**“Implementation of a Quick Response (QR) Code System for Efficient Verification of Operators and Drivers in TODA”**

GROUP 12

**Chapter 1**

**Background of the Problem**

The transportation sector, particularly in rural and semi-urban areas, heavily relies on traditional modes of transport such as tricycles, which are often organized into associations known as Tricycle Operators and Drivers' Associations (TODAs). These organizations typically regulate the operations of tricycle drivers, ensuring adherence to local laws, providing a unified tariff system, and enhancing safety for passengers. However, in many regions, TODAs face challenges in efficiently managing and verifying the identities of their members.

One significant issue within TODAs is the difficulty in ensuring the legitimacy and authenticity of tricycle operators. This is particularly problematic when verifying if a driver is officially registered, licensed, and authorized to operate within a specific jurisdiction. Existing manual verification processes are often time-consuming, prone to human error, and susceptible to fraudulent activities, such as unregistered operators working within the association or the use of forged documents.

Many TODAs still rely on paper-based records or outdated databases for tracking operators, which is hard to update, prone to data loss, and inefficient in real-time tracking. This makes it difficult for local authorities or transport coordinators to verify operators' credentials quickly and accurately. Traditional manual methods of verifying tricycle operators (e.g., checking ID cards or membership lists) are prone to errors, fraud, and time delays. This can lead to difficulty in identifying legitimate operators, allowing unregistered or unauthorized individuals to operate in TODA areas, posing safety risks to passengers.

Furthermore, passengers and authorities may struggle to quickly identify legitimate operators from unauthorized ones, leading to safety concerns, regulatory non-compliance, and inefficiencies in monitoring. This situation is exacerbated in densely populated urban areas where tricycle operators may frequently change routes or engage in informal activities outside of TODA regulations. Despite these advantages, several challenges need to be addressed, including the digital literacy of operators, the availability of mobile devices and internet connectivity, and the initial setup costs for integrating QR code systems within existing TODA structures.

This research seeks to explore the feasibility, effectiveness, and potential impact of implementing a QR code-based verification system for tricycle operators in TODAs, aiming to provide a scalable and sustainable solution to the longstanding challenges of member identification and operational transparency in the sector.

**Overview of the Current State of Technology**

In recent years, technological solutions, such as digital identification systems and mobile applications, have been proposed to streamline verification processes. One promising solution is the use of QR codes for quick, efficient, and reliable identification of tricycle operators. QR codes can store a range of information, including operator identification, registration status, and vehicle details, which can be easily scanned using mobile devices. The adoption of a QR code-based verification system could significantly reduce administrative burden, improve transparency, and increase accountability within TODAs.

There have been innovations and solutions proposed by the government regarding this situation. An example would be Paleng-QR Ph. A program developed by the Bangko Sentral ng Pilipinas (BSP) and the Department of the Interior and Local Government (DILG) to promote cashless payments in local transportation. The program encourages local government units to promote digital payments among TODA. TODA and other vendors are expected to display their QR codes in their vehicles and stores. The Paleng-QR Ph program highlights the significance of market purchases and local transportation fares as basic components of an average Filipino’s typical payment pattern. Until a market vendor and tricycle driver can accept digital payments, transitioning to cashless transactions would be difficult for an average Filipino consumer.

Hence, the implementation of QR CODE system possesses great benefits, but it is not being used by the commuters since it causes delay, malfunction and needed connection to scan the QR.

Digital Literacy: Some operators, especially in rural or underserved areas, may not be familiar with using smartphones or apps, which could require additional training or support.

System Integrity and Security: Ensuring the security of data stored in the centralized system is crucial to prevent fraud, unauthorized access, or tampering with QR codes as well as storage for the information/data.

Connectivity: For real-time verification to work effectively, a reliable internet connection is required. This may be challenging in remote areas.

Regulatory Compliance: The adoption of such technology needs to be in line with local regulations and supported by local governments to ensure its acceptance and legitimacy.

In conclusion, implementing QR code systems for the verification of tricycle operators in TODAs induced problems such as widespread adoption and effective use of the system, particularly in areas with low digital literacy, infrastructure challenges, and concerns over data security.

**Project Rationale**

Most passengers use tricycle service in their daily lives. Commuters use tricycles going to school, work, church, markets and more. This study aims to have a more efficient and convenient process on public tricycle operation. The said study will benefit both operators/drivers and passengers. Operators/drivers will be verified via QR code to ensure legitimacy and minimize if not removed all unregistered tricycles and unlicensed drivers (colorum). It will give higher chances for our legitimate operators/drivers to earn more. On the other hand, passengers will have more confidence and security while using the service of our tricycle operators/drivers. Using QR codes is a great way to streamline the user experience and ensure customers can access information as quickly and efficiently as possible. By scanning a QR code, customers can go straight to a landing page or check-in at a location without having to speak to a staff member or ask for support.

It will benefit tricycle operators regarding the queuing within the terminal and it will increase the efficiency and effectiveness of the transportation service. Safety and security of the passengers because with efficient verification commuters will know if the tricycle operators are legitimately operating within its vicinity since it is a habit of operators to get passengers that are not within the drivers area of span.

A QR code-based system offers a modern, cost-effective, and scalable solution to these challenges. By embedding a unique, tamper-proof code in each registered operator's ID, both passengers and enforcement authorities can quickly verify an operator's credentials with a simple scan. This would significantly reduce the chances of fraud, enhance the efficiency of the verification process, and increase transparency in the operation of TODAs.

Additionally, such a system would streamline regulatory oversight by providing a real-time record of operator activity and compliance. This is particularly important in areas where there are large numbers of informal or unregistered operators. With the integration of QR codes, TODAs can maintain better control over their members, ensuring that only legitimate and licensed operators are allowed to provide services.

Ultimately, implementing a QR code-based verification system will not only improve safety and reduce fraud but also promote confidence in the tricycle transportation system, benefiting both operators and passengers alike. It will help create a more organized, regulated, and secure framework for the industry, supporting its long-term sustainability and growth.

**Chapter 2**

**Statement of the problem**

The problem is that Tricycle Operators and Drivers Associations (TODAs) face significant challenges in verifying the identity and legitimacy of tricycle operators, leading to issues such as fraud, lack of safety, and difficulty in regulatory oversight. Current manual identification methods are time-consuming, prone to errors, and easily exploited, making it difficult to ensure that only registered and authorized operators are allowed to provide services. This results in compromised passenger safety, confusion in the regulatory process, and a lack of trust in the system.

Since this study is about implementing a QR code system for efficient verification of tricycle operators, it will need a reliable device and knowledge in basic websites and applications. In reality, not everyone owns a cell phone or tablet and even knows how to use them. Operators and drivers that have either one of these issues might struggle with this system.

In conclusion, without a reliable and effective system for verifying operators, TODAs face difficulties in managing their members, while passengers lack a straightforward way to confirm the legitimacy of operators before using their services. This highlights the need for a more secure, efficient, and easily accessible method for verifying tricycle operators.

**General Objective**

To design and implement a QR code-based system that allows for fast, secure, and accurate identification of tricycle operators in TODAs. This system will help improve the transparency of operations, enhance security by preventing fraud, and ensure better compliance with local regulations, ultimately contributing to the smoother and more organized operation of tricycles within the community. Also build and implement a QR code-based verification system that simplifies the monitoring of tricycle operators in TODAs, improving regulatory enforcement, optimizing operator management, and enhancing the passenger experience. Establish a comprehensive QR code system for TODA operators that enables streamlined verification processes, ensures real-time updates on operational status, and supports regulatory compliance for safer and more efficient public transport.

**Specific Objective**

To improve the passenger experience by enabling a QR code-based system for passengers to verify the legitimacy and safety standards of tricycle operators before boarding, enhancing overall trust and satisfaction.

To develop a system that allows tricycle operators to easily generate and update their details, ensuring that all necessary operational data (driver credentials, vehicle details) are accessible in real time for regulatory inspection.

To integrate the QR code system with a map destination of the terminal to monitoring of tricycle operators, enhancing route management and improving safety oversight within TODAs.  
 To Generate unique QR codes for each registered tricycle operator to store essential information.

To Develop a secure database to manage and store operator details, ensuring data privacy and easy access.

To Enable instant verification of operator status and compliance with local regulations during checks.

To Design a user-friendly interface that makes the system easy to use for both operators, passengers and authorities

**Scope**

QR codes can serve as a digital ID for operators, linking to a secure database with operator information such as license, registration, and association affiliation. Authorities or TODA representatives can easily scan the QR code to verify the legitimacy of the operator, ensuring only authorized tricycles operate. We use QR code for online payment to offer financial services a contactless payment option for drivers to receive payments from passengers.

**Limitations**

The QR code cannot provide real time locations, criminal records. QR code doesn't guarantee slots or schedule for the day. QR code will not work without internet connection or mobile data. Also, compatibility issues with older devices.

**Methodology**

The researcher uses the Waterfall method particularly because the research process is well-defined, predictable, and a clear step-by-step approach. Researchers use the Waterfall method because it is characterized by a clear, fixed scope. It provides a reliable structure for studies that do not require frequent revisions or iterative cycles.

The project process begins with the planning phase, where each group member is tasked with proposing three potential project titles, along with a brief description of each to explain the rationale behind the suggestions. Following this, tasks are assigned to each member based on the chosen titles to ensure that every aspect of the project is covered.

In the data gathering phase, relevant information, research, and resources are collected to support and justify each proposed title. After thorough review, the research adviser chooses the most suitable title to be conducted and revisits the proposal for any necessary revisions.

The next phase is system design and planning, which involves documenting the chosen title officially and determining the appropriate system or technologies to use for development. At this point, the team prepares the foundational documentation, included in Chapter 1, Chapter 2, and Chapter 3, detailing the research approach and design. Additionally, a comprehensive design plan is developed, outlining the project’s structure, implementation strategy, and timeline.

In the implementation/development phase, the researcher begins to lay out or plan the things they wanted to do upon developing the system based on the design plan, ensuring each feature is carefully documented. An initial prototype is created to demonstrate the system’s core functionality. As development progresses, the testing/debugging phase ensures that any error or bug in the system will meet functional solutions. The project will go through numerous testing, with any bugs identified and fixed, followed by enhancements to improve overall performance and user experience.

Once testing is complete and the system is fully refined, the project enters the finalization phase, where the team prepares for the final presentation. During the presentation/submission phase, the completed project is presented, showcasing its features and functionality, followed by the submission of the final version of the project along with all supporting documentation, including design plans, code, and reports. This systematic approach ensures that the project is executed in an organized manner, allowing for efficient collaboration and a high-quality final output.

**CHAPTER 3**

**3.A Calendar Activities**

**3.A.1 Description of Activities**

**Planning**

**Project Proposal.**

**September**

**10** Giving 3 title proposal each member of the group

**23** Description each title proposal

**25** Giving task each member of the group

**Analysis**

**Data Gathering**

**October**

**10** Reviewing the presented title proposal of each member

**15** Choosing title proposal

**20** Approval date of title proposal

**Revision**

**October**

**21** Revision of title proposal

**23** Reviewing the approved proposal

**27** Gathering data related to our approved proposal

**November**

**3** Final consultation of proposal

**Design**

**Documentation**

**November**

3 Documentation of chapter 1

5 Documentation of chapter 2

7 Documentation of chapter 3

7 Documentation of chapter 4

**3.A.2. Gantt Chart of Activities**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PLANNING | **SEPTEMBER** | | | |
|  | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 |
| Giving 3 title proposal each member of the group |  | COMPLETE |  |  |
| Description each title proposal |  |  |  | COMPLETE |
| Giving task each member of the group |  |  |  | COMPLETE |

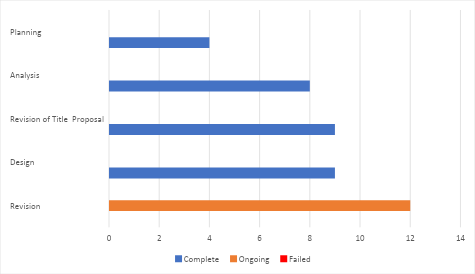
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ANALYSIS | **OCTOBER** | | | |
|  | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 |
| Reviewing the presented title proposal of each member |  | COMPLETE |  |  |
| Choosing title proposal |  |  | COMPLETE |  |
| Approval date of title proposal |  |  | COMPLETE |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| REVISION OF TITLE | **OCTOBER** | | | |
|  | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 |
| Revision of title proposal |  |  | COMPLETE |  |
| Reviewing the approved proposal |  |  | COMPLETE |  |
| Gathering data related to our approved proposal |  |  |  | COMPLETE |
| REVISION | **NOVEMBER** | | | |
| Final consultation of proposal | COMPLETE |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DESIGN | **NOVEMBER** | | | |
|  | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 |
| Documentation of chapter 1 | COMPLETE |  |  |  |
| Documentation of chapter 2 | COMPLETE |  |  |  |
| Documentation of chapter 4 |  |  |  |  |
| Documentation of chapter 4 | COMPLETE |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| REVISION | **NOVEMBER** | | | |
|  | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 |
| Revision of chapter 1 |  | ONGOING |  |  |
| Revision of chapter 2 |  |  | ONGOING |  |
| Revision of chapter 3 |  |  | ONGOING |  |
| Revision of chapter 4 |  |  |  | ONGOING |

**Overall Chart**

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**B. Resources**

1. **Hardware**

|  |  |  |
| --- | --- | --- |
| Books and Academic Texts | The Researcher used books and academic texts because they provide reliable, in-depth, and well researched information that are credible and truthful information. |  |
| Mobile device | Mobile Device is part of the hardware since it is important due to its use and function other than being portable mobile devices offered unique data collection and communication which is essential in forming the research |  |
| Laptop and personal computer | The researcher also uses a laptop and personal computer since we use this for research purposes for information such as additional information to back up our research and also we used this to compile and format the research paper. |  |

1. **Software**

|  |  |  |
| --- | --- | --- |
| Canva | Canva is an app editor that specializes in editing pictures that have templates. The researcher uses canva to edit pictures and tables in order to make the research paper more reliable and credible. |  |
| Google | The researcher also uses google because it is the convenient way to gather additional information wherein in google you can find anything. The researcher as a collective group uses google in order to support the said study. |  |
| Microsoft Word | Microsoft Word is a word processing program that allows users to create, edit, and format documents. So the researcher uses the microsoft word to compile, revise, format, and form the research paper as well as arrange its information. |  |
|  |  |  |
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**Chapter 4**

**A. References**

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