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MAKERERE UNIVERSITY BUSINESS SCHOOL

DEVELOPING AN E-TICKETING SYSTEM FOR VIPERS SC IN UGANDA

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A Project Proposal Submitted to the Faculty of Computing & Informatics of Makerere University Business School in Partial Fulfillment for the Award of the Degree of Bachelor of Business Computing of Makerere University

September 2025

DECLARATION

We the undersigned declare that to the best of our knowledge, this proposal is our original piece of work and has never been published and/or submitted for any award in any other university or higher institution of learning.

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APPROVAL

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SECTION ONE

1. INTRODUCTION

1.1 Project Background

E-Ticketing is the process of selling tickets to events to the end users through the web or app. It offers a wide range of solutions to problems faced by paper tickets like fraud, operational inefficiency and long queues at physical buying points. E-ticketing has been used globally and the sports industry has engaged it more for instance during FIFA and UEFA games, tickets are easily purchased online and physical tickets are barely used. This process of ticket purchasing has been introduced to Africa and our sports for example CAF games. This takes us back to our national football league which is still engaging the physical format of purchasing tickets and our system is looking at simplifying the process and time taken while purchasing the tickets.

This system will reduce complexity in terms of user interface and user experience through controlling the traffic while purchasing and including more APIs for mobile payments for example MTN Momo payment, AIRTEL mobile payments, PAYPAL, and VISA. This system will also look forward to eliminating fraud in form of fake tickets as it will have QR codes that will check for authentication at the stadium gates during entry. This system will therefore simplify the mode of purchasing, check ticket authentication and monitor the ticket sales for each game scheduled. E-ticketing has not been fully adopted at local team level but has been seen at National level (tkt.fufa.co.ug) though it is incompetent because the system is difficult to use and our system will look to simplify the whole process of purchasing.

In 2016, E-ticketing for sporting events was unheard of in Uganda, particularly when it came to football. Ticketing handled at club level as well as national level was marred by allegations of ticket scalping and fraud. On top of that, the system was tedious and inefficient especially when it came to popular club derbies and international fixtures. With the growing popularity of football and the commercial potential of the Star Times Uganda Premier League, leading football entities like Vipers SC face increasing demands to improve matchday operations and fan satisfaction. E-ticketing can therefore address matchday challenges like long queues, ticket forgery, inefficient cash handling there by improving service delivery and operational effectiveness. This system does not only align with global trends but also enhances the league's professionalism and commercial appeal hence increasing revenue and fostering sustainable club growth.

Vipers SC, one of Uganda's most successful and popular football clubs competing at the highest level of domestic football and also representing the country in continental competitions like CAF has been facing significant operational challenges with its manual paper-based ticketing system. This manual system has proven inefficient, leading to prolonged fan queues at the different stadia gates, fraud, ticket duplication as well as difficulties in tracking ticket sales and attendance leading to potential revenue leakage. Relatedly, this has been limiting the club's engagement with fans directly, gathering data for targeted marketing and limiting the offering of modern conveniences like advance online payments. The above inefficiencies not only compromise the fan experience but also affect the club's revenue generation and operational control.

In order to address the above challenges, this study sought to design and develop a customized E-ticketing system for Vipers SC. The project aims at creating a robust digital solution to streamline ticket management, enhance security, improve the overall fan experience, monitor the club's revenue generation and set a bench mark for digital adoption in Ugandan football.

1.2 Statement of the Problem

The global sports industry has rapidly adopted digital ticketing systems with major leagues like the Germany Bundesliga, English Premier League attaining over 90% mobile ticket adoption which has consequently reduced operational costs, enhanced fan engagement, loyalty and security as well as creating more revenue streams through digital validation (Deloitte 2023). Currently however, Vipers SC usage of physical tickets causes quite a number of managerial issues notably, protracted fan queues leading to gate congestion, ticket forgery, difficulties in accurate sales-to-attendance reconciliation as well as revenue leakage. Vipers SC risks compromising its brand reputation, causing consistent fan dissatisfaction, limiting the club's operational efficiency and revenue potential if the club continues to operate in a manual paper-based ticketing system. A customized E-ticketing system for Vipers SC has potential to automate tickets sales, validation and access control, improve transparency, ensure revenue integrity and provide a scalable platform for future engagement initiatives and operational innovation.

1.3 Project Goal and Objectives

1.3.1 Project Goal

This project seeks to design and develop and E-ticketing system for Vipers SC to enhance operational efficiency as well as fan experience as they use the ticketing system

1.3.2 Project Objectives

- a) To assess the current state of E-ticketing at Vipers SC.
- b) To clearly identify main drivers and barriers to the E-ticketing implementation.
- c) To examine E-ticketing impact on service efficiency and customer satisfaction.
- d) To develop a practical framework for effective E-ticketing deployment in the StarTimes Uganda Premier League.

1.3.3 Project Scope Summary

The scope of this project involves designing, developing, and deploying a digital E-ticketing system that enables users to purchase and verify tickets for football matches at Vipers SC in Uganda. The system will support mobile and web platforms, integrating QR code verification and mobile money payments.

Key Activities and Deliveries:

- a) System Design: Research and define system requirements, design wireframes and establish the project architecture.
- b) Developing Phase: Implement user authentication, ticket purchasing, mobile money payment integration and QR code verification.
- c) Testing and Deployment: Conduct system testing, security testing, security checks and final deployment to ensure a seamless user experience.
- d) User Training and Documentation: Provide stakeholders with user guides and training for efficient adoption of the system.

1.4 Anticipated Significance of Project

The significance of the system is going to solve the problem of manual inefficient ticketing. The system will enhance efficiency and speed as it automates the process of issuing, processing and verifying tickets there by reducing manual work and allowing faster service delivery. It will also improve record keeping and data management since transactions will be automatically recorded in digital form hence making it easier to track sales, analyze usage and generate reports.

The study will offer valuable skills in the development of the front and back end of the system from its analysis to its deployment. It will enhance practical skills in project management, problem solving and user centered design. The project will foster teamwork, communication and decision-making abilities essential for professional success.

1.5 Project Assumptions

Resource Availability: It is assumed that the necessary resources, such as software development tools, hosting services, internet access, and testing devices will be available throughout the project.

Assumption 1: “The team assumes that the required tools, cloud services and development platforms for the E-ticketing system will be accessible and functional throughout the project”

Stakeholder Participation: Stakeholders, including match fixture organizers, stadium managers and potential users will provide feedback and approvals at the key stages of the project.

Assumption 2: “All key stakeholders will provide timely input and approval at critical stages of the project. Supervisors will be available for consultation. Users and event organizers will participate in system testing and feedback sessions.”

Project Scope Stability: The project’s scope will remain stable and will not undergo major changes after approval.

Assumption 3: “The project’s scope and objectives will remain consistent and major changes will not be introduced after the initial approval.”

Technology, software availability and Compatibility. The selected technologies, including the web and mobile platforms, payment gateways and QR Code scanners, will function as expected and integrate smoothly.

Assumption 4: “The technology stack (e.g., programming languages frameworks, mobile and web platforms, payment gateways) will function as expected and be compatible with the project objectives.”

Other Important Assumptions: Other critical assumptions for the project include;

Users will have access to smartphones and the internet to purchase and verify tickets.

Payment gateways such as MTN Mobile Money and Airtel Money will support transactions without major disruptions.

Security measures such as QR code verification, will be effective in preventing fraud.

The system will handle high traffic during peak ticket sales.

These assumptions ensure that the project remains realistic and feasible within the given time frame and resources.

SECTION TWO

REVIEW OF LITERATURE

SECTION INTRODUCTION

2.1 INTRODUCTION

This chapter presents a preview of the findings and reports that are relating to E-ticketing system for Vipers SC. It displays how electronic ticketing has evolved and transformed in the world, the technology behind it and how it addresses operational inefficiencies, enhances fan experience and drives revenue growth for the club and the sports sector in Uganda. This chapter combines ideologies and takes from researchers focusing on the current state of E-ticketing in Ugandan football, drivers and barriers to its implementation, it's impact on service efficiency, customer satisfaction and frameworks for effective deployment in leagues like the Star Times Uganda Premier League.

2.2 The Global Evolution of E-ticketing in Sports

Ugandan football, including the Star Times Uganda Premier League has seen gradual digitization but E-ticketing remains underdeveloped compared to global standards. The Star Times Uganda Premier League, restructured in 2025 with a focus on data sharing and financial transparency, mandates clubs to report sporting and business metrics, yet explicit E-ticketing requirements are absent as per FUFA (2025). For Vipers SC the reigning champions 2024/2025 season, ticketing relies heavily on physical ticket sales at St. Mary's Stadium, with limited online integration as highlighted by Kawowo sports (2024). This mirrors broader African trends where clubs like Kenya's AFC Leopards introduced E-ticketing in 2023 to curb fraud and queues, reducing stampede risks at stadia gates as reported by Citizen Digital (2023). In Uganda, the 2025 CHAN tournament piloted online e-ticketing via CAF's platform, delivering digital tickets via SMS or Email for scanning but this was specifically for an event and not for domestic leagues, CAF Online (2024)

Regionally, CAF has accelerated digital adoption launching the YALLA app in 2024 for AFCON Morocco enabling e-visas and mobile tickets to enhance accessibility as highlighted by CAF (2024). However, Ugandan clubs face infrastructural lags; according to a study made in 2020 on Ghana's bus sector that is aligned to informal football ticketing found that only 30% of users had access to reliable digital platforms due to low smartphone penetration as noted by Dzisi et al;(2020). For Vipers SC, this state underscores the need for assessment, as manual systems contribute to revenue leakage estimated at 20-30% from counterfeits in African stadia, Oluwole (2022)

2.3 Drivers and Barriers to E-Ticketing implementation

This study identifies key drivers for e-ticketing in African football clubs, including revenue optimization, fan convenience and security enhancements, while barriers center on infrastructure deficits and user resistance

Drivers: Convenience and cost savings are primary motivators. A 2023 Kenyan case study on AFC Leopards showed e-ticketing increased attendance by 15% through advance remote purchases, directly boosting traceable revenues for cash strapped clubs as reported by Citizen Digital (2023). In sub-Saharan contexts, digital systems enable data driven personalization, such as targeted promotions, fostering loyalty amid rising smartphone adoption highlighted by GSMA (2024). For Vipers SC, integration with UPL's 2025 data-sharing mandates could drive compliance and attract sponsors as seen in Nigeria's NPFL where digital ticketing secured

CAF/FIFA alignments (NFPL media 2024). Globally, dynamic pricing via e-platforms has lifted MLB revenues by up to 16%, adaptable to UPL variable match demands as reviewed by Deloitte Sports (2023).

Consequently, the barriers of E-ticketing Implementation include infrastructure and digital divides pose significant hurdles. In Uganda, erratic internet coverage is less than 70% in rural areas and low digital literacy among older fans hinder adoption, echoing Ghana's 2020 findings where perceived ease of use influenced only 40% of potential users, Dzisi et al., (2020). Security concerns including data breaches, deter 25% of African consumers, per 2025 reports on ticketing fraud as reported by FTC & Interpol (2025). For football clubs, resistance from touts and legacy vendors over whelms issues; a 2022 study on African stadia recommended modern QR validation to counter this yet implementation lags due to costs.

2.4 Impact of E-ticketing on service efficiency and customer satisfaction

The implementation of E-Ticketing systems has demonstrable and profound impact on both the operational backbone of a sports organization and the perceived experience of its fans, creating a virtuous cycle of efficiency and satisfaction.

Service efficiency improves through streamlined operations and reduced costs. A 2021 analysis of sports ticketing projected 50% of sales via mobile by 2025, cutting printing or distribution expenses by 30% and enabling real-time inventory management as observed by Statistica (2021). In football, MLB 2023 facial authentication trials reduced entry times by 40% minimizing queues, a critical gain for Vipers SC's high attendance matches average of 3000+ fans, literature by MLB Technology Report (2023). African examples included AFCON 2024 YALLA app which enhanced logistics with 70% of tickets sold digitally, improving crowd flow and compliance with health protocols (CAF 2024)

Customer satisfaction rises via personalization and seamlessness. A 2023 study linked to electronic ticketing to higher loyalty through interactive features like seat maps and notifications increasing Net Promoter Scores by 20% in European leagues transferable to UPL fans valuing accessibility. For Vipers SC supporters, New Vision (2024) points out that QR based entry could elevate experiences, countering dissatisfaction from manual fraud. However, barriers like poor connectivity could negate gains, emphasizing inclusive design as cited in the World Bank Digital Development Report (2024)

2.5 Framework for Effective E-Ticketing Deployment in the Uganda Premier League

Frameworks for E-Ticketing emphasize phased integration, stakeholder collaboration and scalability. A 2023 global review advocates a four-stage model; assessment, design with QR or mobile focus, pilot testing and scaling with analytics as reported by Keskinen & Takatalo (2023). For African leagues, CAF's YALLA blueprints integrates e-visas and apps for seamless deployment, prioritizing security for fraud prevention and training evidenced in CAF (2025). In the Star Times Uganda Premier League context, a practical framework could adapt UPLs 2025 reforms-data mandates and financial aid of Uganda Shillings 80 million to fund e-platforms, FUFA (2025). Key elements include; infrastructure build for QR systems, stakeholder engagement, metrics driven iteration, sustainability to reduce paper waste noted by UNEP (2024). For Vipers SC, this framework supports UPLs two round format by enabling efficient group stage ticketing as by FUFA (2025).

2.6 Conclusion

This review examined the barriers hindering E-ticketing implementation for sports clubs in emerging markets with specific relevance to Vipers SC in Uganda. The analysis reveals that successful digital ticketing adoption depends on effectively addressing three interconnected challenges namely infrastructure limitations, user behavior patterns and organizational readiness. Current research indicated that solutions must be context specific rather than simply replicating models from mature markets.

For Vipers SC, this analysis provided a practical foundation for developing an E-ticketing system that balances technological capability with local realities. The insights gathered here directly informed the development approach for Vipers SC's E-ticketing system ensuring it remained both technically sound and practically implementable in the Star Times Uganda Premier League.

SECTION THREE

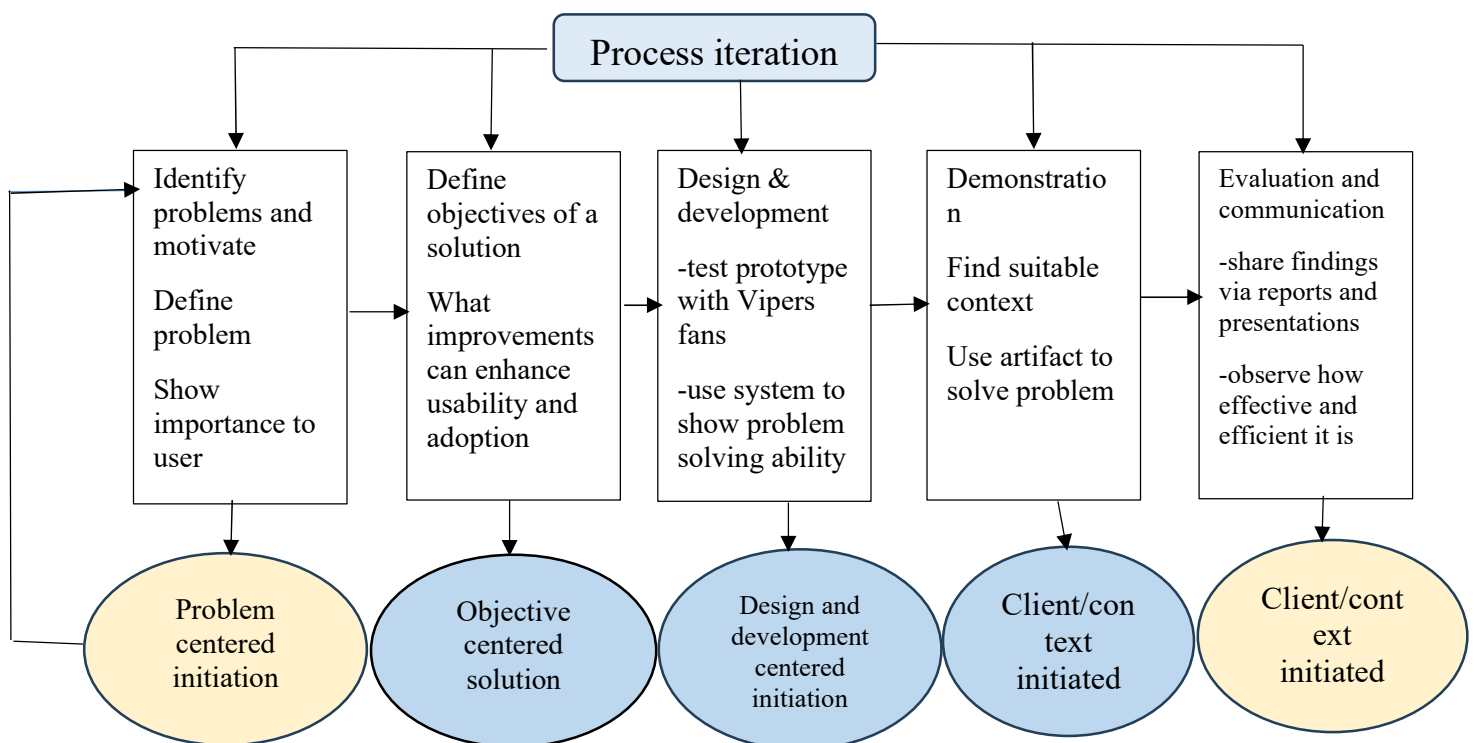
RESEARCH METHODS

3. PROJECT METHODS

This section highlights the research methods, research design/research approach, project development process, requirements elicitation methods/data collection methods, target population, project constraints and ethical considerations.

3.1 Research Design/Research Approach

The project team will undertake a **Design Science Approach**. In this approach, the team will attempt to build an information system artifact through identifying business requirements in there by defining a practical solution to the existing problem (Weber, 2010; Hevner et al., 2004; Au, 2001) in the organization. In this case, the artifact is the E-Ticketing System for Vipers SC. The design process will follow the key Design Science Research stages of first identifying and analyzing existing challenges in the club's ticketing process which includes long queues, ticket duplication and poor record keeping. This process will then be followed by setting research objectives. Basing on the findings, the study will then proceed to design logical models and work flows of the proposed system, which will serve as a blueprint for developing a working prototype of the e-ticketing platform. This prototype will be built to demonstrate how digital ticketing can improve operational efficiency, enhance use convenience as well as strengthen financial accountability within the club organization. The system will then later be tested and evaluated to ensure it meets the identified business requirements and user expectations.



Process Entry Points

Stage 1; Problem identification: The team will use a range of problem definition techniques to identify the problems that Vipers SC is facing with current ticketing system. This will include interviews of club staff and online questionnaires sent to all members and fans. From these, the team will brainstorm on the most pressing issues facing the club's ticketing system, and develop a solution to solve the problem for Vipers SC.

Stage 2; Objective Definition: In this stage, the team will define and state the objectives of the and which is checking current state of ticketing at Vipers SC, drivers and barriers towards the use of physical ticketing, effectiveness of E-Ticketing and developing a fully functioning E-Ticketing System for Vipers SC and testing the system

Stage 3; Design and Development: The team will then develop and design the system for E-Ticketing for Vipers SC basing on the findings and requirements derived from the interviews and questionnaires given out to staff and fans

Stage 4; Demonstration: The team will then test the E-Ticketing system that has been developed and implement it as soon as its fit to be used for matches at Vipers SC

Stage 5; Evaluation and Communication: The team will then present the system and project report to supervisors and faculty for evaluation. There will also be completion of Project Report, upload on e-learning and presentation of the system to the faculty

3.2 Project Organization (Vipers SC)

The team will be undertaking and presenting the project to Vipers SC. The users will be the fans and general public that come to watch matches from Vipers SC stadium. The fans are about 5,000 to 10,000 fans and the general public that accumulate the 20,000-sitter stadium.

3.3 Study Population

The population for this study will include individuals who directly interact with ticketing process at Vipers SC. These will include the club management and administrative staff, IT officers involved in digital system operation, ticketing officers, gate attendants and fans who frequently attend matches. These groups will be chosen because they understand challenges in the current system and can give reliable feedback on the new system.

3.4 Sources of project data

The team will obtain primary data about the current ticketing system at Vipers SC from the club's sporting directors and people in charge of welfare concerning ticket issuing at stadia gates on matchdays. Secondary data will be obtained from online articles and other literature about the use of E-Ticketing

3.4.1 Requirement Elicitation [Data Collection] Techniques

The team will study the existing manual ticketing system at Vipers SC. This will be done to understand how tickets were being issued, the challenges faced by the staff and fans, the limitations that affected service delivery. Through this process, the team will be able to identify gaps and propose a new E-Ticketing system that will improve efficiency, accountability and user satisfaction. To gather accurate information, several requirements were applied. These include interviews, observations, focus group discussions and mind mapping.

Observation; The team will observe the ticketing process during match days, noting how tickets are sold, validated and recorded, this will help identify problems such as long queues, delays and risks of ticket duplication.

Interviews; Semi-structured interviews will be conducted with management staff and ticket issuers. These interviews will provide deeper insights into the operational challenges and the system features that users expect in the new E-Ticketing platform.

Focus group discussion; Small discussion groups will be held with a few fans to gather their opinions on system usability, accessibility and payment preferences. This will ensure that the final design addresses the user's needs.

Mind mapping; The team will use mind mapping to organize and visualize the different system requirements collected from various stake holders. This will help to group related ideas, clarify requirements and establish clear structure for the system's functionality. This approach will make the E-Ticketing System more user centered, efficient and relevant to the operational environment of Vipers SC.

3.5 System Analysis and Design Approach

The team will adopt an Object-Oriented Design Approach. It allows the system to be modeled using real world entities represented as objects, each containing data and functions that describe their behavior case in point objects such as user ticket, match, payment and report will be identified and designed to interact with one another in a structured manner. Object-Oriented Approach was preferred over the Structured System Design method because it provides better system flexibility, reusability and scalability. The Object-Oriented Approach simplifies maintenance since changes in one part of the system can be made without affecting the entire structure unlike Structured System Design. The team adopted the general Software Development Life Cycle (SDLC) approach to guide the design and implementation of the E-Ticketing system for Vipers SC. The approach was selected because it provides a structured framework and was suitable for the study because it ensures that each development stage is completed before moving to the next, reducing errors and making the project more organized and manageable. The SDLC approach will allow the team to work methodically ensuring that the system meets both the user-needs and organizational goals.

3.5.1 Design Techniques

The project team will create a prototype using the Entity Relationship diagram to create an iterative design. This will enable users to interact with the system easily.

The Entity Relationship Diagram shows the logical structure of the database that supports the e-ticketing system. It defines the relationships among key entities and how data is stored and retrieved. Entities and Attributes:

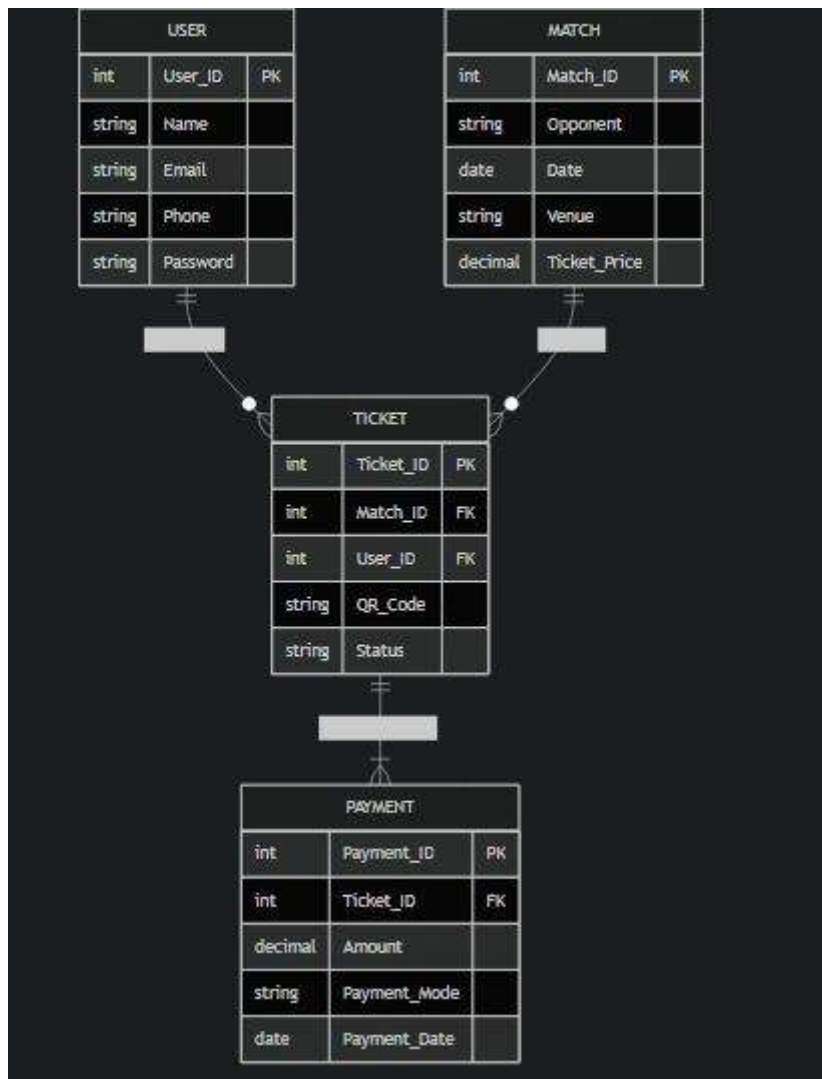
User: User_ID, Name, Email, Phone, Password.

Match: Match_ID, Opponent, Date, Venue, Ticket Price.

Ticket: Ticket_ID, Match_ID, User_ID, QR_Code, Status

Payment: Payment_ID, Ticket_ID, Amount, Payment Mode, Payment Date.

Relationships: One user can purchase many tickets. One match can have many tickets. Each ticket corresponds to one payment.



3.6 Anticipated Project Constraints

The project may be hindered by the inability of companies to keep records such as the number of spectators as most of them provide inadequate data which makes the project inaccurate. Inadequate funds; The team will require a lot of funds while moving from one place to another during data collection and software development of which the money may not be readily available to fund the project.

Inadequate time: Since the project aims at being the best at user interaction, it requires a lot of time to develop it which is not accorded to the project team and this may consequently lead to imperfections.

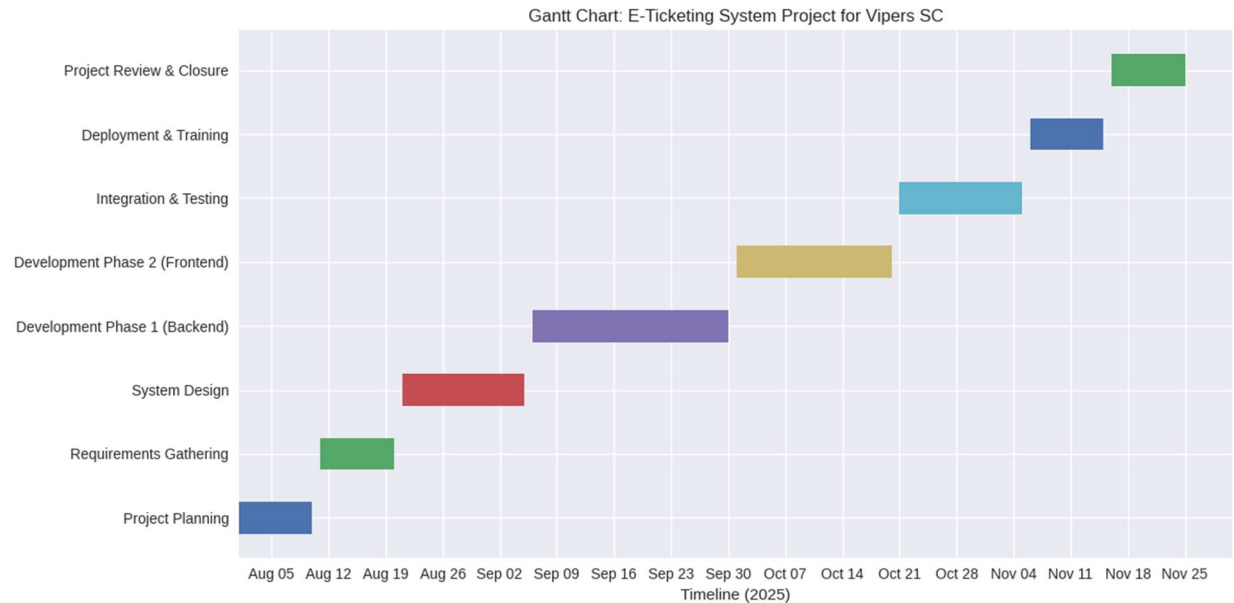
3.7 Ethical Considerations

The study will observe strict ethical standards throughout the design and development of the E-Ticketing system. Since the project involves interaction with fans and staff to collect system requirements and feedback, informed consent will be obtained from all participants before any data was gathered. Personal information such as names, contact details will be handled confidentially and used solely for research and system development purposes.

The team will ensure that no data will be shared with third parties and that all information is

stored securely to prevent unauthorized access. These measures will guarantee privacy, integrity and responsible use of data within the E-Ticketing framework.

3.8 Timeline and Milestone



3.9 Disclosure and Declaration Statement

We, the undersigned, hereby declare that the information presented in this project proposal titled **“Developing an E-Ticketing System for Vipers SC in Uganda”** is the result of our original work and research. All sources of information, data, and references used in the preparation of this proposal have been duly acknowledged.

This proposal has been prepared solely for academic and/or professional purposes and is intended to outline the scope, objectives, methodology, and expected outcomes of the proposed e-ticketing system. It does not contain any confidential or proprietary information belonging to Vipers SC or any third party, unless explicitly authorized or publicly available.

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APPENDICES

1: Proposed Project Budget

Project title; Developing an E-Ticketing System for Vipers SC

Stadium capacity; 20,000

Project Duration; 3months

CATEGORY	RESOURCE/ITEM	DESCRIPTION	QTY	UNIT COST(UGX)	TOTAL (UGX)
Human resource	Lead system developer	System design, backend, payment integration	1	3,000,000 per month	9,000,000
	Assistant developer	UI/UX, frontend, mobile optimization	1	1,500,000	4,500,000
	System analyst	Requirements analysis, documentation	1	1,000,000	1,000,000
	ICT consultant/supervisor	Technical guidance, evaluation	1	800,000	800,000
Software requirements	Domain name	Annual subscription	1	90,000	90,000
	Cloud computing	12-month secure hosting	1	600,000	600,000
	SSL Certificate	Secure payment encryption	1	150,000	150,000
	Payment API Integrated Fees	MTN/Airtel MoMo integration	1	500,000	500,000
	Development Tools	IDEs, libraries, frameworks,	1	300,000	300,000
Hardware & Equipment	QR-Code Scanners	Handheld scanners for gates	6	350,000	2,100,000
	Laptops	Dev, testing, demo	2	250,000	500,000
	Server Backup Drive	Data backup and testing	1	250,000	250,000
	Wireless Routers	Internet for development and testing	1	180,000	180,000
Internet and data costs	Monthly data bundles	Heavy usage for dev and deployment	3 months	100,000	300,000
Operational Costs	Transport	Stadium testing, stakeholder visits	15 trips	40,000	600,000
	Communication	Airtime, calls, payment integration calls	3 months	50,000	150,000

	Printing & Photocopying	Reports, manuals questionnaires	1 lot	150,000	150,000
	Meetings and refreshments	Stakeholder meetings and testing days	5 sessions	80,000	400,000
	stationery	Pens, notebooks, files	1 lot	60,000	60,000
Other requirements	Marketing mockups	Flyers	1 lot	120,000	120,000
	Backup power bank	For field testing & gate operations	1	150,000	150,000
Contingency (10%)	Unexpected expenses	-----	-----	-----	1,333,000
TOTAL PROJECT BUDGET					UGX 20,033,000

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