

Design and Implementation of e-Government Systems for Public Administration

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Abstract— The use of information and communications technology (ICT) is increasing every day and organizations have to adopt their services with it. E-Government is one of the recent trends in using ICT in developed and developing countries which refers to the use of ICT by the governments to deliver online governmental services to the citizens as well as industries. This article explores the challenges and opportunities of information technology in governmental organizations and discusses the challenges of implementing e-Government in developing countries such as Afghanistan. Using e-Government, citizens are able to have access to the government services 24/7, which makes government services more transparent, decrease costs, higher quality, and more time-efficient. Therefore, the citizens have easier access to their services. In this article, the authors argue that the public administration processes have to be adopted with the new technologies to ensure reliability and transparency. The research was based on Herat Municipality organization which needed an information system to facilitate the process of property registration and tax payment for the citizens. Challenges and opportunities discussed and the best solution as an information system was provided.

Keywords— E-Government, Challenges, Government, Municipality, ICT, Herat, Opportunities, Information System.

I. INTRODUCTION

Technology has changed different aspects of our life, how the people live, work, how companies are doing their businesses and how governments are serving their people. It is the time to utilize technology in different aspects of our government to enhance access and services for citizens. Therefore, “The term E-Government emerged in the late 1990s, but the history of computing in government organizations can be traced back to the beginning of computer history” [9]. E-Government is the use of information technologies such as Wide Area Networks, Internet, and mobile computing to make a new type of relationship with citizens, businesses, and other parts of a government. It could provide better delivery of services for citizens, better interactions with business and industry and more efficient government management. Use of e-Government and its services are increasing in developed and developing countries. But there are many challenges for its implementation in developing country. Afghanistan is a country with lots of challenges to implement e-Government projects and most of the organizations doesn't want to change their paper-based processes to adopt with new technologies. However, the result of using E-Government would be less corruption, increased transparency, cost reductions, revenue growth and more convenience [18]. The main goal of this research is to define the key challenges and opportunities of e-Government in developing countries specifically Afghanistan. Besides examining and evaluating the current situation of E-Government in Afghanistan as well as developing an e-Government solution based on the requirement of Herat Municipality (a governmental organization in Herat, Afghanistan) which is a type of e-Government to government

model solution.

II. E-GOVERNMENT BACKGROUND

During the years, the interaction between the citizens or businesses and an official organization took place in a government office and the term E-Government was not known. Private Sector of the United States of America provided the first electronic services. After developing internet and then WWW (World Wide Web) many changes occurred in different parts of the societies.

As the influence of e-commerce and e-business was increasing in daily life; governments, their organizations and the society started to use information technology and internet as well. Firstly, private sectors were thinking about the new trends in using IT, but now the governments are focusing to provide their maximum services online. So, governments started to promote the use of ICTs afterward [5].

“The purpose of adopting ICTs is to give an opportunity to citizens, so they can get involved in decision-making process” [1]. After increasing the use of ICT in governments, developed countries could get many benefits and increase their efficiency in providing different services through E-Government for their citizens.

III. E-GOVERNMENT GOALS

Goals of E-Government varies depending on the governments, their diplomacy and politics. Accordingly, the World Summit for the Information Society Plan of Action recommends for governments to “develop national E-Government initiatives and services, at all levels, adapted to the needs of citizens and business, to achieve a more efficient allocation of resources and public goods” [19]. Besides

governments have to “support international cooperation initiatives in the field of E-Government, in order to enhance transparency, accountability and efficiency at all levels of government” [19]. With this, citizens could be seen as customers of government services and affect the day-to-day management of financial systems by providing feedback and their opinions.

Today most of the governments use websites to enable their customers/ visitors getting information online, paying taxes, registering automobiles, accessing vital records, communicate with government officials and participate in different politic or diplomatic decision-making processes. Governments expect to achieve such gains as [8]:

- Collecting the related data from citizens using online forms and reduce costs and make error checking automated.
- Reduce the communication costs with citizens.
- Providing data sharing facilities within the government, governmental agencies and private sector.
- Greater re-use of data.
- Reduce government publication and distribution costs through online publication [13].

IV. E-GOVERNMENT MODELS

E-Government models are categorized according to the relationships they provide with different types of users such as citizens, businesses, employees and etc. These models are as follows:

A. E-Government to Citizens

This is the relationship between the government and the citizens which means the government provides different services to its citizens. Many services such as passport registration, id card registration, healthcare services, and other public administration services are provided by the governments. Citizens are playing the most important role in the government and have possibility to use E-Government services instantly, conveniently, from everywhere, by using Internet, TV, Mobile phone and other channels for free.

B. E-Government to Business

It’s the relationship of public or private companies and businesses with the government. Government provides electronic interactions with private businesses. It allows e-transaction initiatives such as e- procurement and the development of an electronic marketplace for government [7]. In this relationship Government provides some sort of services online to the businesses. For example, if there is a governmental project, the government has to inform different companies and businesses via the internet and then any of these companies or organizations are able to bid on it. Other services like providing certificates or licenses, purchase or selling products and etc. fall in this category.

C. E-Government to Government

In this relationship, one or more governmental organizations could provide services to other governmental organizations. It means one organization can access the

information and services provided by another organization which are not accessible publicly. “In order to realize a single access point, collaboration and cooperation among different governmental departments and agencies is compulsory. Online communication and cooperation allow government agencies and departments to share databases, resources, pool skills and capabilities, enhancing the efficiency and effectivity of processes” [14].

D. E-Government to Employee

This model includes the relationship between a government and its employees who are working in different governmental organizations. This model is effective to provide e-learning and knowledge sharing for employees. “G2E refers also to strategic and tactical mechanisms for encouraging the implementation of government goals and programs as well as human resource management, budgeting and accounting” [16].

Table I [3] provides introduction and examples of E-Government Services in different models of E-Government:

TABLE I. Overview of E-Government Solutions

	Overview of E-Government Solutions		
	External: G2C	External: G2B	Internal: G2G
Phase 1: Information	Local/Department al/National information which includes mission statements and organizational structures, addresses, opening hours, and etc.	Business Information such as address, opening hours, products, rules, news, and etc.	Knowledge base (Static Interanet) Knowledge Management
Phase 2: Interaction	Submitting forms on websites, downloading, online contact forms, discussing groups, and etc.	Online contact forms, submitting or downloading forms, online help, email, and etc.	Emails, Interactive knowledge databases, complain handling tools, and etc.
Phase 3: Transformation	Personalized website with integrated personal account for all services	Personalized websites with integrated business account for all services	Database integration

V. IMPORTANCE OF E-GOVERNMENT IN DEVELOPING COUNTRIES

Basu [2] has noticed that, no country can ignore the benefits of ICT either it is developed or developing, small or large. ICT is a major source of modernization. Developing countries can increase their competitiveness by investment in communication technology. They viewed the information and communication technologies with three perspectives as Bhatnagar [4] explained:

They use ICT to help their economy, growth and employment. It is a way to earn foreign exchanges by offering products and services. They use ICT to provide government services for their citizens. This usage of ICT could improve the effectiveness and transparency in their countries. The third perspective is the use of electronic medias and provide communications with the society.

As Crede and Mansell [6] said, ICTs offer the potential not only in collecting, storing, processing and diffusing enormous quantities of information at the minimal cost, but also to network, interact and communicate across the world.

It is more than a decade that United Nations started to assess the global development of E-Government in the world. First assessment was done in 2001. After that, there is an increasing amount of implementing E-Government projects in different countries. Surveys of United Nations are done according to the conceptual framework of E-Government Development Index (EGDI). As United Nations explains “The EGDI is a composite measure of three important dimensions of e-Government, namely: provision of online services, telecommunication connectivity and human capacity” [17].

According to the United Nation survey [17] all 193 members of the United Nations have national websites, but most of them are at low or intermediate levels of e-Government development. A large number of countries are providing basic search tools which support more than one language. About half of the members have advanced search engines, 40 percent enable user opinion features and less than one-third of them are able to provide more secure connections.

VI. CHALLENGES AND OPPORTUNITIES OF E-GOVERNMENT IN DEVELOPING COUNTRIES

Information and Communication Technology and everything related to it, had its impacts on different parts of the societies. These impacts could be categorized in positive (Opportunities) and negative (Challenges) ones. Challenges include the ones that make it hard for E-Government projects to be implemented and opportunities, on the other hand include the positive points that E-Government could provide for a developing country in the future. According to the experience of developed countries and some developing countries, E-Government could be a reason for growth and wealth of the countries. Besides it has many opportunities and benefits in a society, it can have its challenges and issues as well. So, the good infrastructure of E-Government includes the hardware and software which together provide more secure and fast services to citizens, employees and businesses. There are some challenges as well as Jaeger [12] mentioned; computer security, privacy, and confidentiality of the personal data. Some challenges and opportunities in developing countries are listed as discussed by Hamidi [10]:

A. Challenges

- Lack of ICT Infrastructure
- Lack of Policy
- Lack of ICT skills among employees and society
- Lack of motivation for using ICT and online services
- Improving or changing administrative processes of governmental organizations
- Lack of strategy

B. Opportunities

- Reducing costs and increasing efficiency
- New and high-quality services
- More transparency and decreasing corruption

- Increasing the participation of citizens
- Providing shared environment and relationships
- Decision-making quality and democratic facilities
- Increasing use of ICT in the society
- Enhance the national information infrastructure

VII. CHALLENGES AND OPPORTUNITIES OF E-GOVERNMENT IN AFGHANISTAN

Afghanistan suffered from civil wars during the last decades. About all technological resources were destroyed, and the education stopped for many years. There was no way for technology to improve in the country and most of the important resources like electricity, internet, telephone and other ICT tools were damaged or could not be implemented in Afghanistan. In 2000s everything changed. Many refugees who left their country because of the wars, were educated in other countries and came back to their country to start working. ICT industry developed, many telecommunication and internet service providers started.

Thus, today there are so many people who have access to the newest technologies and are getting benefits from them. There are 23.21 million mobile phone users and about 2,413,610,672.32 USD have been invested in this sector. Afghanistan fiber optic project is undertaken and more than 8 cities and universities in Afghanistan are connected to the National Fiber Optic Network. More than 60 internet service providers company are licensed, and 10% of the population (about 3 million people) have access to the internet services in the country. Ministry of ICT then started to use these improvements to build government capacity, improve governance and reducing corruption by moving toward e-Government [13].

There are different types of challenges and opportunities in implementing E-Government projects in developing countries. They exist in Afghanistan as well, but the level of their effectiveness may vary. According to the interviews and survey done, most of the interviewees strongly agree on the four top opportunities than others. According to their opinion, using E-Government and new technologies could decrease corruption, enhance the capacity of the governments, increase the use of IT in the society and enhance the National Information Infrastructure. In the other hand, they were not so optimistic about improving efficiency and reducing costs of the administrative processes, quality of services, participation of the citizens, shared environment and relationships between the organizations and effecting decision-making quality. They provided different reasons for their opinions:

- Lack of ICT skills and awareness about IT in the society and governmental organizations.
- Long work processes in the organizations which could not have many effects on their online procedure as well.
- Culture of using ICT in Afghanistan is not entirely known.
- Effects of political parties on government’s decisions which affect the quality of decision-making.
- Lack of Electricity

Also, there are some more opportunities which were

mentioned by the interviewees:

- New job opportunities for expertise
- Access to the services 24/7

Figure 1 summarizes the interviewees' opinions and survey about the opportunities of E-Government in Afghanistan.

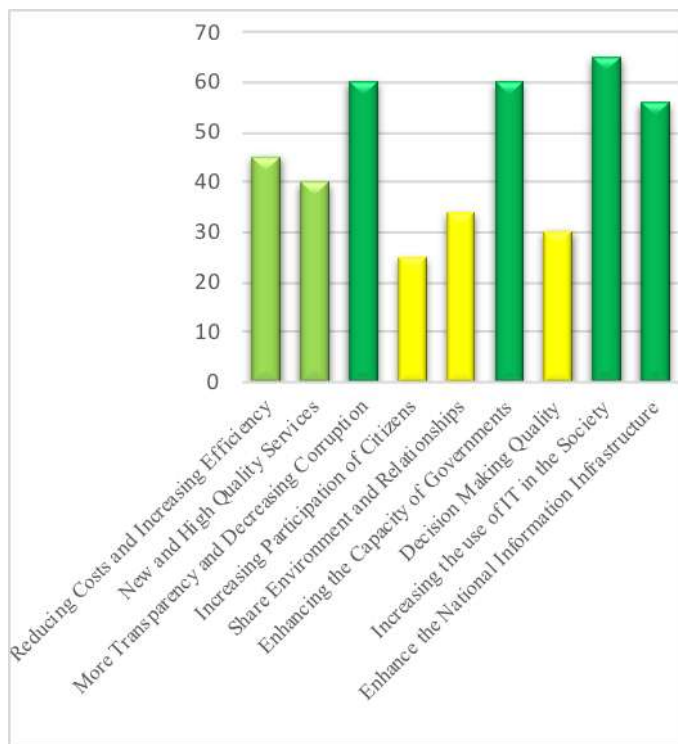


Fig. 1. Opportunities of e-Government and online services in Afghanistan

The interviewees also expressed their opinions about the challenges of E-Government in developing countries in general as well as in Afghanistan. According to the interviews, researches and analysing the gathered information other challenges exist in Afghanistan as well. These challenges could not be seen in most other developing countries but they are important to be mentioned here:

- Electricity problem.
- Lack of political willingness to implement E-Government.
- Lack of awareness about E-Government in the society.
- Economic Issues
- Internet charges

Figure 2 summarizes the interviewees opinions and survey about the challenges of E-Government in Afghanistan.

VIII. GOVERNMENT RESPONSIBILITIES

If the governments are willing to have successful implementation of E-Government projects in their countries they have to consider the followings:

- Add ICT and E-Government syllabus to their school and university subjects.
- Invest more in building technology infrastructure.
- Start with small online projects and be flexible.

- Provide more collaboration and communication among government organizations and private sector
- Build or enhance their ICT strategic plans.
- Provide trainings, campaigns and seminars to their current employees.
- Offering seminars and conferences for employees, lecturers and undergraduate students.
- Use medias such as TV, radio, journals, newspapers, billboards, and etc. to provide more awareness in the society.

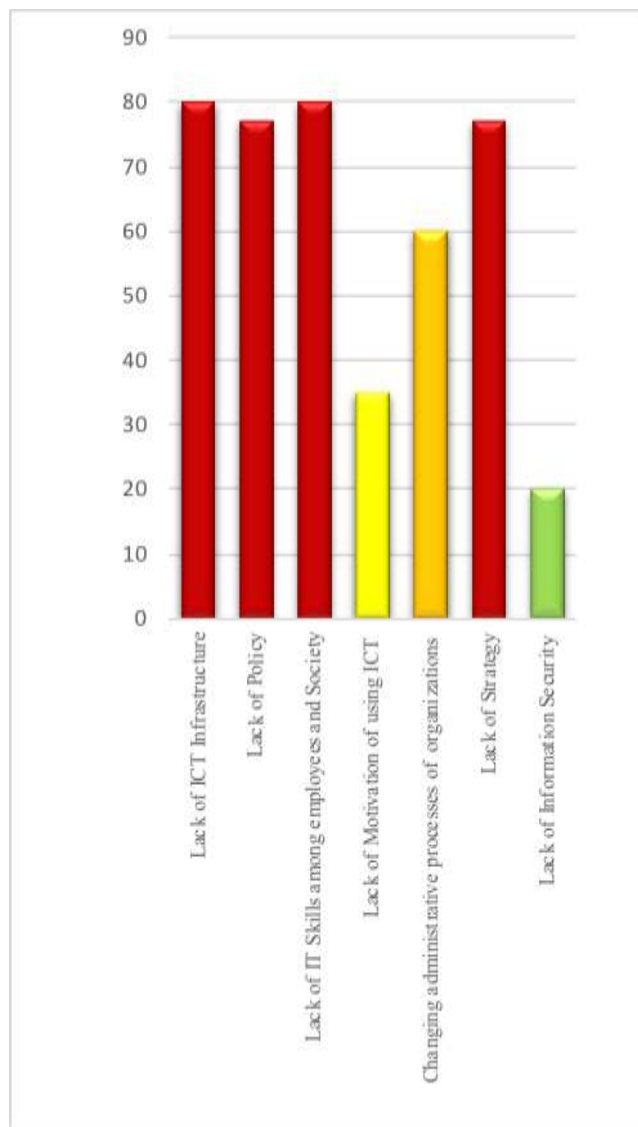


Fig. 2. Challenges of e-Government and online services in Afghanistan

IX. IMPLEMENTATION OF AN E-GOVERNMENT SYSTEM FOR HERAT MUNICIPALITY

Herat is the third largest city in Afghanistan [11]. There are different governmental organizations which are responsible for different parts of the government in Herat. For management and coordination of city affairs, an office by the name of Kalantary, Nazmeia and some other names was existing which all meant as municipality. But the first official

municipality office was founded in 1308 in Chahar Bagh under the leadership of Abdul Ghafor Gulmiri.

At first, the core functions of Herat municipality were to collect taxes, registration of soldiers, registration of population and controlling the city traffic. There was less population living in Herat and delivery of services to them was easier. Up to now, there were 36 mayors who led the municipality of Herat which were chosen by the government. Currently, Herat municipality office is located in the center of Herat and has 15 district [15].

Herat Municipality has more than 400 employees who are working in different departments. One of its most important departments is property registration which is responsible to register residential and trading properties as well as collect taxes from the registered ones. Both processes are long and time-consuming for the employees as well as citizens.

A. Current Problems in Property Registration Department

According to the current situation of Property Office (According to the interviews with the manager and employees of Property Office), there are different problems which are as follows:

- Corruption: When the procedure is long, citizens are willing to pay some extra and illegal amounts to the employees
- Security of Information: The information is accessible to all employees in this office
- Privacy: some of the people fear of registering their, because they are not sure if their information is completely secure.
- Archiving Documents: More than 20 properties are registered by Property Registration daily. Each property has in average five paper documents. Every year all the archived documents are thrown to the garbage.
- Finding Duplicate Registrations: It takes around a week to check if the property is registered before or not.
- Time-consuming processes
- Lack of accessibility in a shared environment: There is no single point of information in Herat Municipality.

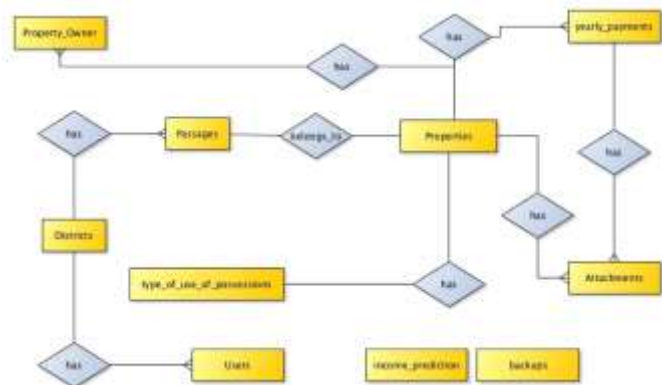


Fig. 3. ER diagram designed for Property Registration Department of Herat Municipality

B. Proposed Solution

To solve the problems in property registration department

of Herat Municipality, information gathering process was done, their requirements found, gathered information evaluated and analysed; An initial design of an Information Management System was provided and then implemented for Property Office.

The system development included:

- Database and query design
- User interface and server-side programming

The following figure shows an example of user interface of Herat Municipality’s Property Registration System.



Fig. 4. User interface of Herat Municipality’s Registration System

Thus, the following components were found as the most essential ones for the system and implemented:

- User Management: The Information Management System let the authorized users review, add, update and delete users’ information.
- District Management: The Information Management System let the authorized users review, add, update and delete districts’ information.
- Passage Management: The Information Management System let the authorized users review, add, update and delete passages’ (which are located in each district) information.
- Property’s Type of Usage Management: The Information Management System let the authorized users review, add, update and delete type of Property’s usages information.
- Property Registration: This part of the system allows the authorized users to register a new property, update, view and delete the registered properties.
- Search: Authorized users could search and find a property and also check for duplicates.
- Report Generation: Different types of reports and statistics of the system could be generated.
- Yearly Estimated Income Management: Entering the estimated yearly income of Herat Municipality to the system.
- Tax Payment: Authorized district user could enter a tax payment record for a property whenever tax is paid by the owner.
- Backup & Restore: Authorized user could use this part of the system for backup or restore the database.

X. CONCLUSION

The solution could be defined as an E-Government to

government solution in the context of our research which could provide facilities for the organization and the employees. Later it could be enhanced and improved to provide tax payment services for the citizens as well. The system logs sensitive changes and modifications and user activities. So, it could reduce security issues. Employees don't have to waste their time to find duplicate records. Also, it could help them to store the data in an organized way and could be changed and accessed whenever it is needed. The Archiving problem with paper-based documents would be resolved by scanning and uploading them into the system. The information could be shared between different municipality's offices. Duplicate registrations would be found in seconds and generating high-quality reports would be much faster than before. As a result, the employees of Herat Municipality's Property Registration Office are able to do their works faster, more reliable and more transparent to provide better and high-quality services for the citizens.

As Hamidi [10] mentioned, in general, challenges and opportunities in developing countries depend to what degree E-Government applications and services are implemented and their usage accepted and practiced by the end users. The government has to choose a good solution for making the society ready and provide them more awareness about new technologies and especially E-Government.

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