**IMPLEMENTING ONLINE GARAGE PLATFORM**

**A CASE STUDY OF JATINGA GARAGE AND AUTOSPARES COMPANY**

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**This is a research project submitted to the department of Information Technology in the school of Computing and Information Technology. The research project forms a fundamental part in the fulfillment of degree certification in Information Technology at Jomo Kenyatta University of Agriculture and Technology.**

**2023**

# DECLARATION

I hereby declare that I am the sole author of the project proposal titled, Online Garage Platform, and it is my original work.

**ILLA KEVIN ODHIAMBO**

**Signature: ……………….. Date: …………………….**

**SUPERVISOR**

I have reviewed the project proposal and approve that it meets the criteria for successful completion.

**GRACE MUGAMBI**

**Signature: ………………. Date: ……………………..**

# DEDICATION

My project is dedicated to God for keeping me alive and healthy up to this particular moment of documenting the project proposal, to my family who have showed continued support and morals throughout my studies, to my fellow classmates who have offered collaboration and assistance in various class tasks. Also, to my lecturers for providing efficient knowledge and skills that has led to my progress up to this moment in time.

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**TABLE OF CONTENTS**

[DECLARATION ii](#_Toc139488462)

[DEDICATION iii](#_Toc139488463)

[ACKNOWLEDGEMENT iv](#_Toc139488464)

[CHAPTER ONE 1](#_Toc139488465)

[INTRODUCTION 1](#_Toc139488466)

[1.1 Background study 1](#_Toc139488467)

[1.2 Research Area 2](#_Toc139488468)

[1.3 Problem statement 2](#_Toc139488469)

[1.4 Objectives 3](#_Toc139488470)

[1.4.1 System General Objectives 3](#_Toc139488471)

[1.4.2 System specific objectives 3](#_Toc139488472)

[1.5 Research Questions 4](#_Toc139488473)

[1.6 Justification. 4](#_Toc139488474)

[1.7 Scope of the project 5](#_Toc139488475)

[1.8 Methodologies 5](#_Toc139488476)

[1.8.1 Data Collection Methods 5](#_Toc139488477)

[Observation 5](#_Toc139488478)

[Questionnaires 6](#_Toc139488479)

[Interviews 6](#_Toc139488480)

[1.9 System Development Methodology 7](#_Toc139488481)

[1.10 System requirements 9](#_Toc139488482)

[1.10.1 Hardware Requirements 9](#_Toc139488483)

[1.10.2 Software Requirements 9](#_Toc139488484)

[CHAPTER TWO 11](#_Toc139488485)

[LITERATURE REVIEW 11](#_Toc139488486)

[2.1 Introduction 11](#_Toc139488487)

[2.2 Theoretical Review 11](#_Toc139488488)

[2.2.1 History of online garage platforms 11](#_Toc139488489)

[2.2.2 Concepts Leading to the Emergence of Online Garage Platforms 12](#_Toc139488490)

[2.2.3 Current Status of Online Garage Platforms 13](#_Toc139488491)

[2.3 Key Features of Successful Online Garage Platform 14](#_Toc139488492)

[2.4 Factors Contributing to the Success of Online Garage Platforms 14](#_Toc139488493)

[2.5 Research Gaps 15](#_Toc139488494)

[2.6 Business Actors 16](#_Toc139488495)

[2.7 Summary 17](#_Toc139488496)

[CHAPTER THREE 18](#_Toc139488497)

[SYSTEM ANALYSIS AND DESIGN 18](#_Toc139488498)

[3.1 INTRODUCTION 18](#_Toc139488499)

[3.2 SYSTEM DEVELOPMENT METHODOLOGY 18](#_Toc139488500)

[3.3 FEASIBILITY STUDY 20](#_Toc139488501)

[Technical Feasibility: 20](#_Toc139488502)

[Economic Feasibility: 21](#_Toc139488503)

[Operational Feasibility: 24](#_Toc139488504)

[3.4 REQUIREMENTS ELICITATION 25](#_Toc139488505)

[3.4.1 Data Collection 25](#_Toc139488506)

[3.4.1.1 Questionnaires 25](#_Toc139488507)

[3.4.1.2 Interviews 26](#_Toc139488508)

[3.4.1.3 Observations 27](#_Toc139488509)

[3.5 DATA AND SYSTEM ANALYSIS 27](#_Toc139488510)

[3.5.1 The type of vehicles 28](#_Toc139488511)

[3.5.2 The type of repairs and services offered 29](#_Toc139488512)

[3.5.3 The most used mode of payment 30](#_Toc139488513)

[3.6 SYSTEM SPECIFICATION 31](#_Toc139488514)

[3.6.1 FUNCTIONAL REQUIREMENTS 31](#_Toc139488515)

[3.6.2 NON-FUNCTIONAL REQUIREMENTS 32](#_Toc139488516)

[3.7 SYSTEM DESIGN 33](#_Toc139488517)

[3.7.1 LOGICAL DESIGN 35](#_Toc139488518)

[3.7.1.1 Use Case Diagram 36](#_Toc139488519)

[3.7.1.2 Sequence Diagram 37](#_Toc139488520)

[3.7.2 DATABASE DESIGN 41](#_Toc139488521)

[3.7.2.1 Normalisation 41](#_Toc139488522)

[3.7.2.2 Database tables 44](#_Toc139488523)

[3.7.2.3 Data Dictionary 46](#_Toc139488524)

[3.7.3 PHYSICAL DESIGN 50](#_Toc139488525)

[3.7.4 SYSTEM ARCHITECTURE 51](#_Toc139488526)

[REFERENCES 53](#_Toc139488527)

[List of Appendices 56](#_Toc139488528)

[Appendix one: Project Budget 56](#_Toc139488529)

[Appendix two: Project Schedule 57](#_Toc139488530)

[Appendix Three: Gantt Chart 58](#_Toc139488531)

[Appendix Four: Questionnaires 59](#_Toc139488532)

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background study

Jatinga Garage and Autospares is among the busy garages in Nakuru County. It is located at Shaabab Industrial Area, 1.8 kilometers from the Westside Mall in Nakuru town. The garage was initially started in 2014 after which it was closed for a period of two years due to financial issues. It was later re-established in 2016 for the purpose of providing garage services to both the local and country-wide customers, which included providing services to big companies like Tusker Limited Company.

Since its re-establishment, Jatinga Garage and Auto-spares has been providing different kinds of services to its customers. The services include tire rotation, oil changes, engine tune-up, battery replacement, wheel alignment, transmission repair, vehicle diagnosis, windscreen repair, brake repair and exhaust system repair.

The garage is well structured with every activity located in its own space. The management of Jatinga Garage takes the three levels of management consisting of the strategic level (The owner of the garage-named Jatinga), tactical level (garage manager- named Peter) and finally the operational level (mechanics). It consists of 12 mechanics who work on different servicing activities based on how experienced they are. A space has been provided to give top ambience to its customers as they wait for their cars to be repaired or serviced.

The garage is alongside different auto-spare shops and two other garages. After conducting a detailed benchmark about the garage, I came into conclusion of finding both the advantages, disadvantages and future issues that could affect the garage. The major concern that affects the garage negatively is its recognition across Nakuru town and other regions. Also, the issue of congestion at a particular time as customers have no specific time to be attended to.

Therefore, coming up with an online platform was highly recommended in order to provide a streamlined system for customers to book services, offer streamlined communication between mechanics and customers, provide access to auto parts and accessories, allow for easy scheduling and tracking of maintenance services. Additionally, the platform could provide an efficient billing and payment system.

The main target stated by the garage manager was to achieve maximum profits with ease. He added that to attain the maximum profits, a platform is the main solution as it will deal every short-comings they have been facing for the past 7 years.

## 1.2 Research Area

This research area focuses on the application of information technology and digital solutions to improve and streamline automotive repair and servicing processes through an online platform. The research provides insights into the application of technology to enhance customer satisfaction, service efficiency, and business growth in the context of the online garage platform (Jones, Smith, P. A. 2020). Jatinga Garage and Auto-spares is an ideal area of incorporating digital solutions as it will enable its customers gain a wide-range view of all garage services resulting to a manageable garage system.

## 1.3 Problem statement

The challenges facing Jatinga garage has affected the profitability and growth of the garage in various ways.

The method used by the garage to acquire new customers is so basic in that they rely on their daily customers to provide awareness about the garage to their friends and other car owners for them to visit and see their services. This is a slow and time consuming method that results in loss of opportunity to find new customers thereby limiting the garage’s profit capabilities.

During the daily activities cars may break down at different regions of the county. Most mechanics find it hard to realize car breakdown at any specific place in the county. This hinders their availability to address such an issue as they are not aware of a car breakdown in a certain area.

Majority of the customers come to the garage at no specific time. Since it’s a busy garage, the problem of congestion has been a major concern as customers at times have to wait for more than one customer to be attended to. This hinders the customer’s schedule of activities as it wastes much of their significant time to do other activities. This problem has also led to loss of customers due to poor scheduling.

Moreover, the garage faces the problem of keeping track of different types of cars that have been serviced and/or are under maintenance. The manager and mechanics take much of their time and energy reviewing previous maintenance procedures. The issue of billing and payments are not well tracked thereby generating losses at the end of the process.

Finally, the number of auto spare shops around the garage area are limited. Sometimes customers come with issues from their automobiles that require advanced tools, resources, car parts and even skills. The garage has faced the problem of business integrity and availability not forgetting its efficiency levels.

## 1.4 Objectives

## 1.4.1 System General Objectives

To implement user-friendly online platform for a garage system.

### 1.4.2 System specific objectives

The specific objectives include:

1. To design and implement an online garage platform based on user requirements.
2. To provide a streamlined booking, scheduling of services and automated reminders for service appointments.
3. To ease communication between customers and mechanics, and provide customer feedback and reviews.
4. To provide efficient tracking of maintenance services, billing and safe payments to customers.
5. To test and validate the usability capabilities of the online platform.
6. To provide maintenance phases of the online garage platform.

## 1.5 Research Questions

1. What type of services do customers want to book online?
2. How can communication between customers and mechanics be improved?
3. How can online platform provide access to auto parts and accessories?
4. How can an online platform be designed to provide positive user experience?
5. How can an online platform provide helpful tips, tricks and resources?

## 1.6 Justification.

An online garage platform is an essential tool for any modern garage that is serious about providing an excellent customer experience.

With the ever-increasing demands of customers, it is essential that garages are able to provide efficient and streamlined services to its customers. An online garage platform is the best tool to help garages offer the best possible customer experience.

From providing convenient way for customers to book services, allowing them to easily schedule appointments and keep track of their maintenance needs to offering efficient billing and payment, customer feedback and reviews, and data tracking and analysis to help garages understand their customer base and refine their services, an online garage system will have greatly influenced the growth and profitability of a garage.

Additionally, an online platform will provide access to auto parts and accessories from different dealers thus creating a strong connection between a garage and a dealer company for its customers. This positive interaction will ensure that customers will be provided with a variety of the necessary auto parts and accessories taking into consideration the best and required tools with the quality of service that is needed.

## 1.7 Scope of the project

The goal of this project is to develop an online garage platform that allows customers to request for appointments, manage their cars, track their car maintenance, make payments and be able to communicate either through conversing with the mechanics, making requests, giving feedbacks and delivering their reviews about the garage services.

The platform will include registration of new customers, payment processing, customer support services, a portal for customers to manage their cars and also tracking tools for customers to maintain the state of their cars.

The research will be conducted among the mechanics, auto dealer shops near the garage and the available customers at the Jatinga Garage and Auto Spares. The project is expected to take six months as from February to end of July 2023 and will have a budget of 20,000/= to complete.

Risk management and quality assurance will be a priority throughout the project. The platform will be industry standard for security and privacy. Finally, customer feedback will be collected to ensure that the final product meets customer expectations.

## 1.8 Methodologies

## 1.8.1 Data Collection Methods

### Observation

It will involve the researcher visiting Jatinga Garage to collect information based on what is seen and the activities being conducted. This will help to generate a report on how garage services are conducted, the issues they are facing and formulate a solution to those issues.

Observation will provide valuable insights into user preferences, behaviors, and trends which can be used to optimize the platform’s design and features, leading to increased user engagement and satisfaction.

### Questionnaires

I will use both open and closed questionnaires to collect data from the manager, mechanics and customers at the garage. The questionnaires will give insight into customer preferences and opinions. The questions will be tailored to focus on specific aspects such as how the platform will offer the ease to navigate through.

Open questionnaires will allow participants to provide open-ended responses as they will be free to express themselves thereby acquiring more detailed and nuanced insights.

Closed questionnaires will only allow predetermined response from participants as it will provide a clear and consistent structure for data collection allowing for easier analysis and comparison. They can also be used to measure customer satisfaction with the idea of designing an online platform.

### Interviews

Conducting interviews will allow for a more in-depth exploration of both customer and mechanic’s opinions and experiences. It will be a major activity as participants will express and explain their views when asked a question.

I will conduct the interviews in schedules so as not to interfere with the daily procedures and activities of the mechanics. For the customers, I’ll conduct a distributed series of interviews from different customers at different time as they wait for their cars to be serviced.

## 1.9 System Development Methodology

The online garage platform is an interactive platform therefore it will require more collaboration with the users for its successful development. The **agile method** is a great choice for developing an online garage platform as it is iterative, incremental approach that emphasizes on flexibility, collaboration and feedback between the garage business and the developer.

Agile methodology through the **Scrum** framework will allow the developer to quickly adapt to customer feedback, make changes quickly and efficiently, and collaborate with the customer and mechanics through sprint meetings to ensure that the platform meets their needs.

The following steps will be taken in order to accomplish the agile method:

1. **Project Initiation:**
   * Identify the stakeholders and form a cross-functional Scrum Team with roles such as Product Owner, Scrum Master, and Development Team.
   * Define the vision and objectives of the online garage platform project.
   * Create a Product Backlog, which is a prioritized list of features and requirements.
2. **Sprint Planning:**
   * Conduct Sprint Planning meetings to select a set of features from the Product Backlog to be developed in the upcoming Sprint.
   * Break down the selected features into smaller tasks and estimate the effort required for each task.
3. **Sprint Execution:**
   * Develop the features and functionalities in short iterations called Sprints ( 2-3 weeks).
   * Hold regular Stand-up meetings to discuss progress, challenges, and plans for the project.
   * Collaborate closely with stakeholders and customers during development.
4. **Sprint Review:**
   * At the end of each Sprint, hold a Sprint Review meeting to demonstrate the completed features to stakeholders and customers.
   * Collect feedback and incorporate it into future development.
5. **Sprint Retrospective:**
   * Conduct a Sprint Retrospective meeting to reflect on the team's performance and identify areas for improvement.
   * Implement action items to enhance the team's efficiency and effectiveness.
6. **Incremental Development:**
   * Continuously deliver potentially shippable increments of the online garage platform after each Sprint.
   * The platform becomes more functional and valuable with each iteration.
7. **Continuous Integration and Testing:**
   * Practice continuous integration, where code changes are integrated into the main repository frequently.
   * Implement automated testing to ensure the quality and stability of the platform.
8. **Customer Feedback and Adaptation:**
   * Continually gather feedback from customers and stakeholders to adapt and prioritize the Product Backlog.
   * Respond to changing requirements and market needs throughout the development process.
9. **Collaboration and Communication:**
   * Foster a collaborative and transparent environment where the Scrum Team and stakeholders communicate effectively.
   * Use tools like Scrum boards and collaboration software to track progress and share information.
10. **Iterative Improvement:**

* Apply lessons learned from each Sprint to improve the development process.
* Embrace change and be open to evolving requirements.

## 1.10 System requirements

### 1.10.1 Hardware Requirements

1. Laptop with:

* 4GB RAM
* 256GB SSD storage/500GB HDD.
* Core i5 processor
* Windows 10 pro

1. 64GB External Disk
2. Secure Internet Access

### 1.10.2 Software Requirements

1. Web Server

Apache

1. Database Server

MySQL

1. Backend Programming Language

PHP

1. Client-side Scripting Language

HTML, CSS and JavaScript

1. Payment Processor

MPESA Paybill

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# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter is a comprehensive summary of previous research of an online garage platform. It synthesizes and evaluates the research, tracing the evolution of theories and ideas in the field of a garage system. It will therefore provide an overview of the current state of knowledge on an online garage platform and to identify areas of controversy and potential avenues for further research.

The development of an online garage platform has been an increasingly popular trend in the automotive industry in the recent years. This literature review explores the history and current state of an online garage platform, their potential applications, and their impact on the automotive industry. It will discuss the main features of this platform, the benefits and challenges associated with their use not forgetting the potential for future development.

Additionally, it will examine the current research surrounding online garage platform and discuss the implications for the automotive industry.

## 2.2 Theoretical Review

### 2.2.1 History of online garage platforms

Online garage platforms are web-based services that enable car owners to find and book garages and mechanics for car repairs and maintenance. These platforms typically offer a range of services, including searching for garages and mechanics based on location, reviews, ratings, and pricing; booking appointments; and paying for services online. Different scholars such as Kim, M. H. (2017). *A study on the development of an online platform for automobile maintenance and repair services.* Journal of Digital Convergence, 15(4), 277-286 have argued that online garage platforms have become increasingly popular in recent years due to their convenience and ease of use.

Online garage platforms emerged in the early 2000s, with the rise of e-commerce and the sharing economy. One of the first online garage platforms was Openbay, launched in 2012, which allowed customers to compare prices and book appointments with local mechanics. Since then, many other online garage platforms have emerged, including RepairPal, YourMechanic, and Wrench. These platforms have become increasingly popular due to their convenience, transparency and cost effectiveness.

Several studies have investigated the potential of online garage platforms. For instance, a study by *Wang et al. (2017)* found that online garage platforms could significantly reduce the search and transaction costs associated with traditional garage rental services, while also providing a higher level of security for vehicle owners. Similarly, a study by *Liu et al. (2019)* showed that online garage platforms could help address the problem of parking shortages in urban areas, particularly during peak hours.

### 2.2.2 Concepts Leading to the Emergence of Online Garage Platforms

Several concepts around the world have also fueled the emergence of online garage platforms. These concepts include:

1. E-commerce platforms: E-commerce platforms have become increasingly popular for buying and selling products and services. E-commerce platforms have also been used for garage sales, which has led to the emergence of online garage platforms. These platforms provide users with a convenient and easy way to buy and sell used items. Studies have shown that the use of e-commerce platforms can enhance consumer satisfaction, trust, and loyalty *(Chen & Lin, 2018; Yunus, 2020).*
2. Social capital: Social capital refers to the resources and connections that individuals have within their social networks. Social capital has been identified as a key factor that affects the success of online garage sales. Online garage platforms provide a platform for building social capital by facilitating connections between buyers and sellers. Studies have found that social capital has a significant impact on consumer satisfaction and loyalty *(Kitzmann & Rice, 2018; Zong & Hu, 2017).*
3. Trust: Trust is a key factor that affects consumer behavior in online transactions. In the context of online garage sales, trust is critical for establishing a sense of security and reducing perceived risks associated with online transactions. Trust can be established through various mechanisms, including reputation systems, customer reviews, and seller guarantees. Studies have shown that trust has a significant impact on consumer intention to purchase in online garage platforms *(Park et al., 2020; Hsiao & Chang, 2019).*
4. Technology acceptance model (TAM): The technology acceptance model (TAM) is a theoretical framework that explains how users accept and adopt new technologies. TAM has been widely used to study the adoption of e-commerce platforms, including online garage platforms. According to TAM, the perceived usefulness and ease of use of a technology are key factors that influence its adoption. Studies have shown that TAM can be used to explain the intention to use online garage platforms *(Wang & Lee, 2017; Chua & Banerjee, 2019).*
5. Third-level digital divide: The third-level digital divide refers to the unequal access to and use of advanced technologies and online services among individuals and communities. The third-level digital divide has been identified as a significant barrier to the adoption of e-commerce platforms, including online garage platforms. Studies have shown that factors such as age, income, education, and digital literacy can affect the adoption of online garage *platforms (Van Deursen & Helsper, 2018; Beretta & Bucchianico, 2018).*

### 2.2.3 Current Status of Online Garage Platforms

According to a report by Grand View Research, the global online automotive repair and maintenance market size was valued at USD 7.42 billion in 2020 and is expected to grow at a compound annual growth rate of 16.6% from 2021 to 2028. This growth can be attributed to the increasing number of vehicles on the road, the rising demand for on-demand services, and the increasing use of smartphones and other mobile devices.

These trends happening in Europe countries goes parallel with our local trends as 95% of the growth of automotive industry and technology relies on the status of those European countries. From car manufacturing parts to providing services to the automotives, the trends experienced in western counties are similar to the ones in our country.

## 2.3 Key Features of Successful Online Garage Platform

The success of online garage platforms consists of several key features that have been identified as critical. These features include:

1. User-Friendly Interface - online garage platforms need to provide a user-friendly and intuitive interface that makes it easy for users to find and book garage spaces. A study by *An et al. (2018)* found that the usability of a sharing platform significantly influenced users' satisfaction and intention to use the platform again. Thus, online garage platforms need to invest in the design and development of their user interface to ensure that it meets the needs and expectations of their users.
2. Transparent Pricing - Another key feature of online garage platforms is pricing. Users need to feel that they are getting value for their money, while garage owners need to set prices that are competitive and profitable. A study by *Alavi et al. (2020)* suggested that dynamic pricing strategies, such as surge pricing during peak demand, could be effective in balancing the supply and demand of garage spaces.
3. Quality Assurance – Quality assurance is critical to the success of online garage platforms. Users should be able to rely on the quality of services provided by garages and mechanics listed on the platform.
4. Customer Support – Customer support is crucial to ensuring a positive user experience. Users should be able to contact customer support easily and receive timely and helpful responses to their queries and concerns.
5. Integration with Payment Systems – Integration with payment systems is essential for users to pay for services easily and securely.

## 2.4 Factors Contributing to the Success of Online Garage Platforms

Several factors contribute to the success of online garage platforms. These include:

1. Trust: Trust is essential to building a successful online garage platform. Users need to trust that the platform will provide them with accurate information about garages and mechanics and that the services they receive will be of high quality. Several studies have highlighted the importance of trust in peer-to-peer sharing platforms *(Botsman & Rogers, 2010; Sundararajan, 2016),* and online garage platforms are no exception. To build trust among users, online garage platforms need to implement robust verification and screening procedures, as well as clear and transparent terms and conditions.
2. Reputation: Reputation is critical to the success of online garage platforms. Users are more likely to use platforms that have a good reputation and positive reviews from other users. *Kim, J. (2019).* Service quality and customer satisfaction in online automobile aftermarket services
3. Convenience: Convenience is a key factor in the success of online garage platforms. Users should be able to easily find and book garages and mechanics for their car repairs and maintenance. Also users can browse a range of services and prices from the comfort of their homes.
4. Customization: Customization is essential to providing a personalized experience for users. Users should be able to customize their searches based on their specific needs and preferences. This factor has offered a variety of service enabling users to find the services they need in one place.

## 2.5 Research Gaps

An online garage platform is an e-commerce platform that connects vehicle owners with mechanics for the repair and maintenance of their vehicles. Designing a project proposal for such a platform requires identifying the research gaps in the existing literature on online garage platforms to improve upon their design and implementation. Here are some of the research gaps that i explored in the project proposal:

1. User Experience Design: The usability and user experience of online garage platforms are crucial for customer satisfaction and retention. There is a research gap in understanding the user requirements and expectations of an online garage platform. This gap could be addressed by conducting user surveys, user interviews, and usability testing to understand the user behavior, preferences, and pain points.
2. Mechanic Quality Control: The quality of mechanics on the online garage platform is essential for customer satisfaction and trust. There is a gap in research in understanding the factors that contribute to the quality of mechanics on the platform. I will address this gap by conducting a study on the selection process of mechanics, their training, and the feedback mechanism for customers.
3. Pricing Model: The pricing model of online garage platforms is an important factor for customer acquisition and regular visit. There is a research gap in understanding the factors that influence the pricing of repair services on the platform. I will address the gap by conducting a study on the pricing models used by existing online garage platforms and identifying the factors that influence pricing, such as location, repair type, and mechanic quality.

## 2.6 Business Actors

In a garage system, the business actors include the following:

1. Customers: These are individuals or organizations who bring their vehicles to the garage for repairs, servicing, and maintenance. Customers are the primary revenue source for the garage.
2. Mechanics: Mechanics are skilled professionals responsible for diagnosing vehicle issues, performing repairs, and providing maintenance services to customers' vehicles.
3. Manager: The manager oversees the overall operations of the garage. They handle staff scheduling, customer service, inventory management, and ensure that the garage runs efficiently.
4. Parts Suppliers: These are external vendors or suppliers who provide spare parts and automotive components required for vehicle repairs and maintenance.

## 2.7 Summary

In this chapter, I reviewed the existing literature related to online garage platforms. I identified the key features of successful online garage platforms and the factors that contribute to their success. I also identified the several gaps in the literature which my project can address. This review of the literature provides a foundation for the development of my online garage platform, which will incorporate these key features and address the identified gaps in the literature.

# CHAPTER THREE

# SYSTEM ANALYSIS AND DESIGN

## 3.1 INTRODUCTION

This chapter entails several components of the process of analysis and design of the proposed system. It entails a description of the Systems Development methodology used in the research project. The feasibility study of the project is also discussed to determine whether the development of the proposed system is viable. Requirements elicitation is also included in this chapter where the data collection tools are discussed as well as an analysis of the data collected. Chapter three will also cover the design of the system, that is, it’s logical and physical designs that will help model business needs and create a blueprint of how the system should be developed. This is helpful because it is important to understand the organizational structure and the ways of operation.

## 3.2 SYSTEM DEVELOPMENT METHODOLOGY

The **Agile** methodology with the help of **Scrum framework** will be employed for the development of the online garage platform. The Agile methodology is a flexible and iterative approach to system development that emphasizes collaboration, adaptability, and incremental delivery of software solutions. It involves breaking the project into smaller iterations or sprints, allowing for continuous feedback, adaptation, and incremental improvements. The Agile approach promotes regular communication with stakeholders, rapid development cycles, and early delivery of valuable functionality. When applied to the development of an online garage platform for car repair and servicing, Agile can provide numerous benefits, including faster time-to-market, continuous improvement, and increased customer satisfaction.

Agile methodology follows the following series of steps:

1. Formation of Agile Team: Build a cross-functional Agile team consisting of developers, testers, designers, and domain experts, that is, I the developer, the garage manager and the team of skilled garage workers and customers. The team should be self-organizing and empowered to make decisions throughout the development process.
2. Product Backlog: Create a product backlog that lists all the desired features and functionalities of the online garage platform. The backlog is dynamic and can evolve over time based on customer feedback and changing requirements.
3. Sprint Planning: Plan the development process in iterations called sprints. Each sprint typically lasts for a fixed time period, for this case, two weeks is required. In sprint planning, my team and i selects a subset of items from the product backlog to be completed during the sprint.
4. Regular Stand-up Meetings: Conduct regular stand-up meetings where team members briefly discuss their progress, challenges, and plans. These meetings promote communication, transparency, and accountability within the team.
5. Sprint Execution: During each sprint, the team works on developing and delivering the selected features. The development tasks are broken down into smaller units of work, called user tasks, which are estimated and assigned to team members.
6. Continuous Integration and Testing: I will adopt continuous integration practices, where code changes are integrated into a shared repository multiple times. Automated testing is performed regularly to ensure the stability and quality of the software.
7. Customer Collaboration: Involve the customers (car owners, repair shops, etc.) in the development process by seeking their input, feedback, and validation. Regularly demonstrate the implemented features to gather feedback and make necessary adjustments.
8. Sprint Review and Retrospective: At the end of each sprint, conduct a sprint review to showcase the completed features to stakeholders and gather feedback. Additionally, hold a retrospective meeting to reflect on the sprint and identify areas for improvement in the team's processes and practices.
9. Iterative Development and Delivery: Repeat the sprint cycle, selecting new items from the product backlog for each sprint until the desired functionality of the online garage platform is achieved. Continuously deliver increments of the software, enabling early feedback and ensuring that valuable features are delivered quickly.
10. Adaptation and Evolution: Embrace changes and adapt the development process based on feedback and evolving requirements. Agile allows for flexibility and encourages continuous improvement and learning throughout the development lifecycle.

## 3.3 FEASIBILITY STUDY

To determine whether the project has a chance of succeeding, a feasibility analysis has to be performed. Feasibility studies are performed to help determine the viability of the project. It is simply the assessment of the practicality of the proposed solution.

The feasibility studies which are performed include:

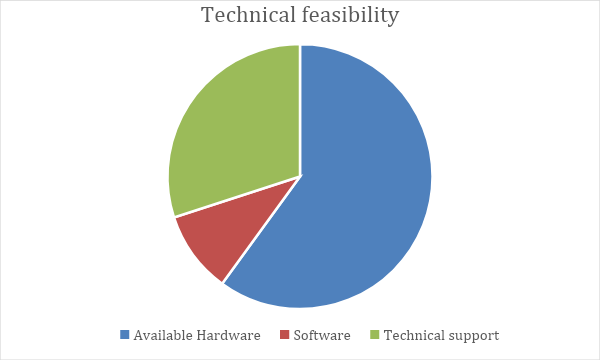
### Technical Feasibility:

It was conducted to:

* + Assess the technical resources required for developing and maintaining the online garage platform, such as hardware, software, and infrastructure.
  + Evaluate the technical expertise and skills available within the development team or determine the need to acquire additional resources.
  + Consider the compatibility of the platform with various web browsers, operating systems, and devices.

The result of this study indicated that for the implementation and deployment of the online garage platform, Jakinda Garage and Autospares has the necessary resources required which include:

* The manager has a working laptop with internet access that will enable the management of operations at the garage website.
* The mechanics have smartphones that will be connected to the internet of the garage thus help them link with the manager to receive communications on appointments and tasks allocated to them.
* Almost all customers (95%) have smartphones to run operations in the garage website.
* The mechanics are enough in number (12) to be assigned tasks and well skilled with both same and different professional skills to repair and service vehicles.
* The system is compatible with the stakeholder’s devices whereby one can access the website on different browsers such as chrome, Opera mini and Mozilla Firefox. Majority have chrome web browser.



*Figure 1: Technical feasibility pie chart.*

### Economic Feasibility:

* + Conduct a cost-benefit analysis to determine if the project is economically viable.
  + Estimate the initial investment required for development, including hardware, software licenses, development tools, and infrastructure.
  + Evaluate the potential revenue generation of the platform through transaction fees, subscriptions, or advertisements.
  + Consider the ongoing operational costs, such as server hosting, maintenance, marketing, and customer support.
  + Consider potential partnerships with car repair shops, service providers, or automotive industry stakeholders to enhance market reach and credibility.

The economic benefits of developing an online system are:

* + 1. Expanded Customer Reach- By going online, the garage can reach a larger customer base beyond its physical location. People from neighboring areas or even distant locations can access the garage's services through the online platform thereby increasing profits.
    2. 24/7 Availability-The online platform allows customers to book appointments, request quotes, and access information about the garage's services at any time, even outside business hours. This enhances convenience and attracts more customers.
    3. Streamlined Booking and Scheduling-The platform can automate appointment scheduling and service bookings, reducing the chances of double-booking or scheduling conflicts. This leads to better organization and utilization of the garage's resources, optimizing revenue potential.
    4. Improved Customer Engagement-Online platforms provide channels for customer feedback, reviews, and testimonials. Positive reviews and satisfied customers can attract new clients and build a loyal customer base, leading to repeat business.
    5. Value-Added Services-The online garage platform can offer value-added services, such as vehicle maintenance reminders, service history tracking, and personalized service recommendations. These services enhance customer satisfaction and encourage repeat visits.
    6. Upselling and Cross-Selling Opportunities-Through the online platform, the garage can showcase additional services or promotions, leading to upselling and cross-selling opportunities
    7. Efficient Inventory and Resource Management-With the online platform's help, the garage can better manage its inventory of spare parts and resources. This reduces wastage, optimizes stock levels, and improves cost efficiency.

From the above outcome of benefits, the below table represents the entire economic structure of the garage:

|  |  |
| --- | --- |
| **Aspect** | **Description** |
| Revenue Generation | - Service fees for vehicle repairs, servicing, and maintenance. |
|  | - Value-added services, such as vehicle maintenance reminders or personalized recommendations. |
| Operational Costs | - Salaries and benefits for mechanics, manager, and cleaning person. |
|  | - Rent, utilities, equipment, and supplies. |
|  | - Marketing and promotional expenses. |
| Pricing Strategy | - Competitive pricing while maintaining profitability. |
|  | - Different pricing tiers based on service complexity or vehicle type. |
| Initial Investment | - Development of the online platform (website). |
|  | - Purchase of software and necessary tools |
|  | - Initial marketing and promotional expenses. |
| Resources Required | - Software development team with web development expertise. |
|  | - Servers or cloud hosting for the online platform |
|  | - Marketing team(me) for digital marketing efforts. |
| Break-Even Analysis | - Calculate the total fixed costs and variable costs per service. |
|  | - Determine the average revenue per service. |
|  | - Divide the total fixed costs by the difference between average revenue per service and variable cost. |
| Return on Investment | - Calculate the net profit generated by the platform. |
|  | - Divide the net profit by the initial investment. |
|  | - Express the result as a percentage to represent the return on investment. |
|  |  |
|  |  |
|  |  |

*Table 1: Economic structure of the garage.*

Based on the above table, the total amount of initial investment is:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Duration** | **Amount/Duration** | **Total** |
| Website development | 3 months | 4,500 | 13,500 |
| Stationery and other expenses | 3 months | 750 | 2,250 |
| Web hosting | 1 year | 2,000 | 2,000 |
| Salary | 12months(contract) | 25,000 | 300,000 |
| **Total** | **317,750** |

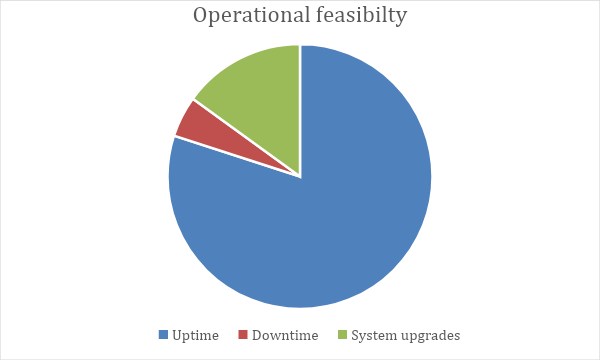
*Table 2: Initial investment table.*

Jakinda Garage makes a profit margin of more than 350,000/- a month thereby the expenses required to develop an online platform does not surpass its revenue generation. The platform aims at increasing profits. This means the garage will generate even more income from having an online platform. The Parkinson’s law on cost estimation, which emphasizes using available resources for a project and pricing to win, states that the cost of a project is equivalent to what the customer or client is ready to spend. This law was used by the garage manager to determine the amount of revenue generation after the deployment of the online platform.

### Operational Feasibility:

* + Identify the operational requirements of the online garage platform, such as user registration, item listing, search and filtering, secure transactions, communication channels, and user feedback.
  + Assess the existing processes and workflows related to car repair and servicing to ensure that the platform aligns with industry practices.
  + Evaluate the impact of the platform on the existing operations of car repair shops and service providers.
  + Consider the scalability of the platform to accommodate increasing user demands and future growth.

The result showed that the platform has the ability to utilize, support, and perform the necessary tasks. Mechanics could communicate with customers, customers able to book appointments, transparent payment through Mpesa Till, Users could register and afterwards login to access and view their profile. Increased customers in the garage market and the platform would have no buffering and lagging issues.



*Figure 2: Operational feasibility pie chart.*

## 3.4 REQUIREMENTS ELICITATION

### 3.4.1 Data Collection

Requirements elicitation is the process of gathering and documenting the functional and non-functional requirements of the online garage platform. Various techniques can be employed to engage stakeholders and capture their needs. The following techniques can be used for requirements elicitation, each with its advantages and challenges:

#### 3.4.1.1 Questionnaires

Data relating to the proposed online garage platform was collected from the Jakinda Garage and Auto-spares staff through questionnaires, a sample of which has been attached as an Appendix. Formulated questions involving both open ended and close ended were issued to the garage manager, the mechanics and customers who complied by giving their responses. Instructions were provided in the questionnaire. Respondents were expected to offer detailed responses to the free-form questions.

For the closed-ended queries, i utilized a 5-point Likert scale and ranking. I used a scale from "excellent" (strongly agree) to "inacceptable" (strongly disagree). Privacy was respected during the survey filling process. Section A of the questionnaires asked for general information on the respondent, whereas Section B focused on the procedures used to run the platform, its interfaces and the ease of navigation. Questions with direct relevance to statistical analysis in the field of study appeared in both parts. This tool helped in the collection of data on the type of user and their expectations.

**Advantages:**

* Due to the small population involving the manager, mechanics and customers, it was simple to examine the data obtained from the questionnaire.
* The questions were straightforward and quick for the respondents to answer.
* Questionnaires gave respondents confidentiality as they were anonymously filled.
* Questionnaires provided standardized and structured data, facilitating quantitative analysis.

**Challenges:**

* It took a lot of time because the team of mechanics had a busy schedule and several customers submitted their comments after the date.

#### 3.4.1.2 Interviews

Interviews involve direct interaction between the interviewer and stakeholders. It allows for in-depth exploration of requirements, preferences, and concerns. Interviews are flexible and provide opportunities for clarification and probing questions thus yielding qualitative data. The researcher took time to interview the garage manager highlighting in-depth questions and concerns about the garage and the implementation of an online platform.

Some of the mechanics and customers at the Jakinda Garage were interviewed by the researcher. Interviewing made them feel like they were a part of the proposed system, thus it was a huge success. The staff freely shared their perspectives and made the session interactive. . This tool helped in capturing both the functional and non-functional requirements of the system.

**Advantages:**

* In a short amount of time, a lot of information was gathered.
* A substantial amount of data was gathered to aid in developing the functional and non-functional needs of the online platform.
* The project was better understood by the interviewer and the interviewees.

**Challenges:**

* Consumed more time with some interviewees as they could go off-topic while answering the questions.

#### 3.4.1.3 Observations

Observations involve directly observing users' behaviors and interactions in real-world scenarios. They provide insights into user experiences, workflow patterns, and process improvement opportunities. Observations were conducted by the researcher at the garage to capture tacit requirements and be used to validate data from interviews and questionnaires. However, the observation required time and had limited generalizability.

## 3.5 DATA AND SYSTEM ANALYSIS

Data was gathered utilizing the various above-mentioned procedures, and the results were tabulated. It was analyzed to decide whether or not it would be best to put the system into place. The results are depicted in the table, graph and pie-chart below:

### 3.5.1 The type of vehicles

*Figure 3: Pie chart showing the type of vehicles brought for repair and servicing.*

In the pie chart:

* Toyota represents 40% of the total vehicle types.
* Nissan represents 25% of the total vehicle types.
* Mazda represents 10% of the total vehicle types.
* Subaru represents 10% of the total vehicle types.
* Others represent 10% of the total vehicle types.

### 3.5.2 The type of repairs and services offered

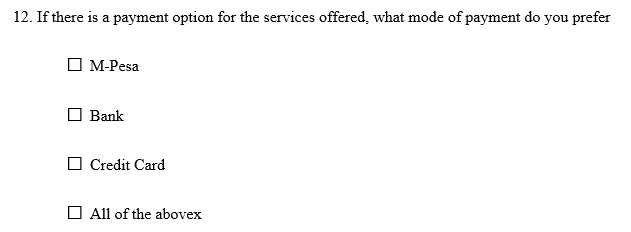
|  |  |
| --- | --- |
| **Activity** | **Description** |
| Engine Repair and Tuning | -Replacement of engine oil to ensure proper lubrication.  -Comprehensive inspection and adjustment of the engine components. |
| Wheel and Suspensation repairs | -Rotating tires to ensure even wear and extend their lifespan.  -Aligning the wheels to improve vehicle handling and tire wear  -Repairing or replacing damaged or worn-out suspension components  -Repairing or refinishing damaged wheels and rims |
| Brake system repairs | -Checking and assessing the condition of the braking system |
| Body modification | -Fixing dents, scratches, and providing paint jobs  -Thorough cleaning and restoration of the vehicle's interior |
| Full vehicle overhaul | -Identifying and troubleshooting vehicle issues through diagnostics.  -Maintenance and fluid replacement for the transmission system. |
| Others | -Replacement of the vehicle's battery when it is no longer functional  -Recharging the air conditioning system for optimal cooling  -Repairing or replacing damaged exhaust components  -Replacing broken or damaged windows or windshields  -Exterior cleaning and detailing to enhance the vehicle's appearance.  -Comprehensive packages including cleaning, polishing, and protection. |

*Table 3: The type of services offered at the garage.*

### 3.5.3 The most used mode of payment

A few of the Jatinga Garage crew and customers were asked about the payment options that they would prefer if they were to transact for the services offered. This was to help come up with what mode of payment should be first incorporated into the system as the garage utilizes different modes of payment.

The following section of questionnaires was used:



|  |  |  |
| --- | --- | --- |
|  | Number of responses | Percentage |
| M-Pesa | 11 | 58 |
| Bank | 1 | 5 |
| Credit Card | 5 | 25 |
| All of the above | 2 | 11 |

Graphical representation:

*Figure 4: Graphical representation of the most used mode of payment.*

According to the analysis of the responses, M-Pesa is the preferred mode of payment. Due to this result, it is most important to incorporate M-Pesa first as the mode of payment and later other payment options such as credit card transactions.

## 3.6 SYSTEM SPECIFICATION

This entails the system requirement in terms of both functional and non-functional requirements.

### 3.6.1 FUNCTIONAL REQUIREMENTS

These kinds of requirements capture the intended behavior of the proposed system. They are expressed in terms of services, tasks, and functions the system is required to perform for its users. They are:

1. User Registration and Authentication:

• Users should be able to create an account and log in securely.

• User authentication mechanisms should be implemented to ensure the security of user accounts.

2. Vehicle Booking and Scheduling:

• Users should be able to select desired repair or servicing options for their vehicles.

• The system should provide a calendar or scheduling feature to allow users to book appointments.

• Confirmation notifications should be sent to users after successful booking.

3. Service Provider Management (Mechanics):

• The platform should support the management of service provider profiles.

• Service providers should be able to update their availability, skills, and service offerings.

• The system should facilitate the assignment of service providers to booked appointments.

4. Payment Processing:

• The platform should integrate with payment gateways to allow users to make secure online payments (MPESA).

• Payment processing should be seamless and user-friendly.

5. Feedback and Rating System:

• Users should be able to provide feedback and ratings for the services they received.

• The system should display average ratings and reviews for service providers.

• Service providers (Mechanics) should be able to respond to user feedback.

### 3.6.2 NON-FUNCTIONAL REQUIREMENTS

1. Performance:
   * The system should be highly responsive, ensuring fast loading times and minimal latency.
   * It should be capable of handling multiple concurrent users and data transactions without significant performance degradation.
2. Scalability:
   * The platform should be designed to handle increasing user demand and accommodate future growth.
   * It should be scalable both in terms of user capacity and data storage capacity.
3. Security:
   * The system should implement robust security measures to protect user data and prevent unauthorized access.
   * User authentication should be secure, employing encryption and strong password policies.
   * Payment transactions and personal information should be encrypted and protected.
4. Usability:
   * The user interface should be intuitive, easy to navigate, and visually appealing.
   * The platform should provide clear instructions and guidance to users throughout the booking and service process.
   * Accessibility features should be implemented to ensure inclusivity for users with disabilities.
5. Reliability:
   * The system should have high availability, with minimal downtime for maintenance or upgrades.
   * Data backups and disaster recovery mechanisms should be in place to prevent data loss.

## 3.7 SYSTEM DESIGN

The methodology used is **Agile**. It happens through an iterative process in which progress is seen after every sprint.

Agile is a flexible approach to project development and has several principles including customer satisfaction, welcomes changes, delivered frequently through sprints, working together, motivated team, simplicity, reflection and adjustments.

Its advantages are:

* Large amounts of interactions.
* Improved transparency
* Predictable output
* Allows for changes.

Agile methodology is implemented using different frameworks such as Scrum, Kanban and Extreme Programming. The framework used for this case is **SCRUM** which works by organizing time periods into fixed durations called sprints. Each sprint results in a potentially shippable increment of the product.

Scrum will help develop the entire software product by following agile methodology principles. Key components of the Scrum framework include:

1. Roles:

* Product Owner: Represents the stakeholders, defines the product backlog, and prioritizes the work to be done.
* Scrum Master: Facilitates the Scrum process, removes obstacles, and ensures the team adheres to Scrum principles.
* Development Team: Cross-functional group responsible for delivering potentially shippable increments of the product at the end of each sprint.

1. Artifacts:

* Product Backlog: An ordered list of requirements, features, or user stories that represent the work to be completed in the project.
* Sprint Backlog: The subset of items from the product backlog that the development team commits to completing during a sprint.
* Increment: The sum of all the product backlog items completed during a sprint, representing the new functionality added to the product.

1. Events:

Sprint: A time-boxed period during which the development team works to complete the agreed-upon items from the sprint backlog.

Sprint Planning: A meeting where the team selects the items from the product backlog to be worked on during the sprint.

Regular Scrum (Stand-up): A brief regular meeting where the team synchronizes activities and discusses progress and potential obstacles.

Sprint Review: A meeting at the end of each sprint where the team presents the completed work to stakeholders for feedback.

Sprint Retrospective: A meeting after the sprint review where the team reflects on the sprint process and identifies areas for improvement.

## 3.7.1 LOGICAL DESIGN

This design pertains to an abstract representation of the system design. In this project use case diagram, activity diagram, sequence diagram, and class diagram are used.

S

### 3.7.1.1 Use Case Diagram

The Use case diagrams summarize the system users’ details and how they interact with the Online Garage system**.**

**ONLINE GARAGE PLATFORM**

*Figure 5: Use case diagram of the garage platform*

### 3.7.1.2 Sequence Diagram

**i.) Main Menu Flowchart**

This shows the step by step representation of how a user navigates in the main menu.

Choose option

from the menu

Start

Display

selected

Menu Option

Perform the

selected task

start

**ii.)** **Login Flowchart**

This is a step by step representation of how a user logs into the system.

Admin login\_ID

and password

**Start**

End

Login to the

system succesfully

Check

login ID

password

Invalid login

password

Set user level and

permission

User is registered

Access the internal

functionalities

according to

permission

**iii.) Service Booking Flowchart**

Shows the step by step procedure a user uses to book a service on the system.

Select add service

User login

Log out

print receipt

Are client

details

correct

correct service

details

submit service

report

Enter vehicle

details

**iv.) Allocation of Mechanic Flowchart**

Receive service bookings

User login

Log out

print job ticket

Are

mechanics

available

Wait for

mechanics to be

available

respond to

booking officer

Check available

Mechanics

## 3.7.2 DATABASE DESIGN

It is concerned with how the data is represented and stored within the system.

### 3.7.2.1 Normalisation

To normalize the given database to the 3rd Normal Form (3NF), identify and remove any transitive dependencies between attributes. Transitive dependencies occur when a non-key attribute depends on another non-key attribute through a separate non-key attribute.

**1. UNF (b) SERVICE**  **(d) VEHICLE**

***(a) MECHANIC***

* Name  Service Number  Vehicle ID
* ID Number  Category  Number plate  Mechanic ID  Sender Name Registration  Department  Sender Phone No.  Engine No.
* Telephone  Sender ID No.  Make Model
* Sender Address  Driver Name

No.

* Address  Receiver Name  Driver ID
* Date of Birth  Receiver Phone No.
* Date of  Receiver ID No.
* Garage

Employment

* Name  Telephone

**st NF**  ID NumberMechanic ID  Date of EmploymentNo. **2. 1**

***(a) MECHANIC***  Department

 Garage  **(b) SERVICE**

* Service Number  Receiver Name  Vehicle ID
* Category  Receiver Phone No.  Number plate  Sender Name  Receiver ID No. Registration  Sender Phone No.  Garage  Engine No.
* Sender ID No.  Driver Name
* Sender Address  **(c) VEHICLE**   Driver ID

**3. 2nd NF**

1. ***MECHANIC***  Sender Name **(c) VEHICLE** 
   * + Sender Phone No.
     + Mechanic ID Sender ID No.  Vehicle ID



* + - Department Sender Address  Number plate 
    - Date of Receiver Name Registration 

Employment Receiver Phone No.  Engine No. 

1. **SERVICE**  Receiver ID No.  Driver Name Driver ID
   * garage 
   * Service Number  Driver Name
   * Category  Driver ID

**4. 3RD NF**  Service Number  Driver ID

* Category
* Sender Name **(c) VEHICLE**

***(a) MECHANIC***  Sender Phone No.  Vehicle ID

* Sender ID No.  Number plate
* Mechanic ID  Receiver Name Registration
* Department  Receiver Phone No.  Driver Name
* Designation  Receiver ID No.  Driver ID

**(b)SERVIVE**  garage

 Driver Name

Hence arranging the data into the 3NF:

1. First Normal Form (1NF):
   * MECHANIC (Mechanic ID [PK], Name, Telephone, Address, Department, Date of Employment)
   * SERVICE (Service Number [PK], Category, Sender Name, Sender Phone No., Sender ID No., Garage)
   * VEHICLE (Vehicle ID [PK], Number plate, Registration, Engine No., Driver Name, Driver ID)
2. Second Normal Form (2NF):
   * MECHANIC (Mechanic ID [PK], Name, Telephone, Address, Department, Date of Employment)
   * SERVICE (Service Number [PK], Category, Sender Name, Sender Phone No., Sender ID No., Garage)
   * VEHICLE (Vehicle ID [PK], Number plate, Registration, Engine No., Driver Name, Driver ID)
3. Third Normal Form (3NF):
   * MECHANIC (Mechanic ID [PK], Name, Telephone, Address, Department, Date of Employment)
   * SERVICE (Service Number [PK], Category)
   * MECHANIC\_SERVICE (Mechanic ID [PK], Service Number [PK])
   * VEHICLE (Vehicle ID [PK], Number plate, Registration, Engine No., Driver Name, Driver ID)
   * MECHANIC\_VEHICLE (Mechanic ID [PK], Vehicle ID [PK])

In the 3NF structure:

* The MECHANIC table contains information about mechanics and their attributes.
* The SERVICE table contains service-related information and attributes.
* The MECHANIC\_SERVICE table represents the many-to-many relationship between mechanics and services they provide.
* The VEHICLE table contains information about vehicles and their attributes.
* The MECHANIC\_VEHICLE table represents the many-to-many relationship between mechanics and vehicles they handle.

By organizing the data into the 3NF, I have removed any transitive dependencies and created separate tables for related data, leading to a more efficient and well-structured database.

### 3.7.2.2 Database tables

|  |  |  |
| --- | --- | --- |
| **MECHANIC DATA ENTRY** | |  |
| *DATE ITEM* | *TYPE* | *COMMENT* |
| Mechanic ID | Integer | Used as primary Key |
| Department | String | Select |

|  |  |  |
| --- | --- | --- |
| **SERVICE DATA ENTRY** | |  |
| *DATE ITEM* | *TYPE* | *COMMENT* |
| Service No | Number | Used as primary Key |
| Category | Text |  |
| Sender Name | Text |  |
| Sender Phone NO | Number |  |
| Sender ID | Number |  |
| Receiver Name | Text |  |
| Receiver Phone NO | Number |  |
| Receiver ID | Number |  |
| Garage | Text |  |
| Driver Name | Text |  |
| Driver ID | Number |  |

|  |  |  |
| --- | --- | --- |
| **VEHICLE DATA ENTRY** | |  |
| *DATE ITEM* | *TYPE* | *COMENT* |
| Vehicle ID | Integer |  |
| Number Plate Registration | Character | Used as primary Key |
| Garage | Text |  |
| Driver Name | Text |  |

### 3.7.2.3 Data Dictionary

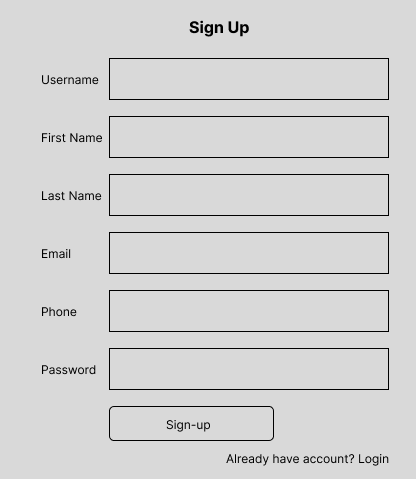
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ENTITY NAME** | **ENTITY**  **DESCRIPTIO**  **N** | **DAT**  **A**  **TYP**  **E** | **LENGT**  **H** | **PRIMAR**  **Y KEY** | **UNIQUENE**  **SS** | **NUL**  **L** |
| ***Mechanic*** | The engineer assigned the roles of servicing vehicles. |  |  |  |  |  |
| ID | The Unique  identification for the Mechanic employment number | Intege  r | 10 | Yes | Uniquely identifies the  Mechanic | No |
| Department | The major part of the garage a mechanic works in. | String | 15 | No | Uniquely  identifies the  Mechanic section | No |
| ***Service*** | The work, or action to be done on vehicle. |  |  |  |  |  |
| Service No | The unique number generated by the system | Varcha  r | 20 | Yes | Uniquely identifies the service being ordered. | No |
| Category | The type of service being | string | 10 | No |  |  |

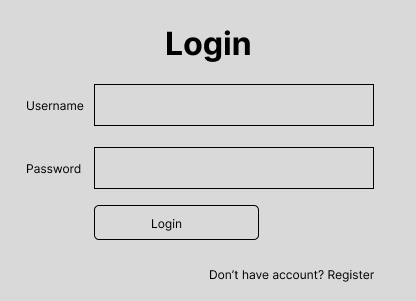
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ordered e.g. partial or full. |  |  |  |  |  |
| Sender Name | The name of the sender of the service. | String | 100 | No | Identifies the sender of the service. | No |
| Sender Phone No | The telephone number of the sender. | Intege  r | 15 | No | The unique telephone number of the sender. | No |
| Sender ID No | The  Identification Number of sender of service. | Intege  r | 20 | No | The unique identification Number of the sender. | No |
| Receiver  Name | The name of the receiver officer of the service. | String | 100 | No | Identifies the receiver of the service. | No |
| Receiver Phone No | The telephone number of the receiver. | Intege  r | 15 | No | The unique telephone number of the receiver. | No |
| Receiver ID No | The  Identification Number of  receiver officer of service. | Intege  r | 20 | No | The unique identification Number of the receiver. | No |
| Garage | The name of the active garage. | String | 100 | No | Identifies the name of the active garage. | No |
| Driver Name | The name of the driver of a yet to be serviced vehicle. | String | 100 | No | Identifies the name of the driver of a yet to be serviced vehicle. | No |
| ***Vehicle/Own***  ***er*** | The vehicle yet to be serviced. | String | 100 | No | Identifies the name of the vehicle yet to be serviced. | No |
| Vehicle ID | The unique number generated by the system | Varcha  r | 20 | Yes | Uniquely identifies the vehicle to be serviced. | No |
| Number Plate Registration | The unique number vehicle. | Varcha  r | 20 | Yes | Uniquely  identifies the  unique number vehicle to be serviced. | No |

## 3.7.3 PHYSICAL DESIGN

This design relates the actual input and output processes of the system. The design has been laid down in terms of how data is input into the system, how it is authenticated or verified, how it is processed and how it is output.

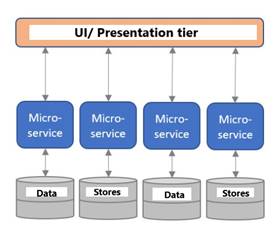
The different interface designs for the various forms where the input of data will be taking place have been listed below.





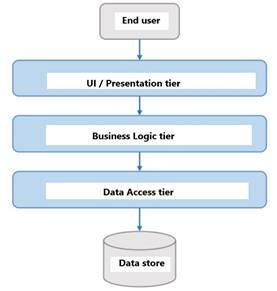
## 3.7.4 SYSTEM ARCHITECTURE

The proposed solution will have a micro-service architecture, in which the application will be divided into small independent well-defined services that communicate over their defined API. Micro-services have their logic, state, and deployment. Since they are loosely coupled, they can be maintained, scaled, and upgraded independently.



*Figure 7: The system architecture diagram*

Each service will utilize the N-tier architecture. The N-tier design, allows applications to be divided into well-defined tiers which include the interface, business logic, and the data back-end.



*Figure 8: The N tier architecture*

## 

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## List of Appendices

### Appendix one: Project Budget

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.no** | **Item** | **Specifications** | **Units** | **Cost** |
| 1. | Laptop | 4GB RAM  256GB SSD storage  Intel Core i5 | 1 | (provided) |
| 2. | Operating system | Windows 10 pro | - | - |
| 3. | Printing and stationary | A5 | - | 2,250 |
| 4. | Internet | Tender wi-fi | - | (provided) |
| 5. | External Disk | 64GB storage | 1 | 1,500 |
| 6. | Software tools | Apache  MySQL  PHP  Visual studio  Jenkins  Laravel  REST | **-** | **-**  (open source) |
| 7. | **Total cost** | | | **3,750/=** |

### Appendix two: Project Schedule

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Task** | **Duration**  **(days)** | | **Expected start date** | **Expected end date** | **Actual start date** | **Actual end date** | **Deliverables** |
| Project idea and approval | 9 | | 1/02/2023 | 15/02/2023 | 10/02/2023 | 19/02/2023 | Proposed procedures to the accepted project idea |
| Proposal writing | 27 | | 22/02/2023 | 17/03/2023 | 23/02/2023 | 22/03/2023 | Proposed documentation |
| Data collection and analysis |  | | 04/04/2023 | 2/05/2023 |  |  | Actual data collected and report |
| Requirements gathering |  | | 5/05/2023 | 15/05/2023 |  |  | System requirements |
| Prototyping |  | | 20/05/2023 | 15/06/2023 |  |  | Prototype of the system |
| Iterative development |  | | 18/06/2023 | 30/06/2023 |  |  | Working prototype |
| Quality assurance |  | | 1/07/2023 | 20/07/2023 |  |  | working system |
| Deployment |  | | 23/07/2023 | 26/07/2023 |  |  | Working system |
| Documentation | 171 | 1/02/2023 | | 27/07/2023 |  |  | Project documentation |

### Appendix Three: Gantt Chart

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Task | Feb-Feb | Feb-Mar | Mar-Apr | May-May | May-Jun | Jun-July |
| Proposal writing |  |  |  |  |  |  |
| Data Collection |  |  |  |  |  |  |
| Requirements gathering |  |  |  |  |  |  |
| Prototyping |  |  |  |  |  |  |
| Quality assurance |  |  |  |  |  |  |
| Deployment |  |  |  |  |  |  |
| Documentation |  |  |  |  |  |  |

### Appendix Four: Questionnaires

**SECTION A: Personal Details**

1. Gender

* Male
* Female

1. Age (in years)

* Between 18 and 25
* Between 25 and 35
* 35 and above

3. Do you own a smart phone or tablet?

i. Yes [ ] ii. No [ ]

**SECTION B: System Information**

1. How satisfied are you with the ease of scheduling an appointment on our online platform?
   * Very Satisfied [ ]
   * Satisfied [ ]
   * Neutral [ ]
   * Dissatisfied [ ]
   * Very Dissatisfied [ ]
2. On a scale of 1 to 5, how would you rate the overall quality of service provided by our mechanics?
   * 1 (Poor) [ ]
   * 2 (Below Average) [ ]
   * 3 (Average) [ ]
   * 4 (Above Average) [ ]
   * 5 (Excellent) [ ]
3. How likely are you to recommend our online garage platform to your friends or family?
   * Extremely Likely [ ]
   * Likely [ ]
   * Neutral [ ]
   * Unlikely [ ]
   * Extremely Unlikely [ ]
4. How satisfied are you with the range of services offered on our platform?
   * Very Satisfied [ ]
   * Satisfied [ ]
   * Neutral [ ]
   * Dissatisfied [ ]
5. Please rank the following factors in order of importance when choosing an online garage platform:
   * Price competitiveness [ ]
   * Service quality [ ]
   * Availability of mechanics [ ]
   * Ease of booking appointments [ ]
   * Timely completion of repairs [ ]
6. Rank the service packages offered on our platform based on your preference:
   * Basic (Standard services) [ ]
   * Standard Plus (Standard services + cleaning) [ ]
   * Premium (Standard services + cleaning + detailing) [ ]
7. Rank the vehicle models you own in terms of frequency of repair and servicing required:
   * Toyota [ ]
   * Nissan [ ]
   * Mazda [ ]
   * Subaru [ ]
   * Others (Please specify) [ ]…………………………………………………

Thank You.