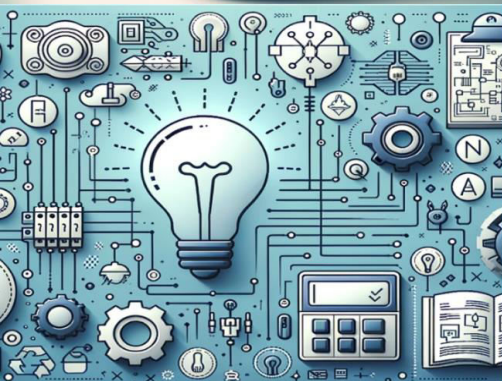# International Journal of Multidisciplinary
Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Tripass: A Web-Based Platform for Tricycle Permit Automation, Driver Monitoring, and QR Passenger Information Access

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ABSTRACT: Cantilan's manual tricycle permit system led to inefficiencies and limited transparency, impacting transport management and passenger safety. This study presents Tripass, a web-based platform developed for the local government that automates permit issuance, driver monitoring, QR-based information access, and ride-booking features. Using the Agile SDLC, Tripass was evaluated by 50 purposively selected respondents using ISO/IEC 25010 software quality standards. Tripass earned a Grand Mean of 4.55 ("Excellent"), with the strongest performance in Functional Suitability (4.80) and high scores in Usability, Portability, Security, and Reliability. Implementing Tripass improves administrative efficiency and transparency in tricycle permit processing, emphasizing the value of digital transformation. Future enhancements are recommended, such as mobile application development and digital payment integration.

KEYWORDS: Tricycle Permit Automation, Web-based Platform, Ride Booking System, QR Code Verification, ISO/IEC 25010

I. INTRODUCTION

Tripass is a web-based platform designed to address the challenges of the current manual tricycle permit process. This system allows drivers to register and apply for permits online while enabling the municipal office to manage, approve, and monitor them more efficiently. In addition, a QR code on the system allows passengers to view a driver's permit status, promoting transparency and building commuter trust. Furthermore, Tripass includes a booking request feature that connects passengers with available tricycle drivers, providing drivers with additional income opportunities.

Manual permit registration processes frequently result in long queues, processing delays, and significant dissatisfaction among applicants [1]. Paper-based workflows not only limit transparency and hinder accessibility but also diminish public engagement in essential government services [2]. Furthermore, the manual validation of Motorized Tricycle Operator's Permits (MTOPs) is often linked to frequent delays and increased risk of document mismanagement. Despite these challenges, existing systems still lack a unified platform that seamlessly integrates permit applications, passenger information access, and ride booking [3].

Currently, there is no online process specifically tailored for tricycle permits. Additionally, ride-hailing services are predominantly operated by private companies and remain disconnected from local government systems, which restricts the potential benefits for local drivers. To address these critical gaps, this study introduces Tripass, a web-based platform designed to automate tricycle permit registration, streamline permit monitoring, provide QR code-based

access to driver information for passengers, and incorporate a booking feature that enhances driver income and commuter convenience.

II. LITERATURE REVIEW

The rapid advancement of information technology has transformed how local governments manage public services. Traditionally, tasks such as permit issuance and transport regulation relied on manual, paper-based systems, often resulting in inefficiency and human error. The adoption of smart governance, which uses digital platforms to enhance transparency and streamline processes, has become crucial. In the transportation sector, web-based systems and real-time data verification are essential for passenger safety and regulatory compliance. This review synthesizes relevant literature to lay the groundwork for automating the tricycle permit and information system in Cantilan, highlighting the potential benefits and challenges of technological adoption in local governance.

Sumeena et al. proposed "Unique QR Code for Vehicle Verification" [4]. The authors discussed the implementation of QR code systems as a modernized tool for vehicle verification, enabling instant digital access to critical documents such as registration certificates, insurance policies, and pollution control certificates via standard smartphones. This digitalization significantly reduces the traditional reliance on physical paperwork, which is prone to wear and loss, and minimizes human error during manual data entry. Furthermore, it serves as a robust mechanism against document forgery by providing drivers and traffic authorities with rapid, secure retrieval of essential information. This work is crucial as it supports the core verification feature of the Tripass system, where passengers scan a tricycle driver's QR code to instantly validate their permit status, thereby ensuring operational transparency and enhancing passenger safety.

Carpio et al. presented "Streamlining Motorized Tricycle Operator's Permit Management in Isabela City, Basilan through QR Code-based Records Keeping and Verification" [3]. The study detailed the technical implementation of a QR code-based Motorized Operator's Permit (MTOP) system, where each tricycle driver's permit is assigned a unique, encrypted code linked to a centralized municipal database. Through this system, authorities can instantly verify permit authenticity during roadside inspections, effectively streamlining enforcement processes and substantially reducing the risk of document falsification or the operation of unregistered ("colorum") vehicles. This work is useful for the current research because Tripass builds upon this concept by not only verifying permits but also integrating a comprehensive ride-booking feature, which significantly expands the utility of the digital platform beyond simple regulatory compliance.

Alindajao et al. presented "Impacts of Digitization of Business Permits and Licenses in District 3 Quezon City" [1]. The researchers analyzed the administrative transition from manual to digital permit processing, finding that digitization drastically reduced processing times and improved the "ease of doing business" metric for applicants by eliminating redundant manual steps. This study validates the core objective of Tripass to automate the tricycle permit system, confirming that digital platforms are effective tools to minimize administrative delays, reduce bureaucratic bottlenecks, and enhance overall transaction efficiency for local government units.

Pandey et al. presented "Online Driver Booking Service" [5]. The authors developed an online driver booking system that eliminated the operational necessity for physical booking offices, thereby reducing overhead and increasing accessibility. Their platform prioritized user convenience and safety, utilizing advanced sensors to monitor driver behavior and detect anomalies in real-time. By integrating these safety monitoring features, the system provided passengers with greater assurance and security during their rides. This work introduces a feasible solution for digital ride booking, which is a key component of the Tripass project and ensures the system will serve as both a regulatory tool for the LGU and a modern convenience for daily commuters.

Manaois et al. proposed "The Assessment of the Usage, Attitude, and Image of Filipino Students Utilizing Motorcycle Taxi Hailing Services as Alternative Transportation in the NCR" [6]. The study investigated the usage patterns and behavioral attitudes of students regarding ride-hailing services, finding that ease of booking, strict adherence to safety protocols, and visible hygiene measures were the most valued aspects influencing their choice of transport. The findings suggested that the successful adoption of digital transport services depends heavily on prioritizing safety and perceived reliability. This allows the current research to tailor the Tripass user interface and features, particularly the driver verification protocols and booking history logs, to meet the specific needs and expectations of the riding public in Cantilan.

Relevance to current Research

This study addresses the specific needs of the Municipality of Cantilan by integrating local government protocols with modern web technologies. In contrast to generic solutions, the proposed system not only digitizes permit issuance but also strengthens driver data integrity and improves commuter safety. By bridging the gap between manual administrative processes and digital solutions, the system enables verification and secure ride-booking, aligning digital convenience with robust regulatory standards.

TABLE 1. *Summary of Relevant Literatures*

No.	Paper Title	Author Name	Key Points	Remark
1	Unique QR Code for Vehicle Verification	Sumeena S, Muhammed Hassan A K, Varsha Vasav, Amrutha Vishnupriya S, 2020	Discusses using QR codes to access vehicle docs instantly via smartphones [4].	Highlights the efficiency of QR codes in replacing physical paperwork.
2	Streamlining Motorized Tricycle Operator's Permit Management in Isabela City, Basilan through QR Code-based Records Keeping and Verification	Claire O. Carpio , Saddam L. Pacio , Abdulgani H. Sahar, 2023	Implemented a QR-based MTOP system to verify permits during inspections [3].	Addresses the issues concerned with manual permit verification.
3	Articles Impacts of Digitization of Business Permits and Licenses in District 3 Quezon City	Ian Dave U. Alindajao, Neygen D. Abbot, Jayson B. Mariñas, Bernandino P. Malang, Florinda G. Vigonte, 2023	Analyzed how digitizing permits reduced processing time and improved ease of doing business [1].	Supports the study's objective to improve administrative efficiency through automation.
4	Online Driver Booking Service	Uttam Pandey, Raghuwansh Kumar Singh, Asst. Prof. Sanchi Kaushik, 2021	Developed a booking system eliminating physical offices; integrated safety sensors [5].	Relevant to the "Booking" feature of Tripass, emphasizing safety.
5	The Assessment of the Usage, Attitude, and Image of Filipino Students Utilizing Motorcycle Taxi Hailing Services as Alternative Transportation in the NCR	Karl Nikolai Manaois, Ronaldo Tan, John Carlo Abadilla, Rappunzel Manaoat, Ronald Romero, Rommel Matienzo Jr, Joshua Biscocho, Bernard Letrero, 2024	Found that students value ease of booking, safety protocols, and hygiene [6].	Used to tailor the system to user preferences for safety and ease.

In summary, this study builds on previous research by examining how the automation of permit systems and ride-booking can enhance administrative efficiency and public trust. Whereas earlier studies addressed isolated aspects such as verification or booking, this research focuses on developing a unified platform that integrates both functions for the

Municipality of Cantilan. By integrating these technologies, the study aims to develop a more transparent, efficient, and user-centric system.

III. METHODOLOGY

Research Design

This study employed a descriptive-developmental research design. The developmental component focused on creating the Tripass system using the Agile Software Development Model, while the descriptive component evaluated the system's acceptability using ISO/IEC 25010 standards.

Instrument

The primary data gathering instrument was a structured survey questionnaire adapted from the ISO/IEC 25010 Software Quality Standards. The questionnaire was designed to measure the system's performance across eight criteria: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Each item was rated using a 5-point Likert Scale.

Data Collection and Participants

The researchers employed a purposive sampling technique to select these participants, ensuring that the respondents were chosen based on their direct relevance to the system's operations. The study involved approximately 50 participants, comprising 5 IT practitioners, 5 local government officials, 15 CDOA drivers, and 25 passengers.

Data Analysis

The data gathered from the survey questionnaires were analyzed using descriptive statistics. The primary statistical tool employed was the Weighted Mean, which was calculated to determine the average perception of the respondents regarding the system's quality based on the ISO 25010 criteria.

The results were interpreted using the following Likert Scale range:

TABLE 2. *Data Analysis and Interpretation Scale*

Scale	Range of Mean	Descriptive Rating	Interpretation
5	4.20 – 5.00	Excellent	The system exceeds expectations.
4	3.40 – 4.19	Very Good	The system meets expectations well.
3	2.60 – 3.39	Good	The system meets expectations adequately.
2	1.80 – 2.59	Fair	The system needs improvement.
1	1.00 – 1.79	Poor	The system does not meet expectations.

IV. RESULTS AND DISCUSSION

System Features

Tripass features four key modules: an Admin Dashboard for permit validation and monitoring, an Inspector Module for digital vehicle safety checks, a Driver Portal for registration and booking management, and a Passenger Interface for ride booking and QR code-based driver verification.

Performance Evaluation

The system was evaluated using ISO/IEC 25010 standards, achieving an overall "Excellent" rating with a Grand Mean of 4.55. Functional Suitability received the highest rating (Mean = 4.80), indicating that Tripass effectively provides all necessary tools for permit applications, inspections, and booking.

TABLE 3. *Performance Evaluation System Tabulation*

Table	Quality Characteristic	Mean	Interpretation
1	Functional Suitability	4.80	Excellent
2	Performance Efficiency	4.32	Excellent
3	Usability	4.65	Excellent
4	Reliability	4.51	Excellent
5	Security	4.48	Excellent
6	Compatibility	4.54	Excellent
7	Maintainability	4.50	Excellent
8	Portability	4.60	Excellent
Over-All Mean		4.55	Excellent

V. CONCLUSION

This study successfully developed Tripass, a web-based platform that modernizes the manual tricycle permit and transport system in the Municipality of Cantilan. By integrating a centralized dashboard, digital inspection checklists, QR-based passenger interface and ride-booking features, the system achieved an "Excellent" rating in the ISO/IEC 25010 evaluation. The platform effectively addresses the need for administrative efficiency and public safety.

The system achieved an overall rating of "Excellent" (Grand Mean = 4.55) based on ISO/IEC 25010 standards, particularly in Functional Suitability (4.80), confirming that Tripass streamlines administrative workflows while significantly enhancing commuter convenience and safety through digital booking and QR verification. By providing drivers with additional income opportunities and ensuring transparent transport, the system fosters a safer local transportation ecosystem and serves as a scalable model for other Local Government Units, with future recommendations including native mobile application development and cashless payment integration.

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