# CHAPTER ONE

## INTRODUCTION

## 1.1 Background of the study

Transportation is one of the most vital aspects of urban and economic growth, as cities expand mobility becomes a crucial factor for influencing productivity, accessibility and quality of life, in cities like Abuja citizens face significant transportation challenges including expensive fares, extreme traffic congestion, and limited public transportation among others, Therefore the need for safe, efficient, and affordable means of transportation has become more pressing in recent years.

With the rise of digital transformation, the integration of technology into the transportation sector has led to the emergence of platforms like Uber, Bolt, Rida and Indrive, these platforms utilize mobile apps, GPS technology, and data analytics to efficiently connect passengers with available drivers.

The proposed system AbjCab is a ride-sharing platform tailored for intra-abuja commuters .This system focuses on cost sharing, smart route matching, driver verification and real-time ride tracking. By applying modern software engineering and system design principles, AbjCab seeks to provide a more convenient and wallet friendly transport option for the city’s residents.

## 1.2 Statement of the problem

Long ride-times, traffic jams, high costs, and inadequate public infrastructure plague Abuja’s transport system. Many individuals are made to rely on single-passenger rides or private cars, which increases fuel consumption and traffic congestion. Additionally, existing ride-hailing services in Nigeria often charge high service fees, limiting accessibility for low- and middle-income earners.

Furthermore, there is limited coordination among commuters traveling similar routes, leading to inefficiency and wasted resources

There is also the issue of passenger safety, as unverified drivers or lack of real-time tracking exposes users to potential risks. These challenges highlight the need for a centralized and secure ride-sharing platform that enables multiple passengers to share rides, split costs, and travel efficiently within Abuja.

The absence of such a localized and affordable system creates a gap that AbjCab aims to fill through an intelligent, data-driven, and user-friendly solution.

## 1.3 Aim and Objective of the Study

The aim is to design and implement a ride-sharing platform that enables intra-Abuja commuters to share rides conveniently, safely, and affordably.

Objectives:

To examine Abuja's current transport systems and identify their shortcomings.

To design a database-driven platform for user registration, ride matching, and cost-sharing.

To incorporate real-time tracking and driver verification for safety.

To develop an easy-to-use/intuitive interface for booking rides and viewing routes.

## 1.4 Research Questions

This study seeks to answer the following questions:

What are the main challenges affecting intra-city transportation among commuters in Abuja?  
How can technology be used to optimize ride-sharing and cost distribution among passengers?  
What system architecture and algorithms are most suitable for implementing efficient route matching and real-time tracking?  
How can safety and trust be enhanced through digital verification and tracking features?  
To what extent can the proposed AbjCab platform reduce commuting costs and travel time for Abuja residents?

## 1.5 Significance of the study

The significance of this study. Academically is to contribute to knowledge in software engineering and smart transport systems, and data-driven transport solutions. It provides a framework for designing sustainable and scalable ride-sharing platforms applicable in developing cities.

Technically, the study demonstrates the use of programming, GPS integration, and algorithmic route optimization in addressing real-world urban transportation challenges. Socially, the proposed system promotes affordable commuting, reduced traffic congestion, and aims to foster a sense of community, thereby supporting Nigeria’s broader goals for sustainable urban development.

## 1.6 Limitations of the project

The development of this project faced several constraints. Time constraints restricted the extent of testing and optimization that could be performed. Access to live transportation data and funding for large-scale deployment were also limited. Additionally, network connectivity challenges and limited access to high-end GPS devices constrained the system’s real-time performance.

Despite these limitations, the project successfully demonstrates the feasibility of using technology to enhance transportation efficiency within Abuja.

## 1.7 Project risk assessment

Developing AbjCab has potential risks that may affect project success. These risks may be technical, operational, financial, or environmental in nature. Identifying and managing them early will ensure smooth project execution and reliable system performance after deployment.

Table 1.1: Project Risk Assessment Table

| **Risk description** | **Mitigation strategy** | **Impact** | **Likelihood** |
| --- | --- | --- | --- |
| Data breach leading to unauthorized access to user personal information, payment details, and location data | Use strong authentication, data encryption, and conduct regular checkups | High | Medium |
| Data loss or corruption | Regular Back-up of data | High | Medium |
| System unavailability due to hosting issues. | Make use of reliable hosting to keep the server running smoothly | High | Low |
| The app may not work well on older devices | Conduct comprehensive cross-device testing, optimize application performance for various device specifications, and provide backward compatibility support | Low | Low |
| Possible government or transport authority limitations. | Ensure proactive compliance with existing transport regulations, obtain necessary operational licenses, and maintain ongoing dialogue with regulatory authorities | Medium | Low |
| Unexpected events, such as weather or health emergencies, can disrupt progress. | Maintain flexible schedules and utilize remote collaboration tools. | High | Low |
| Poor or unstable internet affecting the app use or development. | Optimize app for low-bandwidth performance and use offline caching for essential features. | Medium | High |
| Human error leading to mistakes during coding, data entry, or configuration. | Establish frequent code reviews processes, double-check configurations, maintain detailed documentation, and provide thorough staff training | Medium | Medium |

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## 1.8 Scope/ Project Organization

The AbjCab platform covers the design and deployment of a digital ride‑sharing system that connects commuters traveling along similar routes within Abuja. Its primary objective is to facilitate efficient ride requests, bookings, and shared trips, while enabling drivers to register vehicles, accept ride offers, and receive payments securely through the app. The project seeks to encourage cost‑sharing, ease traffic congestion, and offer a safe, technology‑enabled transport alternative for city residents.

Key features include user registration and authentication, ride creation and matching, booking and seat selection, fare‑sharing computation, in‑app communication between drivers and passengers, and real‑time location based ride tracking. Administrative capabilities cover driver verification, platform monitoring, report generation, and dispute resolution. To strengthen trust and accountability, security measures such as user ratings, verified driver profiles, and live trip monitoring are also integrated.

The project scope excludes physical or logistical management aspects such as vehicle maintenance, fuel handling, and offline payments. Likewise, large‑scale third‑party integrations beyond essential navigation or payment APIs remain beyond this implementation phase. Advanced functionalities like AI‑driven route optimization, surge pricing, and complete fleet management are recognized as potential future enhancements, not part of the current release.

The platform is organized into three main roles:

Administrators: Oversee user management, driver credential verification, platform oversight, dispute handling, and compliance.

Drivers: Register on the platform to offer rides, transport passengers, manage schedules, view trip history, and process in‑app payments.

Passengers (Riders): Search for available rides, view seats, book trips, and share travel costs with others heading in the same direction.

Overall, the project organization defines clear user roles, operational flow, and system boundaries. The outlined scope ensures focused delivery of a secure, dependable, and intuitive ride‑sharing solution for intra‑city commuting in Abuja, with the capacity to integrate advanced features in future developments