ N (e^2))$…….Eq 3.1

Where "n" refers to sample size,
"N" refers to the total number of the study population; and
"e" refers to the level of precision.
$n = 150/ (1+ 150 (0.05)^2)$
$n = 60$

D. Data Collection Methods

Methods of data collection are fundamental components of research, providing the means to gather information essential for analysis and conclusions. In order to get information directly from the study population, the researcher used primary data sources in this investigation. A well-structured questionnaire and in-depth interviews served as the main sources of data. The purpose of the questionnaire was to collect precise answers from participants and quantitative data so that trends and patterns could be systematically analyzed. Conversely, the qualitative insights gleaned from the interviews allowed for a more thorough investigation of the experiences, attitudes, and perceptions of the participants. By using these techniques, the researcher hoped to gain a thorough grasp of the topic and make sure that pertinent, first-hand data was gathered from the study participants.

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➢ *Questionnaire*

One of the most popular tools for gathering data is the questionnaire. For this study, the researcher employed open and close-ended questions to facilitate the capturing of respondents' opinions as far as reaching the research aim was concerned. The choice of questionnaire was because it was very easy to control the sample and obtain more information within a short period given the objectives of the study. Therefore, a total of 60 questionnaires were distributed to collect data for this study.

➢ *Interview*

According to Wang (2022), an interview entails gathering information through spoken or oral dialogue between the researcher and respondents in person. A structured interview with an average of 15 minutes in a relaxed and comfortable environment was conducted to collect data from respondents. This method was utilized to gather information from passengers, ticketing staff and managers from the selected bus companies.

E. Data Analysis

Kombo and Tromp (2017) defined data analysis as the process of deducing and drawing conclusions from information gathered during an experiment or survey. The process involves data processing comprised of editing, coding, and tabulation. This was done thoroughly to ensure the accuracy and effectiveness of the research (Cahoon, 2021). Since the study employed a mixed approach gathering both qualitative and quantitative data, qualitative data analysis was conducted to capture respondents' feedback through content analysis with the help of NVivo software. Content analysis over other analyses because of the flexibility it offers in the analysis process.

For quantitative data, the study used binary logistic regression analysis to analyze the relationship between variables of the study employing a regression model as:

$$\text{Logit}\,(P(Y=1)) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

Where:
P(Y=1) represents the probability of the dependent variable (bus transportation

Service) being 1

X_1, X_2, X_3 and X_4 represent independent variables namely enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security .

The logit function transforms the probability into a linear combination of the predictors namely enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security.

The coefficients β_0 represent regression constant, $\beta 1$, $\beta 2$, $\beta 3$ and β_4 represent regression coefficients associated with X_1, X_2 and X_3 respectively.

F. Validity and Reliability

➢ *Validity*

The researcher prepared an interview guide to keep the researcher on track with the research aim and objectives. Furthermore, questionnaires were prepared under the close guidance of the supervisor and pre-tested and their suggestions were considered to make the final draft of the questionnaires.

➢ *Reliability*

Saunders & Townsend (2018) defined reliability as the degree to which the instrument used provides consistent results over time. So, to say, the ability of data collection tools to provide consistent results each time to the same population under investigation. The researcher tested the reliability of the questionnaire using Cronbach's alpha and interpreted the results as per established parameters. For the study to be reliable, the coefficient should be equal to or above 0.7 and vice versa (Santos, Hatcher, 1994 and 1999). Results from Cronbach's alpha is indicated in Table 1.

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.996	.996	4

Source: Survey Data, 2024

From Table 1, Cronbach's alpha value is 0.996 indicating that the study is reliable as the value is above 0.7 as argued by numerous researchers.

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G. Ethical Considerations

All aspects of research ethics were adhered to when conducting this study such as informed consent of respondents, voluntary participation in the study, not disclosing respondents' names without their permission as well as maintaining confidentiality of information, just to mention a few.

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CHAPTER FOUR
RESULTS, DISCUSSION AND FINDINGS

This part presents findings, a discussion as well a summary of the findings as per the objectives of the study. The study focused on assessing the impact of e-ticketing system on bus transportation service in Tanzania. Specifically, the study focused on examining the role of e-ticketing system on bus transportation service in Tanzania, evaluating challenges of e-ticketing system on bus transportation service in Tanzania as well as finding out strategies for improving the e-ticketing system for bus transportation service in Tanzania.

A. Response Rate

To gather data and determine the study's conclusions, a total of 60 questionnaires were delivered, as shown in Table 2.

Table 2: Response Rate

Particulars	Frequency	Percent (%)
Returned Questionnaire	53	88.3
Incomplete Questionnaire	03	5
Unreturned Questionnaire	07	11.7
The questionnaire used for analysis	50	83.3
TOTAL	60	100

Source: Survey Data, 2024

From Table 2, 53 questionnaires (88.3%) of the distributed questionnaires were returned, while 7 questionnaires (11.7%) were not. Additionally, it was discovered that 03 questionnaires were returned incomplete. Hence the researcher had a total of 50 questionnaires which were filled for analysis, which amounts to 83.3% of the disseminated questionnaires. Amin (2005) states that; data analysis can be used to determine the study's conclusions when the response rate exceeds seventy percent (70%) in the data. So, the researcher used 50 questionnaires for analysis to arrive at the findings of this study.

B. Demographic Information of Respondents

The researcher carefully recorded all the essential demographic and behavioral information gathered from the respondents. This data covered a number of important variables, including gender, age, stakeholder category, and frequency of bus travel. A thorough profile of the research participants was produced by documenting each of these variables. To better understand the respondents' demographic distribution which can affect opinions and usage patterns specifically, gender and age were noted. It was observed that different roles and experiences within the bus transportation ecosystem are distinguished by the stakeholder category, which asks respondents if they are bus operators, passengers, or members of other pertinent groups. To determine the level of interaction with the transportation system, the frequency of bus travel was also monitored. This comprehensive data collection allows an in-depth analysis of the potential effects of various factors on the study population's perceptions and use of e-ticketing platforms as follows:

➢ *Age of Respondents*

The researcher categorizes the age groups of respondents into three main groups: those under 35 years, between 35–45 years, and above 45 years. As per findings, most respondents were under 35 years old (23 respondents) while between 35- 45 years and above 45 years accounted for 16 and 11 respondents respectively. This is the equivalent of 46%, 33% and 21% respectively. Table 3 provides results for the age of the respondents.

Table 3: Age of Respondents

	Frequency (%)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Below 35 years	23	46	46	46
Valid 35-45 years	16	32	32	78
Above 45 years	11	22	22	100
Total	**50**	**100**	**100**	

Source: Survey Data, 2024

Based on the information presented in Table 3, it clearly indicates that the respondents demonstrated a degree of maturity consistent with the age range needed to be included in this research. As can be seen from the table, their age indicates that they have the life experience and cognitive maturity needed to make a significant contribution to the study. Because the respondents are more mature, the study's findings will be more valid and reliable because they will be able to provide thoughtful and pertinent answers.

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➢ *Stakeholder Category*

Since the study involved different stakeholders from bus transportation services, the researcher identified stakeholders who participated in the study. Results indicated the majority of respondents were passengers (27), followed by ticketing staff (15), and bus company managers who participated in this study 08 while none of the respondents formed a category of bus owner. As per such frequency, it made a total of 54%, 30%, 16% and 0% for categories namely passenger, ticketing staff, bus company manager and bus owner respectively.

Table 4: Stakeholder Category

Stakeholder Category	Frequency	Percent (%)
Passenger	27	54
Ticketing Staff	15	30
Bus Company Manager	08	16
Bus Owner	0	0
TOTAL	50	100

Source: Survey Data, 2024

Based on Table 4, it was determined that the majority of study participants were passengers, with ticketing staff and bus company managers following closely behind. This collection of passenger feedback offers a deep, first-hand understanding of their needs and experiences, which is priceless for raising the quality of services. The study is further enhanced by the inclusion of perspectives from ticketing employees and managers of bus companies, which provides a comprehensive perspective on managerial and operational facets.

➢ *Frequency of Bus Travel*

The researcher captured the frequency of bus travel among participants who participated in this study as concerns assessing the impact of the e-ticketing system on bus transportation service in Tanzania. The frequency was categorized into weekly, monthly, occasionally and rarely. Results showed participants who use bus transportation services weekly to be 15, monthly 14, occasionally 09 and rarely 12. In terms of percentage, weekly respondents captured 30%, while monthly, occasionally and rarely represented 28%, 18% and 24% respectively.

Table 5: Frequency of Bus Travel

Category	Frequency	Percent (%)
Weekly	15	30
Monthly	14	28
Occasionally	09	18
Rarely	12	24
TOTAL	50	100

Source: Survey Data, 2024

As demonstrated by Table 5, the results of this investigation encompassed an extensive range of respondents according to their bus transportation service usage patterns. Some respondents used the service at least once a week, once a month, and never. A diverse range of experiences and viewpoints is ensured by this varied representation. The fact that a sizable percentage of respondents used the bus service once a week indicates that they used the transportation system frequently. Subsequently, monthly users together with infrequent users of the service added to a thorough understanding of various frequencies of usage. This diverse input provides an in-depth overview of the service's influence and effectiveness across various user groups, providing insightful information for improving and customizing bus transport services to accommodate a broad range of requirements and preferences.

➢ *Previous Experience with E-Ticketing System*

The researcher thoroughly examined if the respondents had previous experience with electronic ticketing platforms. Responses were categorized into two main categories to efficiently collect this data: those who selected "Yes," indicating prior experience with e-ticketing systems, and those who selected "No," indicating no prior experience. This categorization made it possible to distinguish between people who were and weren't familiar with digital ticketing techniques. The results, which are shown in Table 6, provide insight into respondents' ease and familiarity levels with e-ticketing systems, which is important information to consider when evaluating whether or not these technologies will be accepted and useful in the existing transportation context.

Table 6: Previous Experience with E-Ticketing System

Response	Frequency	Percent (%)
Yes	12	24
No	38	76
TOTAL	50	100

Source: Survey Data, 2024

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C. Specific Objective One: To Examine the Role of E-Ticketing System on Bus Transportation Service in Tanzania

➢ *Case Processing Summary*

Binary logistic regression analysis was done with a total number of 50 cases where none of the values were missing in the analysis. Furthermore, independent variables namely fraud prevention and security, sustainability and environmental benefits, convenience for passengers and enhanced revenue management were abbreviated as FPS, SEB, CFP and ERM respectively. Table 7 illustrates the case processing summary of the analysis.

Table 7: Case Processing Summary

Unweighted Cases[a]	N	Percent
Included in Analysis	50	100
Selected Cases Missing Cases	0	0
Total	50	100
Unselected Cases	0	0
Total	50	100

a. If weight is in effect, see the classification table for the total number of cases.

Source: Survey Data, 2024

From Table 7, it is evident that 50 cases (i.e., 100% of the dataset) were processed in full. This thorough inclusion shows that during the analysis process, no data points were overlooked or ignored. Assuring that the analysis is founded on a complete and uninterrupted set of data, the comprehensive coverage of all cases highlights the dataset's robustness and completeness. This meticulous methodology improves the validity of the research findings and the precision of any inferences made.

➢ *Dependent Variable Encoding*

In this study, the dependent variable involves bus transportation service, and it was systematically encoded into two categories: "good bus transportation service" and "bad bus transportation service." Table 8 provides specifics on how these categories were represented numerically, with internal values of 0 and 1, respectively. With the help of this encoding technique, it is possible to distinguish between the two levels of the dependent variable in a straightforward and quantitative manner, which makes data analysis and interpretation more accurate. Through the assignment of these precise numerical values, the study is able to compare and evaluate the effects of different bus transport service quality levels on the overall research findings.

Table 8: Dependent Variable Encoding

Original Value	**Internal Value**
Bad bus transportation service	0
Good bus transportation service	1

Source: Survey Data, 2024

➢ *Omnibus Tests of Model Coefficients*

The researcher conducted an examination of omnibus tests of model coefficients to evaluate the overall adequacy and fit of the model with respect to the data. These tests are essential for determining whether the predictors included in the model together add to its explanatory power and whether the model as a whole greatly explains the variability in the dependent variable. Table 9 presents in detail the outcomes and specific insights gained from the model fitting, such as the statistical significance and the model's ability to accurately represent the relationships between the variables. With regard to the model's overall performance and robustness, this table gives a clear summary of how well the model matches the data.

Table 9: Omnibus Tests of Model Coefficients

		Chi-square	**Df**	**Sig.**
	Step	20.56	4	.00
Step 1	Block	20.56	4	.00
	Model	20.56	4	.00

Source: Survey Data, 2024

From Table 9, the results indicate that the chi-square test value, calculated with four (4) independent variables and a sample size of 50 observations, yielded a significant p-value for the model. Specifically, the chi-square statistic is reported as $\chi^2(4, N=50) = 20.56$, $p < 0.001$. This significant p-value suggests that the model demonstrates a substantial improvement in fit compared to the null model, which assumes no relationship between the variables. The evidence of such a low p-value strongly supports the conclusion that the model effectively captures the underlying patterns in the data and offers a meaningful enhancement over the null hypothesis. Thus, the model is deemed to fit the data well, providing robust and reliable insights into the relationships being studied.

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➢ *Hosmer and Lemeshow Test*

Hosmer and Lemeshow Test was done to also test model fit. As per the test, when p- the value is higher than .05 it is an indicator of a good model fit and vice versa. Table 10 captures the results of the Hosmer and Lemeshow Test.

Table 10: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2. 49	8	.96

Source: Survey Data, 2024

From Table 10, it clear that the model fit the data exceptionally well, with no appreciable deviations between the observed model and the expected results. This outcome shows that the model performs with a high degree of accuracy and dependability since the predictions are in close agreement with the actual observed data. The absence of disparities between the anticipated and observed values implies that the model successfully represents the underlying dynamics and data structure, confirming its suitability and resilience in accurately capturing the data. This congruence strengthens the overall validity of the study's findings by highlighting the model's capacity to offer accurate and significant insights.

➢ *Model Summary Information*

The researcher measured the degree to which the model could explain the variance observed in the dependent variable. This evaluation is essential for comprehending the extent to which the model explains the variability noted in the dependent variable and offers information about the explanatory capacity of the model. The model summary provides comprehensive information about this measure of explanatory power. Table 11 presents the particular findings and metrics pertaining to the variance explained by the model. This table provides a clear illustration of the model's capacity to explain the variability in the dependent variable, demonstrating the model's potency and efficacy in encapsulating and illuminating the salient features of the data.

Table 11: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	34.547[a]	.337	.505
a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.			

Source: Survey Data, 2024

Table 11 illustrates how the model explains 33.7% and 50.5% of the variance in the dependent variable, respectively. This indicates how much variability the model can explain at different phases or in various situations. These numbers imply that the model explains between a moderate and a significant portion of the variance of the dependent variable. Although 33.7% is a good starting explanatory power, the increase to 50.5% suggests a more sophisticated and successful model that accounts for a larger share of the variability. Both percentages were regarded as reasonable and suggestive of a decent fit. This level of explained variance confirms the model's applicability and efficacy in the context of the dependent variable by showing that it successfully captures and represents a sizable percentage of the variability in the dependent variable.

➢ *Classification Table Results*

The researcher measured Percentage Accuracy in Classification (PAC) to detect the percentage of cases that can be correctly classified with independent variables added. Table 12 provides detailed results.

Table 12: Classification Table Results

Observed		Predicted		
		BTS		Percentage Correct
		Bad Bus Transportation Service	Good Bus Transportation Service	
BTS	Bad bus transportation Service	7	5	58.3
Step 0	Good Bus transportation Service	1	37	97.4
Overall Percentage				88.0
a. Constant is included in the model. b. The cut value is .500				

Source: Survey Data, 2024

As demonstrated in Table 12, the model's remarkable accuracy rate of 88% is regarded as a strong performance. This high accuracy rate is indicative of how well the model classified the results. Furthermore, the model shows remarkable sensitivity in forecasting the opinions of respondents regarding bus transportation service. In particular, the model accurately predicted that 97% of respondents who rated the bus transport service as good would do so among those who rated it as either good or bad. The model's high degree of accuracy in predicting the presence of good bus transport service suggests that it is especially good at

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differentiating and correctly categorizing positive evaluations of the service. These findings highlight the model's overall stability and dependability in capturing the subtleties of respondents' assessments.

➢ *Variables in the Equation Results*

The researcher performed binary logistic regression to find out the role of e-ticketing system on bus transportation service in Tanzania; focusing on four independent variables namely; fraud prevention and security, sustainability and environmental benefits, convenience for passengers and enhanced revenue management which were abbreviated as FPS, SEB, CFP and ERM respectively. Results from binary logistic regression are indicated in Table 13.

Table 13: Variables in the Equation Results

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	ERM	-24.23	10.67	5.16	1	.02	.00
	CFP	39.48	15.67	6.36	1	.01	1.398×10^{14}
	SEB	23.32	10.08	5.35	1	.02	1.348×10^{10}
	FPS	-34.41	14.92	5.32	1	.02	.000
	Constant	-2.37	2.13	1.24	1	.27	.094
a. Variable(s) entered on step 1: ERM, CFP, SEB, FPS							

Source: Survey Data, 2024

From Table 13, results indicate enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security to be roles played by e-ticketing system concerning bus transportation service in Tanzania at a significance level of .02, .01, .02 and.02 respectively. So to say, the odds of respondents (users) regarding good bus transportation service concerning e-ticketing system, roles associated with such a system included enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security at 95% confidence interval.

D. Specific Objective Two: To Evaluate the Challenges of E-Ticketing System on Bus Transportation Service in Tanzania

To arrive at the objectives of the study, the researcher collected data with the use of closed-ended questions as well as interviews. With a closed-ended question, the researcher was able to capture information as pertains to the challenges of e-ticketing system on bus transportation services in Tanzania. Through closed-ended questions, the researcher was able to capture challenges associated with the use of e-ticketing systems on bus transportation services in Tanzania.

Findings indicated that, out of 50 questionnaires that were returned, challenges that were depicted were: resistance to change, technical issues, connectivity problems as well and security concerns. Table 14 summarizes the challenges identified.

Table 14: Challenges of E-Ticketing System on Bus Transportation Service in Tanzania

Identified Challenge	Rank
Technical Issues	1
Connectivity problem	2
Resistance to change	3
Security concerns	4

Source: Survey Data, 2024

From Table 14, it was found that technical issue as a challenge to e-ticketing system was pinpointed by many respondents followed by connectivity problems, resistance to change and security concerns. The researcher inquired about qualitative information about the issue under investigation to be able to triangulate with descriptive data as captured in a closed-ended question. With the interview guide prepared, the researcher was able to collect the needed information for the study on finding out the challenges of the e-ticketing system on bus transportation service in Tanzania. A total of 10 interviewees comprised of passengers, ticketing staff and bus company managers were interviewed to provide the needed data. Furthermore, content analysis was employed to analyze such qualitative data. Participants said clearly that there exist challenges to e-ticketing system as far as bus transportation service in Tanzania is concerned. The next part describes the identified challenges.

➢ *Technical Issues*

Among the identified challenges, technical issues stood out to be one of them. As per the interviewees, there exists a challenge concerning the ticket machines and some respondents uncovered the issue of the use of the smartphone. According to respondents, the use of e-ticketing system requires one to have a device to support such services such as ticket machines and smartphones which pose a challenge to users who don't have a smartphone and need such a service. Furthermore, concerning the use of ticket machines, respondents declared such machines are few to accommodate every bus agent hence forcing some agents to do the task while others cannot issue such electronic tickets which wasn't the case with the manual ticketing system which required bus agents to simply have a ticket book.

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Ensuring the e-ticketing system functions reliably requires robust technical infrastructure. This includes hardware such as ticket machines or mobile devices for ticket validation, as well as software that manages ticket sales, validates tickets, and integrates with backend systems. Maintaining and updating this infrastructure can be a challenge, especially in areas with limited technological resources. The following is the snapshot of the interviewee's response:

Respondent 1:

"……..we are told that we can make bookings and buy tickets through our mobile phones; for example, I don't have a smartphone and I wish to access e-ticketing service to save time from going to the station to buy a ticket because it costs money, but I can't do that because I don't have a smartphone to help me do so. That becomes a challenge for us." Interviewee, 05 June, 2024.

Respondent 2:

"….the main challenge with this electronic ticketing system is that you need to have a smartphone. Now, those of us with low incomes cannot afford these smartphones, so we see no way that this system can help us. Moreover, it makes us feel inferior because others can buy tickets this way even from their homes; meanwhile, we have to come to the bus office to get a service that is similar to the old ticketing system." Interviewee, 05 June, 2024.

Respondent 3:

"…this electronic ticketing system presents significant challenges, especially for us ticketing staff. The main challenge is that, unlike using a ticket book to issue tickets, we use ticketing machines. Now, with these ticketing machines, you find that there is usually only one machine for the entire company, maybe for one region. This forces us to share that machine to issue tickets, whereas we could save time by using ticket books because it only takes one person to fill out a ticket for a customer on paper, and you're done. Now, relying on machines means we have to start issuing tickets with books, and then passengers entering the bus have to start converting their tickets to electronic ones. This leads to a loss of time and resources, which is a significant challenge for us ticketing staff." Interviewee, 05 June, 2024.

Therefore, it was uncovered that technical issues in the form of hardware necessary to support the issue of electronic tickets such as a device namely a ticketing machine and/or smartphone tend to pose a challenge to users as described by interviewees.

- *Connectivity Problem*

Findings disclosed the presence of connectivity problems brought about by issues related to the availability, reliability, and speed of internet or network connections necessary to facilitate an electronic ticketing system. Various interviewees were interviewed to offer their points of view regarding the concern. A snapshot of their response is presented in the part that follows.

Respondent 1:

"... How can you say the system is working well if those involved cannot use it as intended? Okay, I have a smartphone but no internet bundle; can I still access this electronic ticketing service? The cost of living is high, not to mention the price of internet bundles. How can I benefit from this new system? Above all, it seems like I'm just being burdened with additional costs. I want the convenience of purchasing tickets, but isn't there any other way for a low-income citizen like me to access this service without such expenses?" Interviewee, 05 June, 2024.

Respondent 2:

"……it's true that we've been helped by this online ticketing system. However, the main challenge I face is the issue of internet speed. You can wait for hours and hours just for a page to load. Sometimes it's better to go to the office and buy the ticket there. It's true this system aimed to assist us, but there are some things not right. I can't blame the bus companies because they follow the directives of the relevant authorities. But these authorities should look into issues like this because it becomes a challenge for us users." Interviewee, 05 June, 2024.

Respondent 3:

"……we receive many complaints from our customers about facing challenges in accessing the electronic ticketing service due to network issues. This challenge makes us appear as if our services are poor, which is not always accurate." Interviewee, 05 June, 2024.

Respondent 4:

"….during peak hours, when many passengers are trying to purchase tickets simultaneously, our system often crashes due to network overload. This disrupts our operations significantly." Interviewee, 05 June, 2024

Respondent 5:

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"....there are times when I can't use the electronic ticketing system at all because there's no internet signal where I live. This forces me to travel to town to buy a physical ticket." Interviewee, 05 June, 2024.

Respondent 6:

"... We sometimes face operational challenges brought about by connectivity problems which tend to disrupt our daily operations; forcing us to use manual ticketing methods as a backup which pose challenges to respective authorities as the use of such a system is prohibited." Interviewee, 05 June, 2024.

Therefore, with an observed response, it can be seen that connectivity problems as concerns availability, reliability, and speed of internet connections necessary to facilitate the electronic ticketing system posed a challenge to the e-ticketing system on bus transportation service in Tanzania.

- *Resistance to Change*

As concerns challenges associated with e-ticketing system on bus transportation service in Tanzania, respondents declared resistance to change was among such challenges. Because it is a new system when it comes to bus transportation in Tanzania, with a specific context of intercity buses, e-ticketing system faced a challenge of stakeholders comprised of passengers, ticketing staff as well as bus companies' managers being reluctant to adopt a new system. This has been captured in various interviewees' responses as described in the next part.

Respondent 1:

"....the electronic ticketing system is good and has many benefits, as compared to the manual ticketing method; that cannot be denied. However, in practical terms, it's not working smoothly. All these digital manoeuvres are short-lived and temporary." Interviewee, 05 June, 2024

Respondent 2:

"... This system of accessing tickets electronically is a new norm for us. It is a new thing so far. Making everyone adopt voluntarily is not a simple activity; with more force being intentionally inserted into the use of the system, people will become used to it and regard it to be just a usual way of ticketing." Interviewee, 05 June, 2024.

Respondent 3:

"...in Tanzania, still there is a long way to go as concerns electronic ticketing system. So far trace the countries which have adopted the system, they are way too far compared to us. This system is impractical in Tanzania; making things worse the respective authorities are forcing the system to operate irrespective of the concerns identified." Interviewee, 05 June, 2024.

Therefore, as per the responses of the interviewees it was observed that resistance to change is among the challenges facing the use of e-ticketing system in Tanzania.

- *Security Concerns*

According to responses from interviewees, it was regarded as a challenge as far as e-ticketing is concerned with the issue of security. According to interviewees, an electronic ticketing system requires one to enter sensitive personal information such as names and financial information. This poses a challenge to users comes the safety of their data, making it rigid for users to adopt the system especially passengers forcing them to physically access e-tickets which consumes time and money; resulting in the ineffectiveness of the use of e-ticketing system as declared by an interviewee that:

"……All right, you're saying there are benefits to purchasing tickets electronically. Okay, we're not disputing that. What about the security of financial information? Remember, I'll have to enter my details online to make payments. Who ensures the security of my financial information? Who will compensate me if my information gets compromised?" Interviewee, 05 June, 2024.

Regarding the same concern, another participant added:

".....to purchase tickets electronically, you are required to enter your information. Now, where do I get assurance that the information, I enter will be secure?" Interviewee, 05 June, 2024

".....I've come across cases where people's information was hacked by entering it online. Now, I'm a bit hesitant about using an electronic ticketing system; is the information we enter there safe? If something happens to me, who will help me out? I inquire respective authorities to re-check about the issue." Interviewee, 05 June, 2024.

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Therefore, it was observed that security concerns were among the challenges that face the use of e-ticketing system in bus transportation services in Tanzania.

E. Specific Objective Three: To Examine Strategies for Improving E-Ticketing System in Bus Transportation Service in Tanzania

With the interview guide and questionnaire distributed, the researcher was able to collect the needed information for the study on finding out the strategies for improving e-ticketing system on bus transportation service in Tanzania. A total of 50 questionnaires were distributed, and data about proposed strategies to improve e-ticketing system on bus transportation in Tanzania were collected. Furthermore, 10 people were interviewed to provide elaboration regarding the issue under investigation. Among the 10 interviewees, there were passengers, ticketing staff and Bus Company managers who were interviewed to provide the needed data.

Furthermore, content analysis was employed to analyze such qualitative data. Participants proposed some strategies if well implemented will promote improving e-ticketing system in bus transportation service in Tanzania. Findings indicated, that out of 50 questionnaires that were returned, proposed strategies that were depicted were: awareness and educational campaigns, upgrading technology and infrastructure, and having an offline option, together with feedback and support. Table 15 summarizes the proposed strategies that were identified.

Table 15: Proposed Strategies for Improving E-ticketing System on Bus Transportation Service in Tanzania

Proposed Strategy	**Rank**
Having an offline option	1
Awareness and educational campaigns	2
Upgrading technology and infrastructure	3
Feedback and Support	4

Source: Survey Data, 2024

From Table 15, it was found out that a sizable portion of respondents recommended adding an offline option for improving Tanzania's bus transportation e-ticketing system. In order to better educate users about the e-ticketing system and its advantages, respondents also underlined the significance of launching awareness and educational campaigns. In order to guarantee the effectiveness and dependability of the system, it was also determined that modernizing infrastructure and technology was essential. Finally, a crucial tactic to resolve user complaints and enhance the overall experience was emphasized: creating strong systems for support and feedback.

Moreover, Regarding the interview that was carried out, the strategies that were suggested will be further explained in the section that follows. This segment of the conversation will delineate the diverse tactical suggestions that stem from the understandings acquired throughout the interview. The aforementioned strategies aim to tackle the concerns raised by the interviewees and capitalize on the opportunities they brought to light. The comprehensive explanation will encompass an evaluation of every tactic's possible influence, practicability, and conformity with the study's overarching goals. The objective is to provide a concise and feasible implementation roadmap by thoroughly analyzing these strategies, taking into account the insightful feedback gathered from the interview process.

- *Awareness and Educational Campaigns*

Among the interviewed respondents, results indicated awareness and education campaigns if well done will help in improving the efficiency and effectiveness of e-ticketing system in bus transportation service. With awareness and educational campaigns provided to different stakeholders with play the role of educating stakeholders about the benefits of the system, making them effectively use the system. It was described that various ways can be used to create awareness but also conducting educational campaigns. Such identified ways were the use of mass media like television, radio, and social media platforms like Instagram, Facebook and Twitter among others. Here under is a snapshot of the interviewees' responses:

Respondent 1:

> *"Implementing awareness and educational campaigns is pivotal for enhancing the adoption of e-ticketing among passengers. By educating our customers about the benefits of e-ticketing—such as convenience, time savings, and reduced queuing, we can promote and encourage widespread acceptance."* Interviewee, 05 June, 2024.

Respondent 2:

> *"Awareness campaigns are essential for bridging the digital divide and ensuring equitable access to e-ticketing solutions."* Interviewee, 05 June, 2024.

Respondent 3:

> *"LATRA can use media channels to disseminate information through radio, television, and social media can reach a broader audience. Feature stories, interviews with stakeholders, and success stories of e-ticketing implementation to build credibility and generate interest among potential users."* Interviewee, 05 June, 2024.

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Therefore, as per the observed response, awareness and educational campaigns were regarded as one among the ways to improve the e-ticketing system on bus transportation service in Tanzania as the strategy will allow users and other stakeholders to understand the benefits of using such as system as far as improving the transportation sector in Tanzania is concerned.

- *Upgrading Technology and Infrastructure*

Results indicated that, by upgrading technology and infrastructure, operations of the system will be efficient hence allowing enjoying the benefits as it should. Furthermore, results showed that with this strategy different stakeholders will be reached even those suffering from a digital divide. The next part describes the interviewees' responses.
Respondent 1:

> *"...upgrading technology and infrastructure to enhance convenience and reliability in e-ticketing system is important as will ensure consistent connectivity, reducing the frustration of operational delays or failures."* Interviewee, 05 June, 2024.

Respondent 2:

> *"...There is a need to improve network coverage and reliable internet access, especially in rural areas as well to benefit from an e-ticketing system; this would enable me to purchase tickets online without relying on physical terminals."* Interviewee, 05 June, 2024.

Respondent 3:

> *"Upgrading to user-friendly mobile apps that support offline ticketing capabilities would also enhance accessibility and convenience. These upgrades would bridge the digital divide and ensure that all passengers are benefiting from modern e-ticketing solutions."* Interviewee, 05 June, 2024.

Respondent 4:

> *"Upgrading technology and infrastructure for e-ticketing systems is essential for improving operational efficiency and customer service at our ticketing counters. Implementing faster and more reliable ticketing machines with intuitive interfaces reduces transaction times and minimizes errors. Upgrading backend systems with integrated Customer Relationship Management (CRM) tools enhances our ability to provide personalized assistance and manage passenger inquiries effectively."* Interviewee, 05 June, 2024.

Respondent 5:

> *"Telecommunication companies should expand network coverage and enhance data services to support seamless transactions such as Upgrading to 4G/5G networks improves bandwidth and reduces latency, ensuring fast and reliable connectivity for passengers using mobile apps or online platforms."* Interviewee, 05 June, 2024.

Respondent 6:

> *"Telecommunication companies can implement network optimization techniques and invest in scalable infrastructure to support the growing demand for digital ticketing solutions. These upgrades enable us to deliver robust connectivity solutions that enhance passenger experience and support the adoption of e-ticketing across the transportation sector."* Interviewee, 05 June, 2024.

Upgrading technology and infrastructure was therefore proposed as a strategy for improving e-ticketing system in bus transportation service in Tanzania as it will offer a solution by ensuring fast and reliable connectivity for passengers using mobile apps or online platforms to support the e-ticketing system among others.

- *Having an Offline Option*

It was found out that, for the e-ticketing system to flourish well in Tanzania, there is a need to have an offline option like a menu that passengers and other stakeholders can use to deal with it. Respondents declared that the offline option that is needed is the one that offers the same benefits as the online one, but such benefits to be tapped offline as declared by one respondent:

> *"Living in a rural area, reliable internet connectivity is a primary concern when using e-ticketing services. Strategies to improve network coverage and provide offline ticketing options would greatly benefit passengers like me. Ensuring that the system is inclusive and accessible to rural communities is a key for widespread adoption."* Interviewee, 05 June, 2024.

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➢ *Feedback and Support*

With feedback and support, it was found that it will allow smooth operation of the e-ticketing system as it provides a platform for timely assistance whenever the need arises. Various interviewees provided their opinions concerning the issue. The interviewee's opinions are described in the next part.

Respondent 1:

> *"Clear and accessible information about how to use the system and troubleshoot common issues is essential for the e-ticketing system to operate efficiently. Feedback channels where I can report connectivity problems and receive timely assistance would enhance my confidence in using the electronic ticketing system."* Interviewee, 05 June, 2024.

Respondent 2:

> *"Respective authorities can come up with user feedback channels such as dedicated helplines, online forms, and in-app feedback options to allow passengers to report issues, provide suggestions, and express concerns about the e-ticketing system. This direct communication will help in identifying usability issues, technical malfunctions, and areas for improvement."* Interviewee, 05 June, 2024.

Respondent 3:

> *"…respective authorities should actively utilize feedback received from passengers and other stakeholders as concerns the e-ticketing system as people tend to provide their concerns, but they aren't worked on."* Interviewee, 05 June, 2024

F. Discussion of Findings

To achieve the general objective of the study which was to assess the impact of e-ticketing system on bus transportation service in Tanzania, the researcher had a total of three specific objectives namely; to examine the role, to evaluate challenges as well to examine strategies for improving bus transportation service in Tanzania. Discussion of findings is based on the specific objectives of this study as presented in the next part.

➢ *To Examine the Role of E-Ticketing System on Bus Transportation Service in Tanzania*

Results from analysis about the role of e-ticketing systems on bus transportation service in Tanzania indicated enhanced revenue management, convenience for passengers, sustainability and environmental benefits together with fraud prevention and security were roles played by e-ticketing system concerning bus transportation service in Tanzania at a significant level of .02, .01, .02 and.02 respectively. So, to say, the odds of respondents (users) regarding good bus transportation service concerning e-ticketing system, roles associated with such a system included enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security at 95% confidence interval.

The findings of this study are in alignment with the study by Soegoto et al. (2020) who investigated the impact of e-ticketing application on bus transportation in Bandung to determine the impact of the e-ticketing application system on bus transportation for the people of Bandung. The research was aided by the use of a qualitative method. The findings indicated that the e-ticketing system's implementation had some positive effects, one of which is raising public interest in using public transport to lessen traffic congestion, offering comfort and convenience in ticket booking for both users and transportation service providers as the system allows users to see departure schedule and ticket availability hence saving time, unlike the manual system.

The study by Adducul and Adducul (2020) regarding mobile bus ticketing system: development and adoption found that when it comes to bus ticketing systems, integrating state-of-the-art mobile technology with advanced application infrastructure has the potential to significantly enhance service quality, reduce expenses and turnaround times, and protect data stored in each company's system. These findings align with this study's findings as traced on the roles that e-ticketing system play as far as bus transportation service is concerned.

The study by Scărișoreanu (2020) regarding integrated e-ticketing: Solution to make public transport more attractive than personal cars besides describing challenges associated with the system found a lot of benefits of the system for both passengers and transport companies where it was declared that "e-ticketing is definitively one of the important future directions of transport ticketing. Online booking and purchasing a travel ticket offers a lot of benefits, not only for passengers but also for passenger transport companies and responds to the current needs of society, one of them being the need to travel." which is consistent with the findings of this study.

The study by Nzakizwanimana (2021) concerning the effectiveness of the electronic ticketing system in improving fare revenue collection of public transport companies in Kigali City, a case of Kigali Bus Services Limited found that there is a significant relationship between e-ticketing system and fare revenue collection improvement. As per such findings, it can be seen that e-ticketing system has a role to play as far as fare revenue collection improvement is concerned.

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➢ *To Determine the Challenges of E-Ticketing System on Bus Transportation Service in Tanzania*

To arrive at the objectives of the study, the researcher collected data with the use of closed-ended questions as well as interviews. With closed-ended questions, the researcher was able to capture information as pertains to the challenges of e-ticketing system on bus transportation services in Tanzania. Through questionnaires and interviews, the researcher was able to capture challenges associated with the use of e-ticketing system on bus transportation services in Tanzania. Findings indicated challenges such as resistance to change, technical issues, connectivity problems as well as security concerns were major challenges associated with the use of e-ticketing systems on bus transportation services in Tanzania.

The findings of the study correspond with the report of Kenyan Wall Street (2023) with the title E-ticketing Eases Operations in the Transport Industry. It was found out that e-ticketing system has resulted in long queues, as per a survey by GeoPoll, it was observed that 32% of respondents are spending more than one to two hours in a line. Additionally, other challenges observed were: limited payment methods, congested buses, inconsistent schedules, and spontaneous booking cancellations.

➢ *To Examine Strategies for Improving E-Ticketing System in Bus Transportation Service in Tanzania*

Regarding the strategies for improving e-ticketing system in bus transportation service in Tanzania, various strategies were proposed. Strategies such as having an offline option, awareness and educational campaigns, upgrading technology and infrastructure and feedback and support respectively were proposed to facilitate improving the system.

G. Summary

The study was carried out to assess the impact of e-ticketing system on bus transportation service in Tanzania. The goal of this study was to determine how e-ticketing has affected bus transportation in terms of operational effectiveness, customer satisfaction, and general service quality. The following sections present the study summary in accordance with the established objectives in order to give a thorough overview. This summary provides a thorough explanation of the impact of the e-ticketing system on the bus transportation industry by summarizing the main conclusions, analysis, and insights from the study. It ensures a clear and structured presentation of the research results and their implications for stakeholders by highlighting the outcomes in relation to each particular study objective as follows:

➢ *To Examine the Role of E-Ticketing System on Bus Transportation Service in Tanzania*

Results indicated enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security were roles played by e-ticketing system concerning bus transportation service in Tanzania at a significance level of .02, .01, .02 and.02 respectively. So to say, the odds of respondents (users) regarding good bus transportation service concerning e-ticketing system, roles associated with such a system included enhanced revenue management, convenience for passengers, sustainability and environmental benefits and fraud prevention and security at 95% confidence interval. Therefore, e-ticketing system had a significant role on bus transportation service in Tanzania.

➢ *To Determine the Challenges of E-Ticketing System on Bus Transportation Service in Tanzania*

The study findings identified a number of significant issues with the e-ticketing system in bus transportation services in Tanzania. The majority of respondents stated technical issues as their top concern, making them the most pressing of these challenges. These technical issues frequently involve software bugs, system malfunctions, and other operational issues that prevent the e-ticketing system from operating as intended. After the technical difficulties, connectivity issues became apparent as a major obstacle. Additionally, resistance to change was noted as a challenge as some users and stakeholders were reluctant to embrace the new e-ticketing system because they were more accustomed to using the traditional ways. Last but not least, security issues were emphasized as a crucial problem. These results highlight the necessity of taking a comprehensive approach to resolving these issues in order to increase the e-ticketing system's acceptability and efficacy in Tanzania's bus transportation services.

➢ *To Examine Strategies for Improving E-Ticketing System in Bus Transportation Service in Tanzania*

The study unfolded various strategies that can be used to improve e-ticketing system in bus transportation service in Tanzania. It was found out that having an offline option, awareness and educational campaigns, upgrading technology and infrastructure and feedback and support respectively were the proposed strategies as far as improving e-ticketing system in bus transportation service in Tanzania is concerned.

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CHAPTER FIVE
CONCLUSSION AND RECOMMENDATIONS

This part presents the conclusion and recommendations as per the findings of the study. It also presents areas for further research.

A. Conclusions of the Study

The study concluded that e-ticketing system has an impact on bus transportation service in Tanzania as seen by the role of e-ticketing system on bus transportation in Tanzania where various roles were pinpointed such as enhanced revenue management, convenience for passengers, sustainability and environmental benefits not to mention fraud prevention and security. Furthermore, although challenges of e-ticketing system on bus transportation service in Tanzania such as resistance to change, technical issues, connectivity problems as well as security concerns were observed, various strategies for improving e-ticketing system on bus transportation in Tanzania were proposed. Such proposed strategies included having an offline option, awareness and educational campaigns, upgrading technology and infrastructure as well as feedback and support.

B. Recommendations Of The Study

It has been found that e-ticketing system has an impact on bus transportation service in Tanzania as seen by the role of e-ticketing system on bus transportation service, the challenges of e-ticketing system on bus transportation service as well as exploration of various strategies for improving e-ticketing system on bus transportation in Tanzania. With such an observed significance, this study recommends the following:

- Respective authorities to develop and implement campaigns to raise awareness among passengers and other stakeholders about the benefits of e-ticketing systems, promoting adoption and usage.
- Establish feedback mechanisms for passengers and stakeholders to provide input on their experiences with e-ticketing systems, enabling continuous improvement and responsiveness to user needs.
- Implement a strong customer support system to address any issues or concerns that passengers may have with the e-ticketing system, enhancing user satisfaction and confidence.
- Explore opportunities for integration with mobile payment platforms and digital wallets to further enhance the convenience and accessibility of the e-ticketing system.
- Invest in robust and reliable technological infrastructures, such as stable internet connectivity and reliable power supply, to support the seamless operation of the e-ticketing system.
- Ensure the e-ticketing system is user-friendly and accessible to all passengers, including those without smartphones or digital literacy, to promote widespread adoption.

C. Areas for Further Research

The study focused on finding out the impact of e-ticketing system on bus transportation service in Tanzania with a specific focus on finding out the role of e-ticketing system on bus transportation service in Tanzania, the challenges of e-ticketing system on bus transportation service in Tanzania as well as strategies for improving e-ticketing system in bus transportation service in Tanzania. Other studies may focus on the impact of e-ticketing systems on other forms of transportation apart from buses as well.

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APPENDICES

Appendix 1: Research Budget

To accomplish this work, the researcher will need a total of Tshs. 900,000/= (Nine hundred thousand Only). Such funds will be covered by the researcher. The breakdown of such an amount will be as follows:

S/N	TASK	DESCRIPTION	AMOUNT
1.	Concept Note and Proposal Preparation	Airtime and Internet bundle, Transportation, Stationery, Meal	200,000/=
2.	Data collection	Stationery, Transportation, Meal, Airtime, miscellaneous	200,000/=
3.	Data analysis	Internet bundle and Airtime, miscellaneous activities	150,000/=
4.	Final report submission	Printing	250,000/=
4.	Emergency	NIL	100,000/=
		TOTAL	900,000/=

Source: Researcher (2024)

Appendix 2: Schedule of Activities

S/N	ACTIVITY	Feb, 2024	March, 2024	April, 2024	May, 2024	June, 2024	July, 2024	August, 2024
1.	Concept note preparation and presentation							
2.	Proposal preparation and presentation							
3.	Data collection							
4.	Data analysis and report writing							
5.	Final report submission							

Source: Researcher (2024)

Appendix 3: Questionnaire

Dear respondent, my name is Athuman M. Athuman with a registration number MTSM/22/005 from Dar es Salaam Maritime Institute (DMI). I'm conducting a study on **"The impact of e-ticketing system on bus transportation service in Tanzania"** being part of the requirement for the fulfilment of the award of a Master in Transport and Supply Chain Management. The questionnaire attached will collect data as per the purpose of the study and not otherwise. Thank you for your time and consideration. Please note: Participation in this study is completely voluntary.

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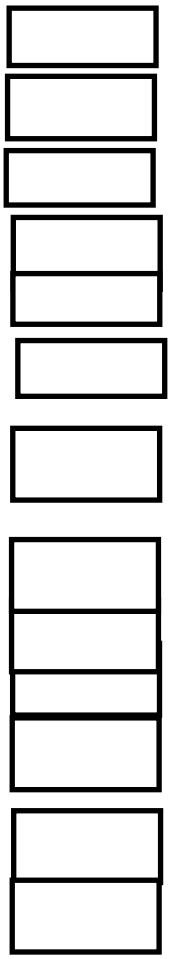
INSTRUCTION

➢ ***PART I: DEMOGRAPHIC INFORMATION OF RESPONDENTS***

- **Instruction:** Please put a tick (√) to the option that best describes you in the following statements:

1. Age of respondent
   - Below 35 years
   - Between 36- 45 years
   - Above 45 years
2. Stakeholder category
   - Bus Owner
   - Bus Company Manager
   - Ticketing Staff
   - Passenger
3. Frequency of Bus Travel:
   - Weekly
   - Monthly
   - Occasionally
   - Rarely
4. Previous Experience with E-ticketing
   - Yes
   - No



➢ ***PART II: SPECIFIC OBJECTIVES OF THE STUDY***

A: Role of E-ticketing System on Bus Transportation Service in Tanzania

- **Instruction:** Please use the point scale below to indicate your level of agreement by ticking each one of the given statements: (Please use the scale below: 1=strongly disagree; 2=disagree; 3=not sure; 4=agree; and 5=strongly agree)

STATEMENT	1	2	3	4	5
A: ENHANCED REVENUE MANAGEMENT (ERM)					
1. The e-ticketing system has improved the accuracy of revenue collection.					
2. E-ticketing has helped in reducing revenue leakages in bus transportation.					
3. E-ticketing has made it easier to track ticket sales and revenue.					
4. The system has led to better financial reporting and transparency.					
5. The e-ticketing system has increased overall revenue for bus companies.					
B: CONVENIENCE FOR PASSENGERS (CFP)					
1. Passengers find it easy to purchase tickets using the e-ticketing system.					
2. E-ticketing has reduced waiting times at bus stations for passengers.					
3. The system provides passengers with multiple payment options, enhancing convenience.					
4. Passengers find the e-ticketing system user-friendly and intuitive.					
5. Passengers appreciate the ability to check schedules and book tickets remotely.					
C: SUSTAINABILITY AND ENVIRONMENTAL BENEFITS (SEB)					

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1. E-ticketing has contributed to reducing paper waste in bus transportation. 2. The system has encouraged bus companies to adopt greener practices. 3. E-ticketing has helped in reducing carbon emissions related to ticket printing. 4. E-ticketing has led to better management of resources and materials. 5. The system has promoted awareness about environmental conservation among bus users.					
D: FRAUD PREVENTION AND SECURITY (FPS) 1. E-ticketing has improved security measures for passengers and staff. 2. The system has effectively reduced ticket fraud and unauthorized travel. 3. Bus companies have seen a decrease in incidents of ticket forgery since implementing e-ticketing. 4. Passengers feel more secure using e-tickets compared to paper tickets. 5. E-ticketing has improved the overall safety and security of bus journeys.					

B: Challenges of e-ticketing system on bus transportation in Tanzania

1. What are the main challenges you face when using e-ticketing for bus transportation? (Select all that apply)
   A. Resistance to change
   B. Technical issues (e.g., app crashes, slow loading)
   C. Connectivity problems (e.g., no internet, poor network coverage)
   D. Difficulty in understanding how to use the e-ticketing system
   E. Security concerns (e.g., data privacy, payment security)
   F. Other (please specify)

   _____
   _____

C: Strategies for improving e-ticketing system on bus transportation service in Tanzania

2. What are the main strategies for improving e-ticketing system on bus transportation service in Tanzania? (Select all that apply)
   A. Awareness and education campaigns
   B. Upgrading technology and infrastructure
   C. Feedback and support
   D. Other (please specify)

   _____
   _____

D: Bus transportation service in Tanzania

3. Are you experiencing a good bus transportation service in Tanzania?
   A. Yes
   B. No

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Appendix 4: Interview Guide

Introduction

Dear respondent, my name is Athuman M. Athuman with registration number MTSM/22/005. I am conducting research titled: ***The Impact of E-ticketing System on Bus Transportation Service in Tanzania;*** being a requirement for a Master's Degree in Transport and Supply Chain Management from Dar es Salaam Maritime Institute. Participation in this study is completely voluntary, and the collected data are for this study and not otherwise. This interview will be structured in nature, hence kindly ask you to be as specific as you can in providing the answers.

NOTE: This interview will take a maximum of 20 minutes only.

- What are the challenges associated with the use of e-ticketing systems on bus transportation services in Tanzania?
- What strategies can you propose as far as improving e-ticketing system on bus transportation service in Tanzania is concerned?