

# ДОСЛІДЖЕННЯ ПЕРСПЕКТИВНИХ НАПРЯМІВ ЗАСТОСУВАННЯ КОМП'ЮТЕРНИХ ТЕХНОЛОГІЙ

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## ANALYSIS AND DESIGN OF ONLINE PUBLIC SERVICE

**Abstract.** This research deals with the barriers of E-Government functioning in Ethiopia. The main goal of this research is to identify the problems associated with Passport application/registration and to provide an appropriate solutions. The research discusses the current situation concerning the E-Government in Ethiopia and analyzes the extent of e-services coverage in the country. Once the drawbacks are found out, the author proposes the creation of online service portal. The creation of the portal will be based on the literature sources analysis, author's personal experience and conducted sample surveys. In the practical part, a web application was created using HTML5, CSS3 and PHP. The application includes detailed information about the user (passport applicant), such as full name, date of birth, address and other attributes. This data should be uploaded to a SQL database, which will in turn transmit the information to the web application.

**Keywords:** analysis, E-Government in Addis Ababa, Ethiopia, online services, web application, e-services

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## АНАЛІЗ ТА ФОРМУВАННЯ ПУБЛІЧНИХ ОНЛАЙН СЕРВІСІВ

**Анотація.** Дане дослідження стосується вивчення бар'єрів у сфері функціонування електронного уряду в Ефіопії. Основною метою цього дослідження є виявлення проблем та розробка відповідних рішень, пов'язаних із реєстрацією та оформленням паспортів громадян. У дослідженні розглядається поточна ситуація з функціонуванням електронного уряду в Ефіопії та аналізується ступінь охоплення населення країни державними онлайн сервісами. Внаслідок виявлених недоліків, автор пропонує створити сервісний онлайн-портал. Створення онлайн-порталу буде відбуватися з врахуванням аналізу літературних джерел, особистого досвіду автора та проведених вибіркового досліджень. У практичній частині дослідження запропоновано створення веб-додатку на основі HTML5, CSS3 та PHP. Веб-додаток містить детальну інформацію про користувача (претендента на паспорт), таку як повне ім'я, дата народження, адреса та інші атрибути. Дані завантажуються в базу SQL, яка в свою чергу передає їх у веб-додаток.

**Ключові слова:** аналіз, електронний уряд у Аддіс-Абебі, Ефіопія, онлайн сервіси, веб-додаток, електронні послуги

**Introduction.** Before discussing about e-government, it is important to know what government is and what its responsibilities towards its people are. A government can be defined as a group of people with the authority to govern a country or state.

E-Government, short for electronic government system, is a broad concept/term for web-based services related to agencies of state and federal governments. E-

Government involves the use of information technology and the Internet to support government operations and service. The interaction may be in the form of obtaining information, filings, or making payments and a host of other activities via the World Wide Web (Sharma & Gupta, 2003, Sharma, 2004, Sharma 2006).

E-Government is one of the most important instruments for modernization and reform as governments deal with the continuing pressure of increasing their performance and adapting to the pressure of the new information society. (Morven McLean, 2014)

E-governance is using information and communication technologies at various levels of the government and the public sector for enhancing governance (Bedi, Singh and Srivastava, 2001; Holmes, 2001; Okot-Uma, 2000). According to Keohane and Nye (2000), "Governance implies the processes and institutions, both formal and informal, that guide and confine the collective activities of a group. Government is an entity that acts with authority and creates formal obligations. Governance need not necessarily be conducted exclusively by governments. Private firms, associations of firms, nongovernmental organizations (NGOs), and associations of NGOs all engage in it, often in association with governmental bodies, to create governance; sometimes without governmental authority." Thus, it is understandable that e-governance need not be limited to the public sector and can be applied in the private sector as well.

The UNESCO definition ([www.unesco.org](http://www.unesco.org)) is: "E-governance is the public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening to citizens and new ways of organizing and delivering information and services. E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is to engage, enable and empower the citizen."

E-Government has been employed by developing countries to be an empowering agent toward quickening methods, conveying a large amount of services to public and organizations, expanding transparency and responsibility while decreasing the costs. Ethiopia being among the world's developing nations, its government has built E-Government Directorate under the Ministry of IT (Technology, 2005). Ethiopia, based on the 2017 UN E-Readiness index report, is ranking 172 from 192 countries scoring a total 0.1857 and distributed to 0.1739 in web measure index. Although, the status is far below the world average, the trends in striding towards these averages are encouraging.

**Objectives.** The main goal is to analyze the weaknesses of the current immigration system in Ethiopian Ministry of Foreign Affairs (Ethiopian Immigration Authority) Addis Ababa. In addition, a design of a new online public service will be presented which would provide the user with the good interface to utilize e-immigration services on the same portal. Partial goals of this thesis are to characterize the current state of online public services and E-Government readiness in

Addis Ababa. This would be done through survey and based on the own experiences of the author.

Further the research will try to analyze opportunities and barriers for online public services in Addis Ababa, Ethiopia based on that a new online public service will be designed to make an overall evaluation. This design will not be considering all the services but it will be a design and the thesis will further discuss how that design can be improved and take maximum benefits.

**Methodology.** The methodology is based on the analysis of the literature survey and own experience. The practical part will be designing e-service for Ethiopian Ministry of Foreign Affairs (Ethiopian Immigration Authority) which will include services like the appointment for passport application, renewal, and collection. The e-service will be designed using software engineering tools such as UML and web design software like HTML, CSS, PHP, and MySQL. Based on the literature review, analysis of opportunities and barriers for new online public services and analysis results collected through the survey, recommendations and conclusions will be formulated.

**Literature Review.** This section covers a review of related research works done in the area related to the concept of E-Government. Further, the principles and management of e-government will be discussed and applications of E-Government in developing countries specifically in Ethiopia will be described. Finally, opportunities and challenges of E-Government in Ethiopia will be stated.

E-Government is given different definition by different authors. Horan, (2005) defined E-Government as deliverance of services by Government to benefit citizens, businesses and government employees through use of ICT. It can be also defined the as use of information and communication technologies to promote more efficient and effective government, making it accessible and accountable to citizens UNESCO (2005:5-6).

Implementation of E-Government provides significant benefits, including: Improved efficiency, bigger access to services, greater accountability, transparency and citizen empowerment (L.L. Tung, 2005), lowered costs and time for services (D. Gilbert, 2004). It has also strategic advantages like improved decision-making through streamlining of information, enhanced knowledge sharing and organizational learning (J. Zhang, 2005). Since the implementation of government started in the world wide, there is a huge gap among economically developed and developing countries in the rate of growth (Gupta, 2008). E-Government projects absorb an increasing proportion of public sector budget to fulfill promises to provide solutions to many public sectors problems.

While many governments have recognized and taken initiatives to implement E-Government projects and applications in the respective domain, evidence shows that most of these projects fail or can be classified as total failures, in which the system is never implemented or is implemented but is completely abandoned, and partial failure, in which major objectives are not attained (Heeks, 2005). The target

group of E-Government services is highly heterogeneous, as it comprises the entire population of a country differing in cultures, languages and skills, political opinions suggest that governments need to develop E-Government capability by maturing through a learning curve that resembles repeated patterns, through integration between local and provincial government departments. A mature E-Government is characterized by high level of capability and performance of multiple dimensions. Capabilities include the ability to share data and information across different government departments by reducing the process time through re-engineering the system and ability to capture and share the knowledge of government employees at the highest level (Karl W. Sandberg, 2007).

#### **Management of E-Government**

As it is clearly described by Richard Heeks in Management Program of Countries, E-Government can be seen in 3 different approaches.

The first one is: **Central** approaches in which central government make decision about E-Government as well as information systems, policies, communications and frameworks. Benefits of implementing Central approach can be seen from different angles. As E-Government being centralized, it uses standard type of process, equipment and other specifics. Using common purchases of equipment and products ensures a cost saving as bulk purchases prove cheaper. It will also avoid duplication by centralized purchase. Other possible benefit of central approach can be resource sharing using common resources together like storage and primarily information. A good example of Centralized E-Government is the Czech Republic where the Czech Republic's Ministry of Interior Affairs manages the E-Government program centrally.

The second approach is the **Decentralized** approach of managing the e-Government program. This type of approach induces the departments or users of the systems to make decisions regarding how E-Government operates in their departments. It will also enable end users to decide on the policies and frameworks to be implemented within the department or ministry. This type of approach ensures the identification and fulfillment of user's real needs, which will give satisfaction for the end users and successful operation within that government department.

The third approach is **Hybrid** approach, which is considered as an intermediate of the previous two categories where decisions on E-Government are taken by both the end users and central ones depending on each country/case. In most cases the client server based approach has been used, where the server component is centrally managed while the client is based on the departmental aspects, so repositories are kept under the central government (Heeks, 2005).

#### **Relationships of E-government**

Appearances of e-government can be described as the utilization of Information and Communication Technologies (ICT) to support forms inside the government and for the conveyance of administrations

to its customers, including different associations, public and some other business organizations.

Although the scope of E-Government involves several initiatives in the process of providing services, there are primarily four types of interaction, which form the foundation of E-Government deployment. These are *Government to Government (G2G)*, *Government to Citizen (G2C)*, *Government to Business (G2B)*, and *Government to Employees G2E*.

The G2G interaction primarily involves initiative that intended to the sharing of information among public organizations and various levels Government administration. In the case of G2C initiative, the target of the system would be citizens or customers. Accordingly, the initiative will be aimed to provide information and services to the public. In this regard, services such as certification, licensing, paying taxes/bills are found to be a common practice. Similarly, in G2B initiatives, E-Government service will target businesses. The initiatives can involve activities such as procurement of goods and services by the government from the commercial business entities and sale of government goods to the public. Moreover, this type of interaction involves the transaction and exchange between the government and the businesses regarding licenses and taxation among others. G2E is the last initiative, which is targeted in serving the employees. The scheme could cover activities such as employment opportunities, work guidelines, rules & regulations benefits and pay structures for the government employees, employee welfare, work rules and regulations, government housing among others (UNESCO, 2015).

#### **Advantages and disadvantages of E-Government**

Everything has its positives and negatives. One the one hand online services make our life better and bring transparency and flexibility to the services provided by the government and on the other hand, it has some drawbacks. The following table identifies some of the advantages and disadvantages.

#### **E-Government differences between developed and developing countries**

Differences between developed and developing countries E-Government strategies had large impact on the way government interacts with their citizens. Developed countries had made a significant advancement in E-Government application as compare to developing countries. It is important to know the significant difference between develop and developing countries.

#### **Practical part**

In this chapter, it will be clearly discussed the work of designing the web for "Ethiopian Ministry of Foreign Affairs (Ethiopian Immigration Authority)". So at the end it will be able to make any user to reserve passport online. The reason behind the development of a web application of this type lies in possible benefits which can be gained through its usage.

Table 1

### Advantages and disadvantages of E-Government

Advantages	Disadvantages
It is much cheaper for both government and public	Building and maintaining a new website can require a lot of money. It needs professionals and also some technical costs.
It is much quicker than traditional way of services where people have to wait in a queue and the workers can be either lazy or slow.	Implementing new security ways can cause problems for citizens to provide more information about them.
Websites provide better ways to manage the information compared to the traditional ways. Hypertexts allow us to provide access to complex sets of information in easier and user-friendly way.	It can cause some security dangers to the government. It can give a chance to hackers to hack the system and that can be tragic for the government and also for the citizens who will use these services
It is a new way of governance and it provides a new, additional point of contact. Only 20% of the whole population of the world has access to internet but it is increasing every year especially in developing countries.	One of the biggest drawback of these services in developing countries is that they are not under the reach of everyone as it is known that developing countries do not have a wide range of internet access to its citizens.

Source: (Danieli, 2008)

Table 2

### E-Government differences between developed and developing countries

	Developed Countries	Developing Countries
<b>History and Culture</b>	Early development in government and economy immediately after independence. Economy growing at a constant rate, productivity increasing, high standard of living.	Government usually not specifically defined; economy not increasing in productivity Economy not growing or increasing productivity; low standard of living
<b>Technical Staff</b>	Has a current technical staff, needs to increase technical abilities and hire younger professionals Current staff would be able to define requirements for development	Does not have a technical staff. Current staff may be unable to define specific requirements.
<b>Infrastructure</b>	Better infrastructure High internet access for employees and citizens	Bad infrastructure Low internet access for employees and citizens.
<b>Citizens</b>	High Internet access and computer literacy; still has digital divide and privacy issues. Relatively more experienced in democratic system and more actively participate in governmental policy-making process	Low Internet access and citizens don't trust online services; few citizens know how to operate computers. Relatively less experienced in democratic system and less active participation in governmental policy-making process
<b>Government Officers</b>	Decent computer literacy and dedication of resources; many do not place e-government at a high priority	Low computer literacy and dedication of resources; many do not place e-government at a high priority due to lack of knowledge on the issue

Source: *E-Government Strategies in Developed and Developing Countries*. Chen. 2006, Vol. 1

Table 3

### Summary of finding with survey Ethiopia current living in Ethiopia

Area	Findings N=30
<b>Internet usage</b>	All the participants had experience of internet. Over 70% of the participants use internet daily. The rest of the participants use it alternatively.
<b>Barriers</b>	Education and awareness, Political Issues, Reliability and Security, High Internet Cost, Low Bandwidth.
<b>E-service essence and Usage</b>	Every participant know the importance of e-services and would like to have passport services. The government is providing some services but all the participants would like to have more services as it would save their time and money.

Source: Author



Home News contact us **Login/Signup**

If you have created an account with us please login using your username and password to track, cancel or edit your application. if you have unsubmitted application, you can complete and submit it after login

User Name :

Password :

If you do not have created an account with us please use the following form to create an account. Please take a note of your user name and password if you have unsubmitted application, you can complete and submit it after login

User Name :

Password :

Confirm password:

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**Figure 1: Login/ Signup page**

### Login and signup

The primary function of the passport application is available to all its visitors, and to view application. The user should have the ability to apply passport application, so that the database of registration stays up-to-date. First, a login and signup page was created that would take the login and signup for the user, regarding the passport application.

**Results and Discussion.** The practical part provided description of the whole development process of e-passport registration application with all obstacles that occurred. It captured the whole process with description of tools and utilities used. The design of the application was also conducted by the developer, which prolonged the development process. Even with a single developer, the application was created approximately within five weeks thanks to application of various technologies.

The research achieved the objectives set by analyzing the weaknesses of the current immigration system in Ethiopian Ministry of Foreign Affairs (Ethiopian Immigration Authority) Addis Ababa. In addition, the author made a design of a new online public passport registration form which provides an efficient interface to utilize e-immigration services on the same portal. As part of partial goals the author characterized the current state of online public services and e-government readiness which is done through survey and based on the secondary resources.

Ethiopian government lacks infrastructure and skills. The government doesn't invest sufficient amount of money in this field. There are other priorities such as construction development which can be seen by eyes like bridges and roads and huge buildings. The government doesn't show any interest in online services and the reason can be said that the bureaucrats don't want the system to get better. They don't want to facilitate the process as people/clients want to it be or as

it is required. Bureaucracy is a major problem that could benefit the bureaucrats while impeding the governing system. While most of the developed world has managed to solve or at least reduce this threat, developing countries such as Ethiopia have not yet implemented the system accordingly. The government should have clear intentions in mind as to introducing more facilitated services. The government must invest more money in this field. The government must educate people and employees. In the first phase, the government should train its employees. Even though employing the trainers will be costly for the government, it should hire them and give them complete freedom to design these services. These services provide continuous support and one of the keys for these services are transparency and reliability.

**Conclusions and perspectives of further research.** The main goal of the diploma thesis was to analyze the weaknesses of the current immigration system in Ethiopian Ministry of Foreign Affairs (Ethiopian Immigration Authority) Addis Ababa and to design online public service.

The passport registration system (E-Government system) designed as a web service could benefit the public in a variety of ways, some of which are discussed below. The major advantage is the time it saves citizens and customers of the Ministry of Immigration Agency. The fact that this system can be accessed from anywhere in the world via the internet makes it far easier for people from the furthest locations to make use of the service without travelling long distances there by saving them the hustle and money they would have spent. In the view of the government itself, once then system is implemented, it could economical since it cuts down the number of employees required to process these tasks. The current trend is that some rent seekers stay in line in the morning to sell their place for an expensive price to those who need it badly. This has been an opportunity

created by the long waiting queues. The Author believes that the system which is designed will ultimately abolish these embezzlements.

Although the internet connectivity in the country has been increasing from time to time, it is far beyond reaching a 100% accessibility rate. Considering this, the author of this thesis understands that the web service could not be accessed from very village in Ethiopia. But being able to access the system from rural towns, by itself, is a major advantage to the users as compared to having to travel to the capital probably three to four times until the whole process is complete.

Author, strongly believes that, this research will help to improve E-Government services in Ethiopia and author would like to focus another poor area of E-Government services by another research.

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