International Journal of Research Publication and Reviews

Analysis of Taxes through E-payment System for Transportation Services

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A B S T R A C T

The use of Information and Communication Technology (ICT) in governmental procedures has become a typical marvel in ongoing years. With the extraordinary improvement of Information and Communication Technologies (ICT) and growing attention to Electronic Governance's advantages, ICT empowered the transformation procedure of administration forms to become an essential part of national strategies in the developing world. For a long time, tax policy has been one of the dominant methods for financing a country's administration. Tax collection provides a financial basis for every country to offer public services to its citizens. Since the Ministry of Transport, especially the Land Transportation Regulation General Directorate is responsible for managing and regulating the transport services so, one of the essential tasks of the institution is to collect transport taxes. These institutions face various challenges in this regard while they use the common manual system. We developed the concept based on evaluating the current processes, interviews with relevant authorities, analysing technologies for electronic tax collection, researching this field, and considering Afghanistan's current situation. The purpose of this thesis is to evaluate concepts and technologies for an electronic payment system for Afghanistan's transportation taxes and make a recommendation considering Afghanistan' situation. Furthermore, the concept aims to provide advancement for the Ministry of Transport, especially the Land Transportation Regulation General Directorate, to have an effective and transparent collection of national or local transportation

Keywords: Taxes, Transportation, E payment, ICT

1. Introduction

The use of Information and Communication Technology (ICT) in governmental procedures has become a typical marvel in ongoing years. In the late 1990s, ICT presented a unique concept for the government (e-Government) in public administration. With the dramatic improvement of Information and Communication Technologies (ICT) and expanding attention to the advantages of Electronic Governance, ICT empowered the transformation procedure of administration forms to become an essential part of national strategies in the developing world.

The development of data and correspondence innovation has altered customary frame- works of payment. People would now be able to do numerous exchanges for products and enterprises utilizing new techniques rather than traditional strategies for money and cheques. This wonder of a cashless installment is known as e-Payment. With e- Payment frameworks, people can pay for merchandise and ventures over the counter and through the Internet without money utilization. E-Payment frameworks have different properties, including convenience, safety, transparency, time, and cost investment funds of exchanges. The installment arrangement of a nation assumes a pivotal job in its economy, as this is the empowering channel for the progression of budgetary resources.

Modern ICT and e-business systems support operations that include ordering, booking, billing, charging tariffs, customs clearance, insurance claims, bill of lading, tracing, and payment. If we are going to refer to the effect of e-business on transport services, keep it in mind that the transport industry has, over the decades, been undergoing organizational and technological changes. These have been independent of any influence from e-commerce, particularly the Internet, which in this respect, is quite a recent phenomenon.

In the last 16 years, Afghanistan has seen significant telecommunications, information technology, and energy resources. By attracting extensive investments in the telecommunications industry, the national fiber optic ring, and the expansion of internet connectivity, the country has seen substantial

achievements in enabling its people to become digitally linked with the rest of the world. Despite the country's tech industry's achievements, there are still problems that need to be addressed to provide a basis for a digitally empowered Afghanistan and connected society.

These include the lack of a cohesive plan, a regulatory and institutional framework for digital transformation, a lack of infrastructure capabilities, lengthy and outdated government processes, and technology procurement and deployment

Besides, duplicate and non-prioritized efforts, insufficient cooperation between government agencies in the implementation of technology, lack of a coherent system for information and data governance, limited human capital and skills, limited use of technology in the provision of public services, and the absence of necessary research and development practices to support digital transformation.

2. Literature Review

Transportation

For economic and social activities such as traveling, producing, distributing goods, or supplying energy, passenger and freight transport mobility is considered fundamental. There is an intent, an origin, a possible collection of intermediate locations, and a destination for each movement. Transport networks consisting of infrastructures, modes, and terminals are supported and powered by mobility. They enable people, organizations, companies, regions, and nations to communicate and consider economic, social, cultural, or political activities. Mobility-providing transport networks are closely connected to socioeconomic shifts. There are likely to be economic opportunities where transportation networks will ensure access to markets and services. Economic development has affected the world differently. Both international, regional, and local transport networks have become essential components of economic activity. Thus, an increasing proportion of wealth is connected to trade and delivery. However, there are also negative effects, such as pollution, injuries, and mobility inequalities, even though transportation has a positive effect on socioeconomic structures. Transportation is also a business activity derived from operational characteristics such as expense, power, efficiency, reliability, and speed. Transportation networks are emerging within a complex collection of links between the supplies of transport, representing the network's operating ability, the demand for transport, and the economy's mobility requirements. [6]

Revenues and Taxation

For a long time, taxation has been one of the dominant methods for financing a country's administration. Tax collection provides a financial basis for every country to offer public services to its citizens. Furthermore, this process plays a useful role in the social welfare and economic development of a society. Today's governments collect taxes in various ways and spend it on current affairs, making it one of the safest ways for the country to progress [7]. Therefore, appropriate, reliable, and transparent methods should be adopted so that as many taxpayers as possible are encouraged to pay taxes voluntary.

For this reason, it is recommended to refer, during the development and operation of the project, to the financial resources of public infrastructure and construction projects, which are primarily supplied by taxation, so that taxpayers can be fully aware of the type of tax expenditure by looking at the above projects [7].

Afghanistan is a country that earns its income from internal and external sources. One of these sources is tax collection, which plays a vital role in government revenue generation. Since the establishment of the current government and the new political system in Afghanistan in 2001, many attempts have been made to develop their financial and economic structure. Thus, many governmental institutions designed a series of reforms and have implemented them to increase internal revenue [8].

Although the use of technology in Afghanistan's governmental institutions as a means for electronic governance, better and effective administration is not yet wholly utilized. However, the government and especially the Ministry of Finance have used technology to improve governmental institutions' transparency and credibility.

Finance and taxation are the backbones of any country's economy. Therefore, it needs to be transparent and credible so that the citizens and donors feel committed to the development process. With this in mind, the government has decided to implement the Afghanistan Financial Management Information System (AFMIS) and Standard Integrated Government Tax Administration System (SIGTAS), with the help of the Public Financial Management Reform (PFMR), which is a project implemented by the ministry of Finance [8].

Transport Taxes in Afghanistan

The Ministry of Transport, to provide better transport services to the people and regulate the country's transport affairs, collects a certain percentage of the freight for the transport of commercial cargo or passengers as transport tax from companies and means of transportation.

According to the Land Transportation Regulation law, the internal transportation companies and vehicles must pay five percent of the total fare as a transport tax to the Ministry of Transport. The same is for the external companies and vehicles but with an increase in the tax amount, which is ten percent of the total fare.

By exploiting the mentioned revenues, the Ministry of Transport spends the collected transportation taxes for building transport terminals for passengers and trucks, Creating repairing workshops for vehicles, and improving and enhancing its transportation system.

Ministry of Transport

The Ministry of Transport is responsible for regulating air and ground transport, operations at airports, international routes, and other government enterprises involved in transport transactions. The main focus is on strengthening the regulatory and monitoring capabilities and improving the country's transport infrastructure. As the development of the transport sector is of particular importance in improving the public's well-being, it continues to have a positive impact on the Afghan economy.

Most importantly, it enhances the growth of a balanced economy across the country and facilitates trade, increases government revenues, creates opportunities for personal investment, and improves the safety, security, credibility, and efficiency of both air and ground transportation.

The Ministry of Transport's primary mission is to design, regulate, oversee, and man- age, with full engagement and participation of the private sector, transportation systems that are efficient, safe, easily accessible, environment-friendly, equitable, affordable, mod- ern, high quality, and are stimulants of the economic growth of the country [9].

Ministry of Transport's Services

The Ministry of Transport has five central authorities that provide different services, namely as follows:

1. National Road Authority

2. Traffic Authority

3. Land Transport Authority

4. Afghanistan Railway Authority

5. Civil Aviation Authority

Land Transportation Authority

Land Transport Authority is one of the vital service and revenue departments in the Ministry of Transport's organizational structure. Their main objectives are to design, regulate, monitor, and manage the road transport system effectively, safe, accessible, environmentally friendly, and economical to provide better services at the national and international level. And it is in cooperation with companies and the private sector for the economic growth of the country. The authority is responsible for preparing transportation facilities and manage all land traffics, including cargo trucks, passenger buses, and private vehicles through Afghanistan, especially on the highways and regional routes [9].

Vehicles Registration

Another essential process in the General Directorate of Land Transport is the vehicle registration process at this directorate. After the contract with the transport companies and to operate in the countries transport system, vehicle owners must submit their application to the vehicle registration department of the General Directorate of Land Transport to receive a vehicle transport card. For this purpose, the vehicle owners must submit their application and some necessary documents such as the approval of the transport company, driving license, identity card, and driver's license. This process includes some sub-processes, which are explained as follows
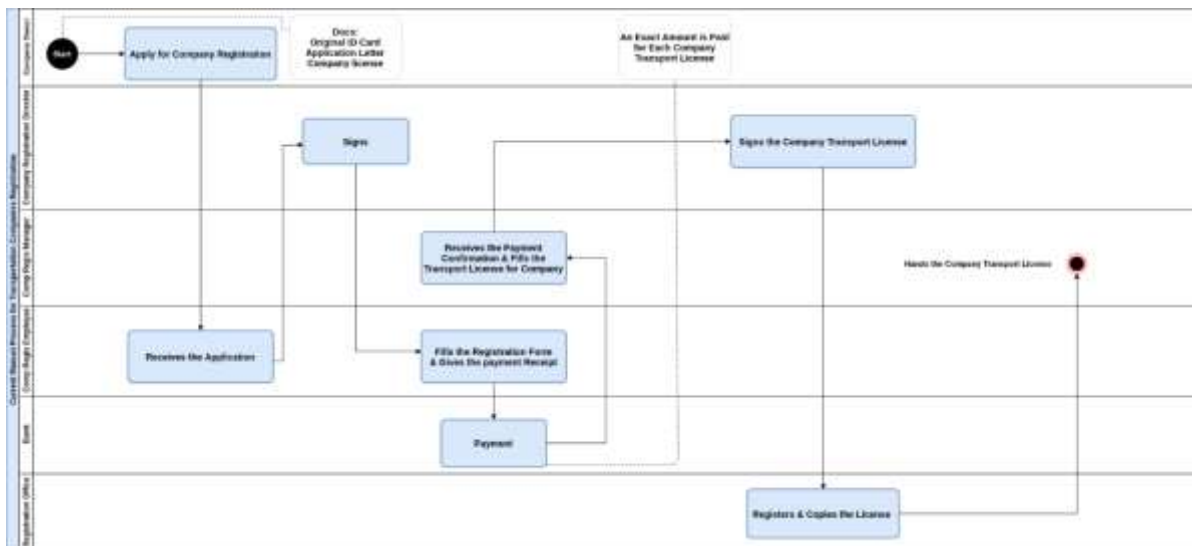

Figure: Current Manual Process for Transportation Companies Registration

Route Determination

After the vehicle registration procedure in a transport company, the route determination procedure is needed to be done. In this procedure, the route determination process is done based on the demands and needs of different local regions in the country. For instance, we can say that Afghanistan's central districts do not have an adequate number of transport vehicles, so the route for the new vehicles is assigned to that region.

Transport Card Distribution

When a vehicle is registered in this phase, and the route is assigned, the vehicle registration department hands in the vehicle owner's transport card. This card contains information about the vehicle, driver, Transportation Company, and the determined route. Cite interview for a better understanding of the vehicles registration process, the following activity diagram illustrates the whole vehicles registration processes, including the route determination and transport card distribution processes:

Table: Requirement description for Vehicles & Drivers Registration.

Steps	8
Required Documents	Original ID Card, Application Letter, Transport Company Confirmation, Driving Licenes, Driving Permit
Process Fee	-
Required Time	1-2 day

For a better understanding of the transport company registration process, the follow- ing activity diagram illustrates the transport company's registration processes:
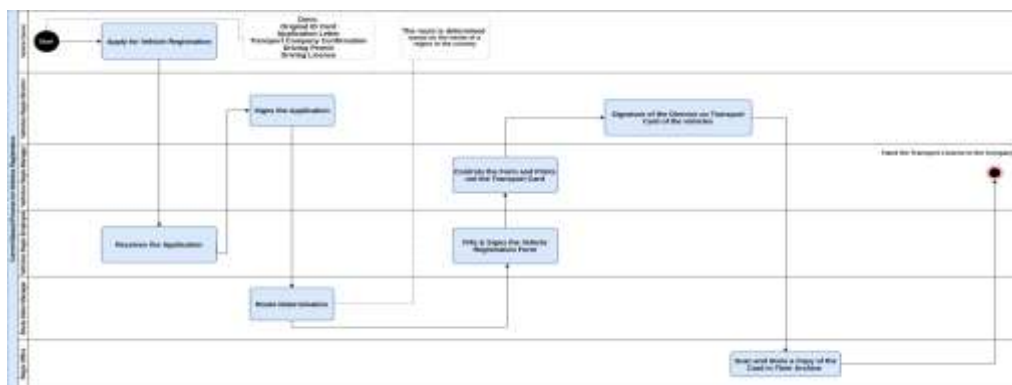

Figure: Current Manual Process for Vehicle Registration

Tax Collection

This is the most critical and essential process being done under the land transportation general directorate's management. It is the primary process that can get digitally- enabled after this system is developed. In the tax payment process, when a vehicle arrives in a transportation port, they have to pay the transport tax, which differs due to the type of vehicles that are for public services or are transferring commercial properties. The transport tax is determined after the identification of the vehicle type. The tax definition is a predetermined process by the Ministry of Transport in which the taxes are assigned or determined based on the type of vehicle and the route distances covered by the vehicles.

After that, the port operators write down the amount of tax that has to be paid by the driver of the vehicle in a slip called transportation tax invoice. The tax amount is gathered in cash by the responsible employees of the transportation port, and then the invoice is given to the driver. This invoice is checked during the route which the vehicles pass, and in case they do not have this invoice, they have to pay an additional amount of money as a fine.[11] For a better understanding of the transportation tax payment process, the following activity diagram illustrates the whole processes, including the route determination and amount of the transportation tax processes:
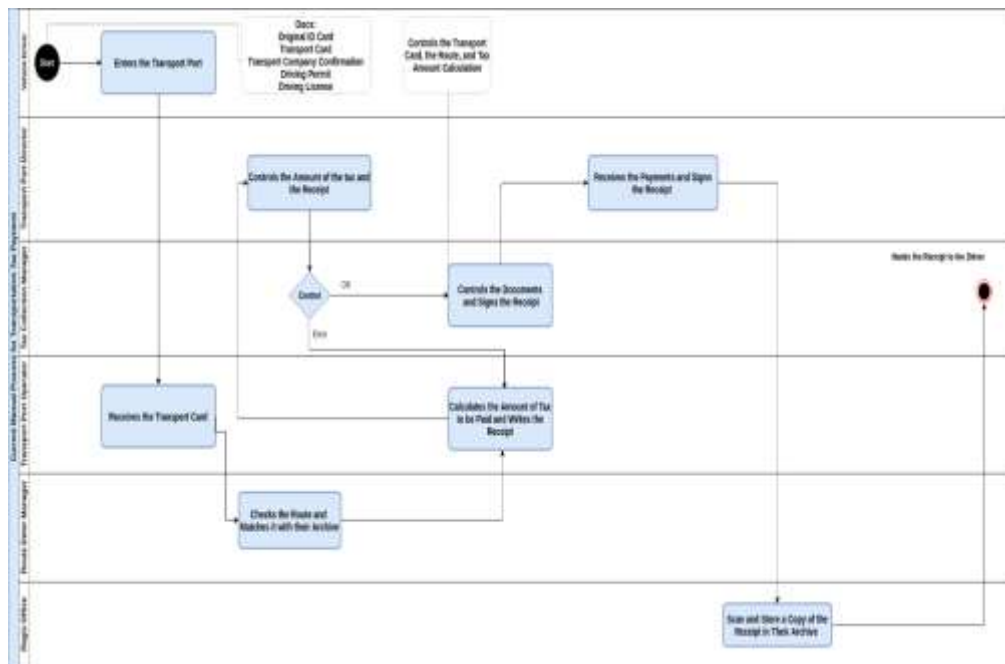
Figure: Current Manual Process for Tax Collection

The primary purpose of this research is to implement an electronic payment system for transportation taxes in Afghanistan. Considering the significant and dramatic advances in technology over the past few decades have had a significant and positive impact on the economy, different industries like construction, health care, education, and trans- partition.

Digitization and utilization of technology today serve as the main driver of economic growth and improve the population's quality of life. Since there are various developed and developing countries around the world where the electronic payment systems or transport toll collection systems have been implemented [12].

Although we will not achieve a complete implementation of these approaches in Afghanistan due to different aspects such as infrastructure, economic or costs, poli- cies, and IT literacy, lessons can be learned from their implementation experiences to solve issues and challenges.

This chapter will look at two different electronic payment systems for transportation taxes including GPS-based electronic payment system, and RFID-based electronic payment system, used in countries such as the Czech Republic, Srilanka, and India. The most suitable approaches, experiences, and best practices could be used as part of the lessons learned for developing an electronic payment system for transportation taxes in Afghanistan. Before addressing the mentioned technologies, we will briefly explain e- governance, e-government in developed and developing countries, and electronic payment.

3. Methodology and Research Work

Proposed Concept

The challenges mentioned earlier have built support for a new concept for an electronic transport tax payment system in Afghanistan. In general, some several technologies and methods make it possible to Change the common system into an automated and electronic system. Different methods from both developed and developing countries have been explored to recommend the concept. The proposed system must be designed and implemented following the relevant depart- ment's requirements and taking into account the needs of that organization, to address all the existing problems and challenges of the current system.

By studying the current situation, modern technologies for the collection of trans- port taxes, the challenges facing them in Afghanistan, and the current situation in Afghanistan, we concluded that it is currently hard and challenging to implement any of these technologies in Afghanistan.

We suggest a management information system for collecting transport taxes in Afghanistan, taking into account all the aspects that have already been addressed in detail in previous chapters. We have proposed this system for several reasons, each of which is discussed below [30].

First, Afghanistan has enough capacity to implement the proposed system. In con- trast, the adaptation of any existing technology, such as GPS or RFID, has its prereq- uisites and modern equipment. In Afghanistan, these conditions are not available, as mentioned in the previous chapter.

Second , in terms of economics and time, this system needs less budget and less time. Simultaneously, it will be time-consuming and expensive for Afghanistan to implement any of the modern technologies.

Third , given the country's existing technological capability, the introduction of this proposed system is much simpler than new technologies that require skilled personnel.

The system will store information related to transport companies, driver information, payments information, payments tracking, and report generation for better management and provide statistics to the relevant authorities.

In the following, we will more discuss the proposed system, and its design aspects.

System Architecture

A system is described as a set of multiple elements that collaborate to achieve a common goal. The objective of a system is to accept input, manipulate or transform such input into output. Therefore, a system is expected to have inputs, processing mechanisms, outputs, and feedback. As mentioned in the previous section, our proposed system is a management information system for transport taxes. Based on web-based manage- ment information systems principles, the overall system architecture is illustrated in the following diagram.

As illustrated in the above diagram, the system architecture consists of three layers: each is explained shortly in the following. The data tier executes a set of commands to allow access to the data storage stored in a database and uses a DBMS to do so. We need a DBMS, such as a MySQL server, to add, view, or process the stored data in the database.
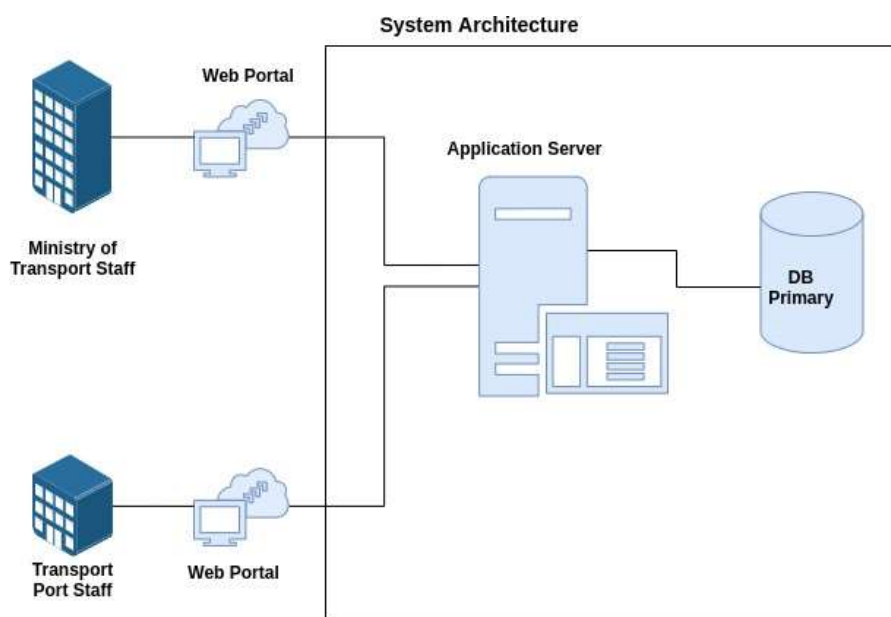

Figure: System Architecture

The middle-tier business logic tier contains scripts and system features representing the interface between the database tier and the presentation tier. After converting to a SQL query, this tier sends the request to the database tier. This layer is physically located on the web services host server.

The presentation tier is the architecture's front-end portion responsible for delivering the user interface, physically located on the client computer. The presentation layer focuses on converting the business logic layer's outcome into a user-friendly and readable   output.

Use Cases

A use-case diagram is simply the representation of interactions between the intended users and the system. The use-case shows the work of a specific user who does use the system [31]. Concerning the system's requirements, especially concerning MOT's administrative structure, differentiation of roles and responsibilities is a crucial task in the system. The privacy of data and data flow requires different roles to be considered in the system. Based on the requirements analysis, the actors and their interactions are visualized in the following use-case diagram:
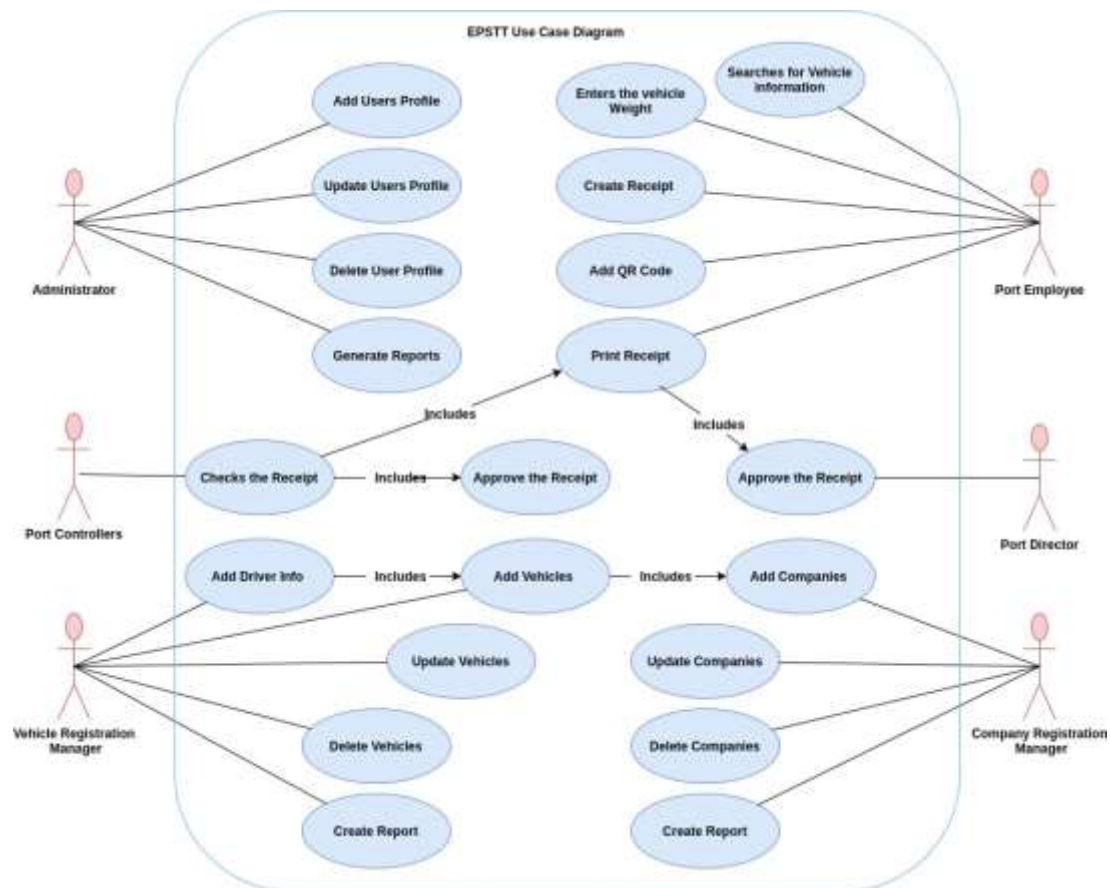
Figure: Use-case Diagram

Based on the user's requirements and the rules of the MOT tax collection procedure, there are different users involved with the system who are doing different tasks. Everyone has to login into the system, the system only allows authorized users to perform their particular tasks, and no one has to influences other users of the system.

The variety of users, according to the transportation tax collection process at MOT, can be categorized into the following types: Administrator, Vehicles registration user, Transportation Companies registration data entry user, Port employee data entry user, Port director user, and port controller user.

Company Registration Manager: The company registration manager is re- sponsible for adding, updating, and if needed deleting transportation companies' information from the system. Another major rule of the company registration manager is creating reports that differ based on its needs. The number of these users is limited to two or three employees, including the company registration, general manager.

Vehicles Registration Manager: The vehicle registration manager is responsible for adding, updating, deleting vehicle information from the system, and adding the driver's information. Furthermore, the vehicle registration manager can create reports that differ based on the authority's needs. The number of these users is limited to two or three employees, including the vehicle's registration general manager.

Port Manager: The port manager is one of the system's primary users. They are responsible for browsing the vehicle information by entering the Plate number, adding the vehicle weight from the Ministry of Public Works' document, creating the receipts for tax payments, adding the QR code to, and printing out the receipts. Another significant rule of the Port manager is creating reports that differ based on the authorities' needs, and the number of these users are different due to the load on a transport port, which rises to more than three employees.

Port Director: The Port director is another user of the system responsible for approving the receipts created by the port managers. If there are some mistakes in receipts, then the port director can update the receipts information as well, and the number of these users are limited to one user per each transport port in every region.

Port Controller: Port controllers are other users of the system responsible for checking and approving the receipts created by the port managers. This controlling can be done in each transport port, and if the vehicles do not have the receipt, the port controllers perform the same processes as the port managers do while they can add fines to the receipts.

It is essential to be considered that the port controllers have the same rules as the port managers have, which means that the same user policies are applied to the port controller users by the system administrator.

System Administrator: Besides all the users who were discussed above, the system administrator is responsible for doing all administrative staff regarding the system users. The system administrator adds, updates, and deletes users and their rules based on the institution's needs and provides some reports for the authorities.

Data Model

A class diagram is one of the fundamental building blocks for object oriented software development (MVC development model in the context). It describes the structure of the whole system by describing the classes involved. It shows basic operations, attributes, and relationships between the classes [32]. Based on the requirements anlysis, the classes and their relationships are visualized in the following class diagram.
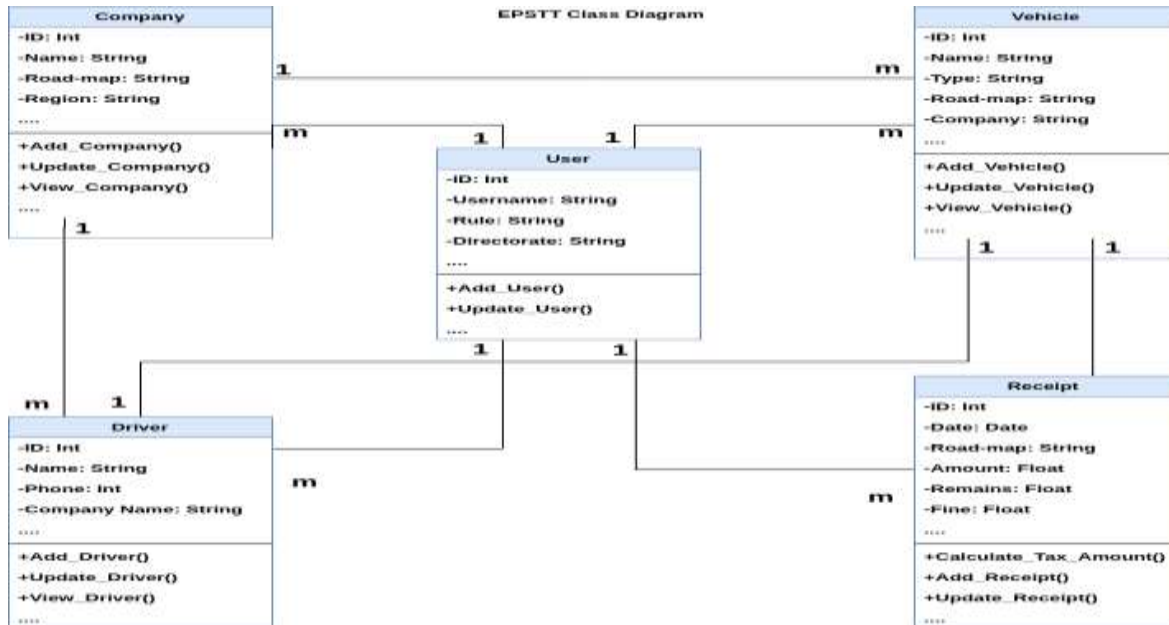

Figure: Class Diagram

Because of the large number of attributes and methods, few attributes and methods are presented in the diagram above. The most important information stored in the sys- tem will be the transportation companies' information, vehicle information, the drivers' information, and receipts information. The basic class elements and their relationship in the mentioned diagram are briefly described as following:

Company: Transport company information such as ID, name, region, road map, number of vehicles, and other required information will be stored in the system. The relevant user is also allowed to add, correct, and, if needed, delete the in- formation of a company. As illustrated in the diagram, the company class has a relation with vehicle, driver, and user classes.

Vehicle: Vehicle information such as ID, name, type, road map, plate number, company name, permissible weight, number of allowed passenger in case it is a public vehicle, and other required information will be stored in the system, and the relevant manager is also allowed to add, correct and if necessary delete the information of a vehicle. As illustrated in the diagram, the vehicle class has a relation with the company, receipt, and user classes.

Driver: The driver information such as ID, name, last name, license number, license type, company name, belonging vehicle, plate number, and other required information will be stored in the system. Furthermore, the relevant user is also allowed to add, correct, and delete the driver's information. As illustrated in the diagram, the driver class has a relation with vehicle, company, and user classes.

Receipt: The receipt information such as ID, date, tax amount, road map, the weight of trucks, number of the passengers(in case it is a public vehicle), remains, fines, plate number, related company name, port name in which the payment was issued, and other required information is stored in the system. The relevant user is also allowed to add, correct, and, if needed, delete the information of a company. As illustrated in the diagram, the receipt class has a relation with vehicle and user classes.

User: Necessary information of the system users, including username password, rules, directorate name, will be stored in the system. As illustrated in the diagram, the user class has a relationship with all other system classes.

4. Core Functionalities

Based on observations as well as interviews, the core tasks are identified. As mentioned in the outcomes of requirements analysis in chapter four, the concept will digitize the transportation tax collection processes. It should be emphasized that these core functionalities are specified based on the ministry

of transport's need to have an electronic system for the processes that are part of the transportation taxes collection. The most essential and core functionalities, which will be provided by the proposed concept, are listed as following:

Transportation Companies Registration: As mentioned in the second chap- ter, the transport companies' registration process was the first step to collect transportation taxes. Furthermore, considering the ministry of transport's re- quirements, one of the main tasks of the proposed system is to register and store information on transportation companies. It includes standard CRUD functional- ities for the transportation companies. Based on their rules, the responsible users can add, view, edit, and, if necessary, delete the information of the transportation companies (See Flow-Chart here: 59).

Vehicles Registration: As previously described in Chapter Two, it is necessary to have information related to vehicles to regulate the transportation tax collection process. Thus, one of the proposed system's main tasks is to register all vehicles that are active in the transport sector and store their needed information in the system. It includes standard CRUD functionalities for the vehicles, and the re- sponsible users, based on their rules, can add, view, edit, and, if necessary, delete the vehicles' information(See Flow-Chart here: 60).

Drivers Registration: Another important task of this system is to record and store the necessary information for drivers specified by the related authorities and the land transport regulating law. As mentioned in previous processes, this in- cludes standard CRUD functionalities for the vehicles. Based on their rules, the responsible users can add, view, edit, and, if necessary, delete the information of the vehicles.

Tax Payments and Tracking: The process of storing and tracking the transport tax payments is one of this system's main tasks. All tax payment steps, including tax calculation based on available vehicle information in the system, tax amount, payment status, payments receipts generation and printing, and other related is- sues, should be stored. Moreover, as standard, the users will perform the CRUD functionalities on the system's tax payment and tracking function based on their rules(See Flow-Chart here: 61).

Reports Generation: Another important task of the system is to prepare reports based on users' demands, who prepare and submit quarterly, semi-annual and annual reports.

5. Risk Analysis

Considering the requirements of relevant institutions in Afghanistan, after providing a detailed concept, the system could face some threats after successful implementation. To understand the strengths, weaknesses, and risks that may threaten the system, as a precaution for these threats and providing some strategic plans for overcoming the weaknesses, we will conduct a comprehensive SWOT analysis and point out some critical risk analysis of the proposed system. It will assist us in having some predefined strategies to deal with upcoming threats. The SWOT analysis focuses on the system's four elements (Strengths, Weaknesses, Opportunities, and Threats). The first two elements, strengths, and weaknesses are identified as internal factors, and two other elements are identified as external factors that affect the system [33]. In the following, we have prepared a SWOT analysis of the proposed system.

Strengths

The proposed system can have good performance, and the following are the system's strengths compared to the current manual system.

- Well organized data regarding the transport companies and vehicles.
- Improves the tax collection processes.
- Improves the payments trucking.
- Improves reporting and customized reports.
- Availability.
- Accessibility.
- Time Efficiency.

Weaknesses

The followings are the system's weaknesses, which are derived from the challenges to- wards the implementation of the system.

- Lack of ICT infrastructure, which may slow down the implementation process.
- Human capital problems, which is a problem towards the adoption of the system.
- Lack of Political willingness, which may disturb the implementation process.
- Electricity dependency.

Opportunities

The proposed system will provide some opportunities after a successful implementation, which are listed as follows:

- It will enhance the highways of transport authorities to have better transport management.

- It will provide the opportunity of payment trucking that provides the ability for the related authorities to enforce the people to pay the transport taxes.

- Provides efficient information and reports which can help the authorities for better planning and management of the transport sectors.

- The system will help the ministry of Transport to increase incomes by transport ports.

- The system will provide the opportunity to increase transparency and, by the time, decrease corruption.

Threats

Some threats may threaten the system, which is listed as follows:

- Fraud in the payment process.

- System failure or downtime.

- Connectivity problems.

- Infrastructure Security.

Strategic Plans to overcome the threats

To deal with the weaknesses and threats that exist for the system, we will provide some plans and strategies in two separate sections to address the weaknesses and deal with the risks and threats.

Recommendations to Overcome the Weaknesses

We need collaboration, commitment, and intention at the national level to solve these problems to eliminate the system's weaknesses pointed out earlier. The way will be paved for the implementation of this system once this collective intention has emerged, and we have the full support of the government.

For this purpose, we must consider the following issues:

Gain government officials' trust by introducing the benefits of the system and describing the opportunities that the system creates. It helps to attract their support and work with them to eliminate other weaknesses of the system.

Assessment and upgrade of the IT infrastructure of participating national and local government units. We can provide the necessary infrastructure and sufficient power for the system by gaining government funding and a certain budget.

We can address the human capital development issue by launching on-location training courses to improve workers and system users' ability.

Recommendations to Overcome the Threats and Risks

To deal with the threats and risks, we considered strategies and plans for each of the previously stated threats that could threaten the system, which is listed as follows.

Fraud Detection:

The system will face two unique problems concerning fraud in payment systems, as stated in the current system problems and challenges related to the tax collection process. First, some vehicles could, cross the port from subways or via smuggling routes without tax payments. Second, some vehicles will carry out the payments, but it is not the real sum. Due to the apparent existence of administrative corrup- tion, they do not pay the actual amount.

It could happen with the proposed system as described in the threat portion of our swot analysis, and that is why we have considered some precautionary plans to overcome these problems.

A: The proposed system is designed so that the information of all vehicles active in the field of transport services will be entered into the system. Therefore, any vehicle that is active in any part of the country can be tracked by the system and reported, which means with the help of the system, we can identify these vehicles and collect taxes from them. Therefore, no device that is included in the system can evade paying taxes. However, in the case of vehicles that are not registered in the system, we can identiand register them with law enforcement agencies' cooperation so that they can be registered and taxed according to the law.

B: In the case of payment fraud, which can often occur due to corruption in trans- port ports, As we described in the system's design and functionality, the variables necessary to calculate the amount of tax, such as road-map, vehicle weight, are already included in the system. The tax is calculated based on those variables. It will avoid fraud and changes in the amount of tax because, except in the case of a formal request, not every user has the rule to change these variables.

System Failure and Connectivity: In the case of system failure and connec- tivity issues, we will use the method and technique of replication to resolve the problems described.

The following diagram shows how the replica nodes are distributed country-wide and how the associated provincial sites communicate with and support them. All the country's provinces are divided into five separate zones, as seen in the illustra- tion, and one control center controls all of these zones. Each

zone comprises many provinces that usually have all their transactions with the appropriate zone server. It is the responsibility of the control center located in Kabul to synchronize the servers of all zones.
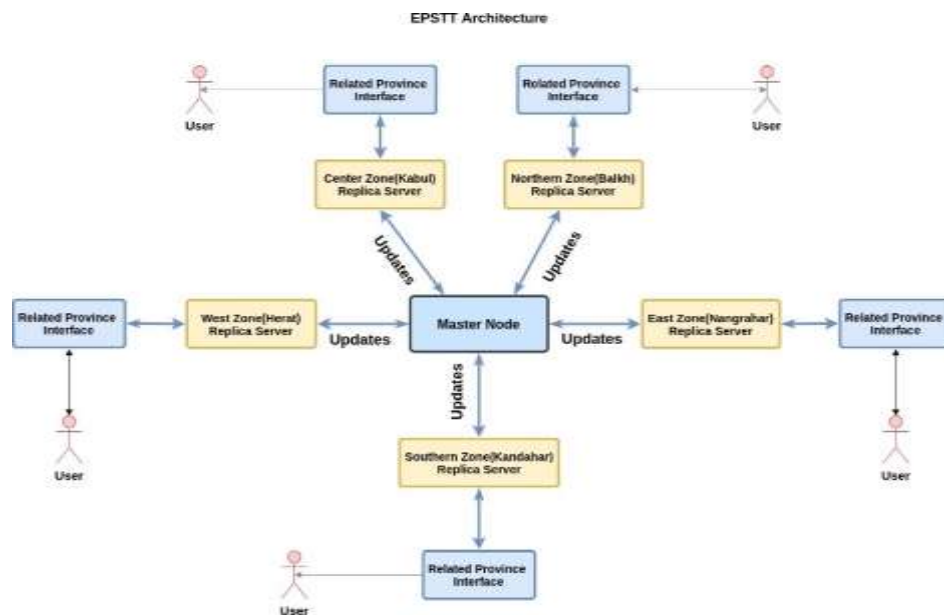

Figure: Replication Architecture Diagram

It is worth mentioning for data replication, and we will use the transactional method because users receive full initial copies of the transactional replication database and then receive updates as the data changes. Data is copied in real- time from the publisher to the receiving node in the same order as it occurs with the publisher, so transactional consistency is guaranteed in this type of replication. In server-to-server environments, transactional replication is typically employed. It does not merely copy the changes in the data but instead replicates each change consistently and accurately[34].

With this strategy, we can achieve system availability, high performance, and pro- tect the system failure; however, it may require more budget and equipment.

Infrastructure Security

Infrastructure security is one of the other threats that may impact the system, especially in a country like Afghanistan.   In the current situation that we have many security issues in Afghanistan, we can not be assured to prevent this risk from happening completely. However, there are some practices that we can do to minimize the risk of damaging the infrastructure. Locate the infrastructure in a secure area and ask the related authorities to cooperate with the Ministry of Transport to achieve this goal.

7. Conclusion

The work presented has shown that collecting transportation taxes in Afghanistan can be improved by conducting different actions and applying different methods and tech- nologies. The proposed concept, which is developed based on the current situation analysis, the analysis of the available concurrent technologies for the electronic collection of trans- portation taxes, and the requirements analysis for the proposed concept, has led us to three following major phases. A literature review on the current situation and the current situation analysis was initially carried out. Subsequently, the systems and technologies available for the electronic collection of transport taxes are being introduced and reviewed to derive the elements and sample design for the proposed concept.

The requirements analysis was performed through face-to-face interviews back in Afghanistan to understand and assess the proposed concept's requirements. Initially, the definitions of fundamentals and terminology are defined, then the current processes for the collection of transportation taxes are analyzed. The problems and challenges of the current manual system for collecting transportation taxes are described and discussed in the last part of this section. Observations of current processes, as well as interviews, are instruments to identify the core tasks.

In this section, we introduced and discussed the available technologies in the field of transportation tax collection. Two modern technologies, including GPS and RFID, have been analyzed in-depth, taking all aspects into accounts, such as structure, components, and work processes. Finally, after reviewing the mentioned technologies, the benefits and challenges of implementing them in Afghanistan were explained in detail.

Derived from the current situation analysis findings and how the users might use the system, both functional and non-functional requirements are specified in this section. Additionally, we have conducted the system's stakeholder analysis and prepared a de- tailed use-case diagram to represent the core tasks in a more precise structure.

We proposed an electronic payment system that is practically a management information system to digitize the current manual system, taking into account the requirements, reviewing the available technologies, and related challenges in Afghanistan, as this was the main objective of this study.Different aspects of the proposed system was discussed in this section, such as usage, system architecture, core features, and risk analysis.

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