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MAKERERE UNIVERSITY BUSINESS SCHOOL

DEVELOPING AN ONLINE CAR HIRE SERVICE SYSTEM FOR MAM

TOURS AND TRAVELS UGANDA.

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

29th September, 2025.

DECLARATION

We, the signatories to this report, declare that this proposal is our original work and has not been submitted to any other University or Institution of higher learning for any academic award. We have acknowledged all sources of data and references cited in this proposal.

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DEDICATION

This research project is dedicated to the Makerere University Business School administration for fostering a spirit of academic excellence and innovation. It is also dedicated to our families and friends for their unwavering support throughout our academic journey. We extend special thanks to our project supervisor whose guidance has been invaluable in shaping the success of this project.

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information, and for providing the practical context that grounded this study. We are also thankful to our colleagues and classmates for their stimulating discussions and moral support.

APPROVAL

This project proposal has been submitted with my approval as supervisor and my signature is here appended:

Signed..... Date:

Mr. Abdallah Ibrahim Nyero

Makerere University Business School

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INTRODUCTION

1.1 Background of the Study

The digital transformation of the car-hire and vehicle-rental industry around the world has been led by the emergence of demand for online travel, mobile reservations, and platform-based distribution. In addition, across the world, consumers have come to expect 24/7 self-service: fleet browsing, instant availability, online payment, and automatic confirmations, which has led global leaders and operators and travel-tech platforms to digitize booking, pricing, and fleet-management workflows to improve utilization and the customer experience. (Euromonitor International, 2024) Sub-Saharan Africa the transformation towards digitalization is also being influenced by a parallel mobile payment's revolution and the fast-growing internet penetration. Mobile money and smartphones revolutionize the very way routine services are conducted, allowing businesses to receive instantaneous payments and meet their customers outside the constraints of office hours and regional policy frameworks supporting an extensive digital transformation across the economy (GSMA, 2024). These regional trends render digital car-rental platforms to digital mobility and tourism operators an increasingly compelling and high-impact innovation for Africa. In addition, Uganda's travel, tourism and transportation sectors are recovering to post-pandemic life, requiring more flexible mobility approaches and private car hire services. While mobile money is common and enabling to carry on their business operations on a day-to-day basis, the periodic outage of internet and service to customers continue to be a danger to business. This confluence of increased tourism demand, high level of digital payment uptake and intermittent connectivity issues are both the inspiration and design restrictions to establish an online car-hire system that is appropriate to Ugandan conditions.

MAM Tours and Travels Uganda Field Operations director Mr. Musoobozi Regan Matthew, who was at MAM Tours and Travels Uganda located at Echo Plaza office no. G21, martin road Kampala Uganda, also gave an overview on the present functioning of the company during our field visit. MAM Tours offers airport transfers, guided tours and private car-hire services, all of which are manual and on paper, while

at the same time office-hours coordination and manual bookings still dominate MAM Tours. This workflow, Mr. Musoobozi said, slows down services, introduces the risk of double booking or misplaced records, and complicates the process of tracking vehicles and efficiently assigning drivers. Outside of regular working hours, customer inquiries are often not answered until the next day, which negatively impacts responsiveness to the customer during busy tourism periods, he said. This data shows that while MAM Tours is growing it has an outdated manual process of managing the service and that the service should rely on the digital system that could help it deliver on its promise.

1.2. Problem Statement

MAM Tours and Travels Uganda was observed to be in serious operational waste of time and money that have been revealed by our field visit and the interview with the Head of Field Operations Mr. Musoobozi Regan Matthew. He added the business's reliance on manual processes has resulted in certain chronic issues. Booking mistakes and occasional twice-reservation may occur because staff can't provide a centralized, real-time view over their fleet or vehicle availability on a computer system. Mr. Musoobozi added that record-keeping and fleet management in most cases is still paper-based and that it often is difficult to monitor maintenance schedules, vehicle deployment and utilization trends, frequently leading to delays or missing information. He also said that periodic internet and fiber failures in Uganda disrupted the business operations so much so that MAM Tours struggle to keep regular and reliable services. These connectivity challenges have also affected numerous businesses and government agencies in the country. Moreover, according to Mr. Musoobozi, some intermittent outages of mobile-money and telecom service providers and additional regulatory changes that impact platforms such as MTN Mobile Money have sometimes disrupted customer payments and delayed the booking process (MTN Uganda, 2022). According to him, these challenges collectively limit efficiency, affect customer satisfaction, and underline the need for a centralized, reliable digital car-hire system.

1.3. Project Solution

The solution for MAM Tours and Travels Uganda is a secure, easy-to-use online Car Hire Service System tailored to the specific requirements of the company and the Ugandan

market. Such a web-based platform would both centralize and automate significant functions, eliminating manual processes, and furnish real-time information to end users and staff directly. A public online portal will be provided for customers to discover all vehicles available, images & details along the way as well as checking for availability at any point in time while creating accounts and making bookings. Mobile-money payments are directly integrated through MTN Mobile Money and Airtel Money for instant and secure transactions, while automated email/SMS notifications will offer booking confirmations, payment alerts, and reminders to facilitate better communication and user experience. For admins, the system will be integrated with a secure dashboard that consolidates all operational activities. Staff will be able to manage bookings, update vehicle status, customer records, and generate reports on revenue and fleet usage. With a strong database, booking, vehicle, customer, and transaction data will be stored in a MySQL database. Overall, the solution will minimize mistakes, enhance service access, enhance fleet management and equip MAM Tours and Travels to be more effectively utilized within Uganda's developing digital economy.

1.4. Project Goal and Objectives.

Goal

This project aims to design and develop an online car hire service system for MAM Tours and Travels Uganda that enhances operational efficiency and customer experience.

Objectives.

- To analyze the current processes and identify system requirements for developing an online car hire service system for MAM Tours and Travels Uganda.
- To design a user-friendly online car hire service system for MAM Tours and Travels Uganda.
- To integrate secure online payment systems into the car hire service system for MAM Tours and Travels Uganda.
- To implement a reliable and well-structured database to support the operations of the online car hire service system for MAM Tours and Travels Uganda

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction.

The rapid development of digital technologies is reshaping how organizations provide services. In the context of transport and tourism, online car hire systems have become crucial platforms to boost the efficiency, availability and client satisfaction. Online car hire systems also transform a largely manual and office-based rental process into a continuous digital service with search, booking, payment, and fleet management. In Uganda mobile internet penetration and mobile money usage are growing and developing, which provides an opportunity for companies like MAM Tours and Travels to digitize services. In developing-country contexts across the globe we see documented benefits such as shorter transaction times, better record keeping, wider reach in the market and greater efficiency of asset use through real-time service availability. But successful operationalization also needs to be grounded in theoretical frameworks, global dynamics, payment models, fleet optimization, and trust characteristics. This literature review aims to explore these areas and determine the research gaps upon which an online car hire service system for MAM Tours and Travels Uganda shall be established.

2.2. Analyze the current processes and identify system requirements

Designing an online car hire service for MAM Tours and Travels Uganda involves not only knowledge in best global practice but also knowledge in the local context of operations. From a worldwide perspective, literature review on online vehicle rental systems stresses rigorous requirements analysis as the “foundation of any successful system” which includes understanding stakeholder requirements, business processes, and system constraints; capturing these early reduces risk of scope creep and failed delivery (Agency, 2023). For instance, systems in review in Africa and Asia specify key functional requirements including real-time availability checking, multi-device booking and cancellation support, and fleet management modules.

In our opinion for MAM Tours, it is also necessary to specifically cover the Ugandan-specific constraints connectivity issues, payment-platform dependency and local vehicle/insurance regulation requirements. The literature from East Africa

suggests very high rates of mobile money usage, which are accompanied by businesses that lose out when networks or rails fail. So, I will consider non-functional requirements such as "availability in low-connectivity environments", "multi-rail payment fallback" and "vehicle security/identity verification" when conducting my requirements analysis since these are less common in generic literature, but are necessary in the Ugandan context.

2.3. Design a user-friendly online car hire service system.

From needs to design, the platform must be user-friendly for customers to be taken up and operations to be smooth. Research on car-rental system design emphasizes intuitive UI, mobile-first architecture, well-defined booking flows and trust value propositions. The findings indicate that systems that enable customers to browse vehicles, choose rental periods, check pricing transparently and confirm to book online, lower the manual overhead and enhance custom. Now in this context, from my view at MAM Tours, it means that the design must be mobile user centric because most customers in Uganda would book via smartphone, thus minimizing the fields/steps. I would focus on stuff like visual listings photos, specs, simple calendar/drop-downs etc., upfront pricing summary including insurance, fuel and immediate confirmation, etc. In addition, because rural and tourist-park customers might have intermittent data, I feel it is important to consider designing the user journey to be fallback (lightweight pages/offline/agent assisted booking) which results in resilience and is indicated in literature. (Digital platform mobility services in African cities: a review, 2023).

2.4. Integrate secure online payment systems.

Payment integration is not a technical add-on; it is central to conversion and operational cash-flow at all levels. Evidence from East Africa is that mobile money is the dominant payments channel and its integration is critical to the success of platforms. According to the wide body of research on mobile money, companies with payments that work this way benefit from lower transaction costs, increased liquidity, and faster settlements (Seck-Sarr, 2024).

When we look at that for MAM Tours, the goal is to design a payment subsystem supporting multiple rails (MTN, Airtel, and card) and not simply relying on a sole

provider as local reports state that outages occur and reliance on a single rail adds to the risk. I should also add features like transaction webhooks, duplicate-charge protection, clear user receipts, and refund workflows. Payment integration also needs to be consistent with the regulatory KYC/AML frameworks, as well as an open and transparent deposit/hold flow (Mobile money taxation and financial inclusion agenda in East Africa, 2025).

In Africa, payment integration will often lead to KYC (know-your-customer) compliance along with AML anti-money laundering requirements especially where high-value transactions or merchant settlement are involved, making application payment integration more complex for both users and businesses. Payment provider and national compliance rules must be followed by operators to avoid fines and maintain merchant accounts ongoing to avoid violations. How deposits, refunds, and escrow arrangements are handled should be clearly explained in the platform's financial workflows and presented to customers in the UI to reduce disputes.(GSMA, 2020).

2.5. Implement a reliable and well-structured database.

Data architecture forms the basis of any online car-hire platform. The literature on car rental management systems is based on standardization of vehicle, booking, customer, payment and maintenance log schema. Major technical aspects should be handled with concurrency control to avoid double-booking, indexing for fast availability search, and audit-logging to maintain accountability. From my perspective with MAM Tours, the database design should represent not only operational entities but also fallback data capture for offline bookings, replication/back-up mechanisms to cope with instability of connectivity, strong data governance encryption, access control since customer identity, payment and vehicle records are sensitive. In addition, scalable designing refers to employing modular architecture, not using monolithic tables, so the organization can grow with the business expansion or adding new features (Zhao, 2022).

2.6. Backup, replication and offline-synchronization strategies.

Since network outages do happen, and high availability is required, the database architecture should employ replication, automatic backup, and failover plans that have been tested. For some geographically spread users and satellite/remote tourists, the planned offline capture for agent-assisted bookings is a possibility, but any offline mode must prevent data loss and provide clear reconciliation reports on sync. Off-the-shelf cloud-hosted databases still offer many of these features, though with careful configuration for security and cost. We believe that for MAM Tours and Travels Uganda having these methods is required, not optional, as the country has irregular internet access with power cuts and disruptions. The system must therefore keep automated, stable backups to a protected cloud network and support local replica storage capable of enduring short-term downtime. Additionally, I think that an offline synchronization solution can support agents in remote tourism areas like local national parks, where the connectivity is not reliable. You could use this feature to record those bookings or updates on site and later synchronize them once the connections are available again. We also acknowledge that this has to be handled with caution so as not to lose data continuity or duplication; thus, we need strong synchronization rules and reconciliation with the timestamp. (IBM, 2024).

2.7. Privacy, Data Retention, and Governance.

Data protection obligations are triggered by collecting personal data for identity verification and payments. The database design should include appropriate encryption-at-rest of sensitive fields, role-based access control which limits access to personally identifiable information (PII), and retention policies for documents (IDs) and transaction logs aligned with local regulations and the company's privacy policy. To comply and build that trust with the consumer, you must have documented processes for the deletion of personal data, responding to incidents as they arise, and obtaining the user's consent (Abdalla, 2021).

At MAM Tours and Travels Uganda, we consider that prioritizing privacy and data governance is not only legal compliance to implement, but is a strategic requirement to gain customer confidence in a digital environment still maturing." Most Ugandan customers are wary of disclosing their personal and financial information online, in large part due to previous misuse and fraud cases of the same in the local news. We should take a "privacy-by-design" focus and we should bake security and confidentiality into every stage of system creation rather than layer these as an add-on layer. We believe also that automatic deletion of obsolete records and maintaining clear user consent logs will enhance both compliance and ethical integrity.

2.8. Handling Minor Vehicle Issues

A minor failure to comply with a consumer guarantee entails that a problem with a hired vehicle can be repaired and does not contain the characteristics of a major failure. A minor failure does not, in the first instance, enable the customer to reject the

vehicle or claim a refund, replacement, or compensation for the difference in value. When a failure to comply with a consumer guarantee is minor, you can choose between providing a repair within a reasonable time ⁸ or offering the consumer a refund or an identical replacement or one of similar value if reasonably available. (Alhassan, 2023).

2.9. Gaps in the literature and implications for MAM Tours

Gaps identified

Most of the literature examines worldwide technological trends and mobile-money implementation at regional level, but there have been fewer published case studies that provide detailed step-by-step implementations for small-to-medium car-hire operators in Uganda. Research at smaller scales on telecom outages, mobile-money settlement timings, and cash-flow management of small operators that are pertinent to MAM Tours, but not yet adequately researched in the scholarly literature, is required. Furthermore, almost all industry reports are high level and concentrated on large providers, which in reality leave an enormous gap. There is no knowledge base of practical advice for practitioners on how an affordable, resilient architecture can be chosen by SMEs.

2.10. Practical implications for requirements & design.

For MAM Tours, the literature suggests a practical roadmap that, for the first part of the app, will focus on availability of focused functionalities, provision of booking, integration with several mobile money providers providing mobile payments, and strong booking state management and design mobile-first interfaces with offline-friendly fallbacks to support mobile phone use while adding modular backend components providing strong logging and reconciliation reports for finance. Security-related tasks for identity verification and deposit handling should be automated into the workflows to reduce theft-related risk. Lastly, look at phased rollout and training from different stakeholder groups, rather than a one-off “big bang” cutover (Kemgou Voptia, 2024).

2.11. Conclusion and recommendations from the literature.

The literature found, is that to create a successful online Car hire services system for MAM Tours and Travels Uganda, a global view of tech must be fused with the operational realities of Uganda. Three key themes arise: thorough specification analysis, user-centered system design, and solid backend implementation. Firstly, the literature also highlights that a comprehensive and clear requirements analysis is necessary to find both functional and non-functional requirements. We believe that this should take account of local realities – including erratic internet connectivity, mobile money dependence, and security threats (e.g., vehicle theft in Uganda). Acknowledging the same factors early, will enable MAM Tours to design a system that is robust and reliable, well before infrastructure falls away. Next, the creation of a mobile-phone-accessible, user-friendly and trust-centered web site is critical for gaining & maintaining users. Most Ugandan devices are smartphone-based so low-bandwidth responsive site design is very important. We think the addition of transparent pricing, easy-to-use booking steps and strong data privacy claims will increase users' trust and satisfaction, we argue. In our conclusion, a phased approach with stakeholder participation would be the best and appropriate approach for MAM Tours. Getting managers, drivers, and customers involved in early testing will make sure the system delivers what it truly does. In short, literature and reflections have both argued that the success of MAM Tours depends on building a context-specific, secure and user-centered digital system that complements the infrastructure of Uganda, the empowerment of users and also competitiveness in the space of tourism and transport sector.

CHAPTER THREE: RESEARCH METHODOLOGY.

3.1. Chosen Research Design

This research is characterized by a Design Science Research (DSR) process. It emphasizes critical analysis, methodology and theoretical foundation. DSR is most well-suited as it pertains to designing and testing IT-based artifacts that will address these problems. It's also an iterative process, where the design is honed by user feedback over time. Through this framework, the DSR strategy informs design and implementation of an online car hire service system for MAM Tours and Travels Uganda in tackling the issues around manual working, overutilization of bookings and payment delays.

3.2. Research Design

It utilizes the Design Science Research (DSR) Process Model, which has six major stages. First is problem identification and motivation, in which interviews and observation highlight operational challenges at MAM Tours and Travels Uganda like manual booking inefficiencies and limited availability. Then, defining the objectives of a solution is essential to create a safe, easy to use online car hire system. During the design and development stage, we create the system architecture, interface and database using technologies such as PHP, MySQL, JavaScript, focusing on mobile responsiveness and compatibility with local payment systems like MTN and Airtel Money. In the demonstration phase, users, administrators, drivers, and customers are presented with the prototype to learn more about usability of the system. Then comes evaluation as measured system performance, reliability, and user satisfaction via feedback/test. Lastly, the communication phase consists of documenting and disseminating the system design, results, and implementation insights to management and academic stakeholders for review, as well as to be used in ongoing improvement.

3.3. Data Collection Method

Data collection in the DSR context is both formative (for design improvement) and summative (for evaluation). The following methods will be used:

- **Surveys and Questionnaires:** Distributed to customers and staff to gather feedback on booking experience, system usability, and satisfaction.
- **Interviews:** Conducted with administrators and system users to understand operational challenges and collect qualitative insights.
- **Observation:** Direct observation of system usage to identify performance gaps or usability issues.

3.4. Data Analysis Techniques

The collected data will be analyzed using various methods

4.1 Statistical Analysis

Descriptive statistics, which means mean, median, and deviation of online hire system. Inferential statistics such as T-tests to compare vs automated attendance systems. Trend Analysis for instance spotting time-series transport trends.

3.5. Usability Evaluation

Evaluation of user feedback for satisfaction is, for example, sentiment analysis. Error Analysis i.e., the detection of errors and what should be done to fix them.

3.6. Performance Metrics

Time taken to hire a car, or, response time. Error rate like false positives or false negatives in attendance marking. System Uptime which is the percentage of time that the system is up and running without failure.

3.7. Ethical Consideration

In order to maintain ethical integrity, this study follows data privacy and security protocols: User consent i.e., the reason for data collection being done underlines and getting consent in writing. Data Privacy including encrypted or encryption of stored biometric data to prevent unauthorized access. Anonymity that is, to make sure that user data is anonymized and not linked to personal information. Adherence to GDPR and other local privacy regulations (data protection laws).

3.8. Validity and Reliability

Validity is established by triangulating data surveys, interviews and system logs. Reliability is achieved by evaluating again for a trial and keeping the same evaluation criteria in each trial. Pilot test feedback will be integrated to confirm the reliability and repeatability of the findings.

3.9. Pilot testing

An idea of the system will be tested in a small group before its mainstream use. Feedback for adjustments will emerge.

3.10. Limitations of the study

The study also has disadvantages that the study also has as they are; Internet Dependency that is to say due to the fact the system will not work without internet connectivity, some areas with insufficient or unstable internet connection might experience decreased usability. E.g., User Adaptability, some customers or employees can have difficulties adapting to new technology. System maintenance costs meaning continuous updating, hosting and maintaining systems or hosts might well involve financial burdens that could stretch the company's budget. To illustrate cyber threats, data security risks such as online systems must rely on strong security measures like encryption and regular backups, or for data integrity, these can take a significant hit. If all is not well, the client will lose control over the system, especially if server downtime or errors are also reported with technical details that can cause trust and satisfaction to dip.

4.0. Process model for online car hire service system at MAM tours and travels Uganda.

Stage	Description	Input	Process	Output
User Registration	The customer creates an account by providing personal details	Customer details (name, contact, email)	Data entered into the system and stored in the database	Registered customer profile created
Car search and selection	Customer browses available cars based on type, price or availability	User search request (filters, dates)	System displays available cars	Lists of available cars displayed
Booking Request	Customer selects a car submits a booking request	Selected carID, booking details, customerID	Booking request processed and stored in the database	Booking confirmation generated
Payment	Customer makes payment via mobile money, bank	Payment details (amount, method)	Payment gateway validates and processes transaction.	Payment confirmation receipt

	transfer or card.			
Car allocation	Admin reviews bookings and assigns the requested car to the customer	Booking requests, payment confirmation	System updates records and reserves the car	Car allocated to customer.
Pickup and Usage	Customer picks up the car for the rental period	BookingID, CustomerID	Staff verifies booking and hands over the car	Customer receives vehicle
Return and Closure	Customer returns the car after use	Car condition and mileage	Staff checks car condition; updates record and closes transaction	Rental transaction completed

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