Report Summary

Improving the Service Level at the Traffic Department in the Ministry of Transportation

Full Project Summary

Abstract

This project focuses on improving the service level at the Traffic Department in the Ministry of Transportation.

Long waiting times, high demand, manual procedures, and limited service capacity can reduce service efficiency and citizen satisfaction.

The project proposes a smartphone application that provides important Traffic Department services electronically.

The system includes:

- Electronic citizen profile
- Driving license services
- Traffic violations
- Notifications
- Electronic payment
- Online communication

The project also uses previous studies about waiting time, Lean Six Sigma, and queueing theory.

The main goal is to reduce waiting time, reduce unnecessary visits, and improve service efficiency.

Chapter 1 — Introduction

1.1 Problem and Background

Waiting is a major problem in many service organizations.

When the number of people requesting a service is greater than the service capacity, queues are created.

Long waiting times can:

- Waste citizens' time
- Reduce customer satisfaction
- Increase pressure on employees
- Reduce service efficiency

Therefore, the project focuses on improving the way Traffic Department services are provided.

1.2 Electronic Government Services

Electronic government applications can improve public services.

They can:

- Reduce time and effort
- Reduce human errors
- Improve efficiency
- Improve transparency
- Make services easier to access
- Improve communication with citizens

The project applies these ideas to Traffic Department services.

1.3 Proposed Solution

The project proposes a smartphone application that provides Traffic Department services electronically.

The application allows citizens to access different services without visiting the department for every procedure.

The system is supported by:

- A mobile application
- A control panel
- A database
- Connection with the government database

1.4 Project Objectives

The main objectives are:

- Create an electronic citizen profile.
- Issue and renew driving licenses.
- Manage traffic violations.
- Provide notifications.
- Support electronic payment.
- Support online inquiries and communication.
- Provide theoretical and practical driving exam simulation.
- Reduce waiting time.
- Improve service efficiency.

1.5 Project Significance

For Citizens

The system can:

- Save time and effort.
- Reduce waiting time.
- Reduce unnecessary visits.
- Provide easier access to services.
- Improve communication.

For Employees and the Organization

The system can:

- Improve productivity.
- Improve data management.
- Increase transparency.
- Reduce some operational costs.
- Make service processes more organized.

Chapter 2 — Theoretical Background and Previous Work

2.1 Purpose of the Chapter

This chapter presents previous studies related to:

- Waiting time
- Service improvement
- Process efficiency
- Queueing systems

These studies help support the proposed solution for the Traffic Department.

2.2 Previous Study: C-Auto

The first study was about a car service center called C-Auto.

The center served about:

2,300 customers per month

The average repair waiting time was:

6.02 days

Customer satisfaction was about:

54%

The study aimed to reduce waiting time and increase productivity.

2.3 Method Used in C-Auto

The study used:

DMAIC

DMAIC means:

- Define
- Measure
- Analyze
- Improve
- Control

The study also used **Lean Six Sigma** tools.

The researchers analyzed the work process and identified the causes of delays.

They used tools such as:

- 5 Whys
- Fishbone Diagram
- 5S
- Process analysis

2.4 Results of C-Auto Study

The study reported improvements in:

- Cycle time
- Repair time
- Productivity
- Process flow

The main idea was that analyzing the causes of delays and improving the work process can reduce waiting time and improve service efficiency.

2.5 Previous Study: Health Services

The second study analyzed a health service system.

The system had:

2 service providers

The utilization was:

96.88%

The average queue length was:

29.55 patients

Because the service providers were highly utilized, a long queue was created.

2.6 Proposed Solution

The study proposed adding a third service provider.

The researchers compared:

M/M/2
with
M/M/3

The results were:

Measure	M/M/2	M/M/3
Utilization	96.88%	64.58%
Queue Length	29.55	0.76
System Length	31.49	2.70
System Time	33.86 min	2.90 min

The results showed that increasing service capacity greatly reduced the queue and waiting time.

2.7 Connection to Our Project

The previous studies show that waiting problems can be reduced by:

- Improving the service process
- Increasing service capacity
- Using technology
- Reducing unnecessary procedures

The current project applies these ideas to the Traffic Department by providing services through a mobile application.

Chapter 3 — Methodology

3.1 Methodology Approach

The project follows several main steps:

1. Study the current service problems.
2. Identify waiting and efficiency problems.
3. Design an electronic service system.
4. Develop system diagrams and workflows.
5. Develop the application.
6. Test the proposed system.

3.2 Main System Components

The proposed system consists of:

Mobile Application

Used by citizens to access services.

Control Panel

Used to manage and control the system.

Database

Used to store and manage information.

Government Database

Provides the possibility of connecting the application with the main government database.

3.3 Functional Requirements

The system should:

- Provide basic Traffic Department services.
- Allow citizens to access license services.
- Provide information about violations.
- Support electronic payment.
- Provide notifications.
- Provide online communication.
- Be easy to use.

3.4 Non-Functional Requirements

The system should be:

- Fast
- Easy to use
- Mobile-friendly
- Secure
- Private
- Accessible
- Reliable

The project also considers standards and guidelines related to security, accessibility, and privacy, such as:

- ISO/IEC 27001
- WCAG
- GDPR

3.5 Design Alternative

A web-based system could be used.

However, the project selected a smartphone application because it provides:

- Faster access
- Easier use
- Better mobile accessibility
- Notifications
- Convenient access to services

3.6 System Modeling

The project uses different UML and system diagrams:

- Class Diagram
- Activity Diagram
- State Diagram
- Process Flowcharts
- Use Case diagrams

These diagrams help explain how the system works and how users interact with it.

3.7 Main System Classes

Citizen

Contains citizen information and citizen functions.

Employee

Contains employee information, role, and contact information.

Driving License

Contains driving license information and related services.

Insurance

Contains insurance information.

Violation

Contains traffic violation information.

Application

Represents service requests and their processing.

3.8 Development Technologies

The project uses:

- **Flutter** — application development
- **Adobe XD** — user interface design
- **Firebase / API** — system support and integration
- **CMS** — content management
- **PHPMyAdmin / MySQL** — database management

3.9 Estimated Cost

The project includes estimated costs for:

- UI Design
- Application Development
- Device Compatibility Testing
- Performance Testing
- Quality Testing
- Application Publishing
- Technical Support
- Bug Fixing
- Hosting
- Maintenance

Examples of estimated costs include:

- UI Design: from $500
- Development: from $1,000
- Testing: about $500 for each testing activity
- Publishing: $100
- Technical Support: $200/month
- Hosting: $50/month
- Maintenance: $200/month
- Bug Fixing: about $500 per bug

Chapter 4 — Results and Analysis

4.1 System Users

The main users are:

Primary Users

Citizens who need services such as:

- License renewal
- Insurance-related services
- New license applications

Secondary Users

Traffic Department employees who manage and process applications.

4.2 System Strengths

The proposed system provides:

- Modern technology
- User-friendly design
- Content management
- Better data management
- Clear separation between citizen and employee functions

4.3 Test Case 1 — Driving License Renewal

A citizen submits a driving license renewal request.

The system:

1. Receives the request.
2. Verifies the citizen's information.
3. Processes the request.
4. Issues the renewed license.

4.4 Test Case 2 — Expired License

If the driving license is expired:

1. The system identifies the expired license.
2. The citizen receives a notification.
3. The system supports the electronic payment process.

4.5 Test Case 3 — New License Application

For a new driving license:

1. The citizen submits the application.
2. The system verifies the information.
3. A request is sent to the health department.
4. The citizen completes the medical examination.
5. Approval or scheduling information is sent to the citizen.

Chapter 5 — Discussion

The system was discussed based on several important factors.

Accuracy

The system is designed to process the main service tasks accurately.

Efficiency

The system can reduce manual procedures and make services faster and easier.

Extensibility

The system can be expanded in the future by adding new services and features.

Data Quality

Accurate and well-managed data is important for the success of the system.

User Efficiency

The application can help citizens access services more easily and reduce unnecessary visits.

System Support

The system requires continuous technical support and improvement.

More testing is also needed under wider and more realistic conditions.

Chapter 6 — Conclusions and Recommendations

6.1 Conclusions

The project concludes that the proposed system:

- Achieves the main project objectives.
- Supports accurate processing of basic services.
- Improves service efficiency.
- Reduces manual procedures.
- Can reduce unnecessary visits.
- Provides easier access to Traffic Department services.
- Can be expanded with additional services in the future.

The project shows that using electronic services can provide a more organized and efficient way to deliver Traffic Department services.

6.2 Recommendations

The project recommends:

- Performing more comprehensive system testing.
- Improving the user interface.
- Improving the user experience.
- Maintaining high data quality.
- Adding advanced online services.
- Improving electronic payment services.
- Supporting automated vehicle registration.
- Supporting driver record verification.
- Providing user and employee training.
- Providing continuous technical support.
- Continuously monitoring system performance.
- Considering cost and maintenance requirements.
- Maintaining strong security and privacy.

- Ensuring compliance with relevant requirements.

Overall Project Summary

The project focuses on improving the service level at the Traffic Department in the Ministry of Transportation.

The main problem is that high demand, manual procedures, and limited service capacity can create long waiting times and reduce service efficiency.

Previous studies showed that waiting can be reduced by improving work processes and increasing service capacity.

The first previous study, C-Auto, used Lean Six Sigma and DMAIC to identify and reduce causes of delay.

The second study used queueing theory and showed that increasing the number of service providers can significantly reduce queue length and waiting time.

Based on these ideas, the project proposes a smartphone application for Traffic Department services.

The application provides citizens with electronic access to services such as driving license renewal, new license applications, traffic violations, notifications, electronic payment, and communication.

The system includes a mobile application, control panel, database, and possible connection with the government database.

The application is designed using modern technologies such as Flutter, Adobe XD, Firebase/API, CMS, and MySQL.

The system was tested through different cases, including driving license renewal, expired licenses, and new license applications.

The results show that the proposed system can support the main service processes and improve service efficiency.

The project concludes that digital services can help reduce manual procedures, unnecessary visits, and waiting, while improving access to government services.

Further testing, user interface improvements, better data management, advanced services, technical support, security, and continuous system monitoring are recommended.