



Faculty of Information and Communication Technology

**E-GOVERNMENT IN COMOROS: TOWARDS A TRANSFORMATIONAL
APPROACH THROUGH THE REENGINEERING OF PUBLIC FINANCE
SERVICES AND PROCESS**

Said Abdou Mfoihaya

Master of Computer Science in Software Engineering and Intelligence

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SERVICES AND PROCESS**

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in Fulfillment of the Requirements for the Degree of Master of Computer Science in
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DECLARATION

I declare that this thesis entitled “E-GOVERNMENT IN COMOROS: TOWARDS A TRANSFORMATIONAL APPROACH THROUGH THE REENGINEERING OF PUBLIC FINANCE SERVICES AND PROCESS” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :

Name :

Date :

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Master of Computer Science (Software Engineering and Intelligence).

Signature :

Supervisor Name :

Date :

DEDICATION

To my beloved Parents.

ABSTRACT

The aim of this thesis is to investigate the current e-Government environment and make recommendations for possible solutions to the adoption and development of e-Government projects in Comoros. The field of e-Government is playing a prominent role on economic as well as social developments in developed and developing countries. Recent studies have shown that advanced countries in e-Government implementation achieved good status both in socio-economic and social aspects. There have been numerous models and frameworks developed for e-Government implementation programs in the literature. The study undertaken in this thesis is based on available models, frameworks, and current practices in different countries. That means, the nature of this study is on a case study research. The study started with a historical background of the e-Government progress across different horizons. It continues with the investigation on e-Government models, frameworks, and the experience of different countries in this field. Also the study examined several theoretical and operational frameworks in order to identify issues, aspects, and techniques that can support the development of e-Government. Then, later the study discussed on the current e-Government environment for the purpose of identifying the gaps existing between this environment and established e-Government programs. The findings obtained from the literature journey lead into the development of a hypothetical framework designed to address the gaps and satisfy the requirements for a successful application of e-Government services. Another result is the identification of key parameters (areas) where transformation does happen. These two results are supported by a case study model for the transformation of the Comoros public finance sector. The results obtained are evaluated against established frameworks available in the literature. During the evaluation process several recommendations have been given. This study achieved two prominent contributions. It can be used by Comoros Government policy makers to drive changes in the Comoros e-Government program. Also the study is useful for researchers for the development of

further studies. Although the research questions have been answered, the study presents some limitations. It needs to be tested in the real world environment to confirm its strengths and identify drawbacks for further improvements.

ABSTRAK

Tujuan karya ini adalah untuk menyiasat alam sekitar e-Kerajaan yang semasa dan membuat cadangan untuk penyelesaian yang mungkin untuk pemakaian dan pembangunan projek-projek e-Kerajaan di Comoros. Bidang e-Kerajaan memainkan peranan penting mengenai perkembangan ekonomi dan sosial di negara-negara maju dan membangun. Kajian terbaru menunjukkan bahawa negara-negara maju dalam pelaksanaan e-Kerajaan mencapai status yang baik dalam kedua-dua aspek sosio-ekonomi dan social. Terdapat banyak model dan rangka kerja yang dibangunkan untuk program pelaksanaan e-Kerajaan dalam kesusasteraan. Kajian yang dijalankan di dalam tesis ini adalah berdasarkan kepada model yang ada, rangka kerja dan amalan semasa di negara-negara yang berbeza. Ini bermakna, sifat kajian ini adalah pada penyelidikan kajian kes. Kajian ini bermula dengan latar belakang sejarah kemajuan e-Kerajaan di seluruh ufuk yang berbeza. Ia terus dengan siasatan terhadap model e-Kerajaan, rangka kerja, dan pengalaman negara-negara yang berbeza dalam bidang ini. Kajian ini juga meneliti beberapa kerangka teori dan operasi untuk mengenal pasti isu-isu, aspek, dan teknik yang boleh menyokong pembangunan e-Kerajaan. Kemudiannya, selepas kajian yang dibincangkan di persekitaran e-Kerajaan semasa bagi tujuan mengenal pasti jurang yang sedia ada antara persekitaran ini dan mewujudkan program e-Kerajaan. Hasil kajian yang diperolehi daripada perjalanan kesusasteraan membawa ke dalam pembangunan rangka kerja yang dibayangkan direka untuk menangani jurang dan memenuhi syarat-syarat untuk permohonan yang berjaya perkhidmatan e-Kerajaan. Hasil lain ialah mengenal pasti parameter utama (kawasan) di mana perubahan tidak berlaku. Kedua-dua keputusan yang disokong oleh model kajian kes untuk transformasi sektor kewangan awam Comoros. Keputusan yang diperolehi dinilai berdasarkan rangka kerja ditubuhkan didapati dalam kesusasteraan. Dalam proses penilaian itu beberapa cadangan telah diberikan. Kajian ini dicapai dua sumbangan menonjol. Ia boleh digunakan oleh penggubal dasar Comoros Kerajaan untuk memacu perubahan dalam program Comoros e-Kerajaan. Kajian ini juga berguna untuk penyelidikan untuk pembangunan melanjutkan pelajaran. Walaupun persoalan kajian telah menjawab, kajian ini membentangkan beberapa batasan. Ia perlu diuji dalam persekitaran dunia sebenar untuk mengesahkan kekuatan dan mengenal pasti kelemahan untuk peningkatan seterusnya.

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LIST OF ABBREVIATIONS

ADB	African Development Bank
ABGE	Appui à la Bonne Gouvernance Economique
ANRTIC	Autorité Nationale de Régulation des TIC
EA	Enterprise Architecture
EU	European Union
FEAF	US Federal Enterprise Architecture Framework
IAF	Integrated Architecture Framework
ICT	Information and Communication Technology
LDC	Least Developed Countries
NSF	National Science Foundation
TOGAF	The Open Architecture Framework
UN	United Nations
USNPR	US National Performance Review

CHAPTER 1

INTRODUCTION

1.1 E-Government in Comoros

In the year 2008 the Comorian government established for the first time the National Authority of ICT Regulations (ANRTIC: Autorité Nationale de Régulation des Technologies de l'Information et de Communication) as the first building block of advanced ICT development strategy in Comoros. The role of this institution covers all the areas of ICT from the regulation perspectives to the development of ICT solutions. This initiative was taken when Comoros find itself trapped with various administration and regulation issues raising national questions on what can be done to handle the situation. One year later this institution proposed different solutions addressing almost all the problems that the Comorian Government was facing where the creation of an e-Government system stands first in the list. Since then great initiatives on good governance and e-government start supported by the National Program of good economic governance support (Programme d'appui à la bonne gouvernance économique - ABGE) created since 2003 and the National Commission of Anti-corruption introduced in 2011 as a government body whose purpose is to fight corruption across the nation. Furthermore some government institutions have shown their willingness to transform their traditional services platforms into automated electronic systems. However latest studies found a very slow transformation process due to political, financial, and technical difficulties.

The e-government idea has been considered by both government authorities and low level government employees as the most effective way to fight poverty, improve the management of public services and human resources, and the best solution to the barriers and communication issues between the government and its citizens. Intensive works start in the middle of 2009 which aim at promoting the use of ICT to address the management issues of economy, public resources, and public finances. Such initiatives lead to the creation of the strategic reform of the public finances document in 2010. To do so they first conducted a study on the current government system in order to identify the real problems faced by both government employees

and citizens when delivering public services, processing funds, and managing public resources which involve both human and public goods. Till date few government websites have been developed. The intention was to promote online presence of government activities, offer online information system, and facilitate sharing of information among government institutions. However all these websites carry out a limited range of activities. This report will address the limitations, constraints, and problems faced not only by Comoros Government but also in the citizens perspective. Then a solution focusing on the transformation of the current e-Government system to an interactive and fully informational system and the integration of financial transaction services will be proposed. The following sections highlight the key facts and the foundation of this thesis report.

E-government programs can serve as a catalyst to improve productivity in a country. In the last recent years many countries used ICT in various areas such as education for promoting distance learning, entrepreneurship, research and development, innovation, health, agriculture, trade, and many other fields. Getting access to ICT technologies for development is nowadays being recognized as one of the key resources for the growth of a country`s economy. The cellular technologies in particular have a very important effect on economy development by enabling more rapid and accessible services anywhere, anytime which is known to increase the growth of many countries` economies over the last few years. The progress in these current trends over the world brings many countries to continuously invest in the development of ICT infrastructure and the improvement of services. However other countries with low levels of ICT infrastructure and human capital remain at the lower levels of e-government development with various issues challenges and issues (UN e-Gov Survey 2012).

1.2 Study Background

The advent of information and communication technology (ICT) has changed the way we live today. This can be clearly understood by the development of new technologies addressing a variety of problems in different areas including management, communication, education, health, economy, law, etc. One of the powerful and recently investigated technologies is electronic government mostly termed as e-Government. This new technology came to replace the traditional way of delivering government services. In addition it enables transparency and trust, serves as a communication system between the government and its citizens.

Due to its achievements in economic and social concerned areas, e-government is being adopted in many countries worldwide with the support of the United Nations Department of Economics and Social Affairs. In addition huge academic research works on e-government are going on carrying out different techniques, frameworks, and methodologies in the study and adoption of this technology. Although this is the case, several social dimensions including the economic status, available infrastructures, and human resources development have to be taken in consideration with other related parameters. These parameters determine not only the readiness of a country to adopt e-government but also allow strategic plans to take place. According to the UN e-government 2012 survey report many countries across the world achieved good status on this issue while others still on the first stages.

Countries like Comoros, Cambodia, Madagascar, Seychelles, Somalia, Yemen and other least developed countries (LDCs) are struggling to start the way (Sinawon, Jeong, and Jongsu). In order to support the development of e-government system in these countries, more research studies have to be carried out aligning the appropriate techniques and methodologies for the adoption of this technology. This is basically the focus in this report. In fact there is a considerable gap between the developed countries e-government systems and those of least developed countries (Sinawon, Jeong, and Jongsu). Once this gap can be measured appropriate actions can be taken accordingly.

Comoros, as many other LDCs, is facing many challenges which create many barriers to the development of e-government in this country (K.A. Mohamed). The current state of the e-government in Comoros has been observed to be very poor as compared to regional and other African countries. Latest studies shown that Comoros has an e-government index of 0.236 as by the year 2012 (UN e-Gov Survey 2012). This is not only due to lack of infrastructure but also on the lack of required technical skills to undertake the e-government revolution. The few developed government websites don't respond to the needs of the Comoros citizens. More advanced researches for improving the current status of Comoros e-government need to be carried out. The main aim of developing such information systems is to improve the overall management of government activities and services, empower the national economy, offer participation of citizens in decision making, create a good environment of transparency, and facilitate citizen's access to government services efficiently and effectively.

Table 1.1 Variation of e-Government Status of some African Countries including Comoros

Country	Score: E-Government 2012	Rank 2012	Rank 2010	Rank Change
 Senegal	0.2673	163	163	
 Sudan	0.2610	165	154	-11 ↓
 Côte d'Ivoire	0.2580	166	144	-22 ↓
 Liberia	0.2407	169	166	-3 ↓
 Comoros	0.2358	171	160	-11 ↓
 Ethiopia	0.2306	172	172	
 Burundi	0.2288	173	174	+1 ↑
 Democratic Republic of the Congo	0.2280	174	158	-16 ↓
 South Sudan	0.2239	175		
 Djibouti	0.2228	176	170	-6 ↓

Other objectives of adopting this strategy include minimizing operational costs of government services, consistency and improved privacy of government data, rapid services delivery, and fighting corruption. The country is for long time in uncountable difficulties which are closely related to the way the government is operating. The current government information system in Comoros is dominated by a paper based management system which is inconvenient and difficult to control as the number of activities and services is growing day to day. With the advances in information processing technology more responsive systems can be applied to overcome these limitations. Furthermore introducing new technology requires deep studies on the operational environment for better results. This thesis will address the current Comoros e-government

limitations especially on creating more interactive, transactions based, and interconnected systems.

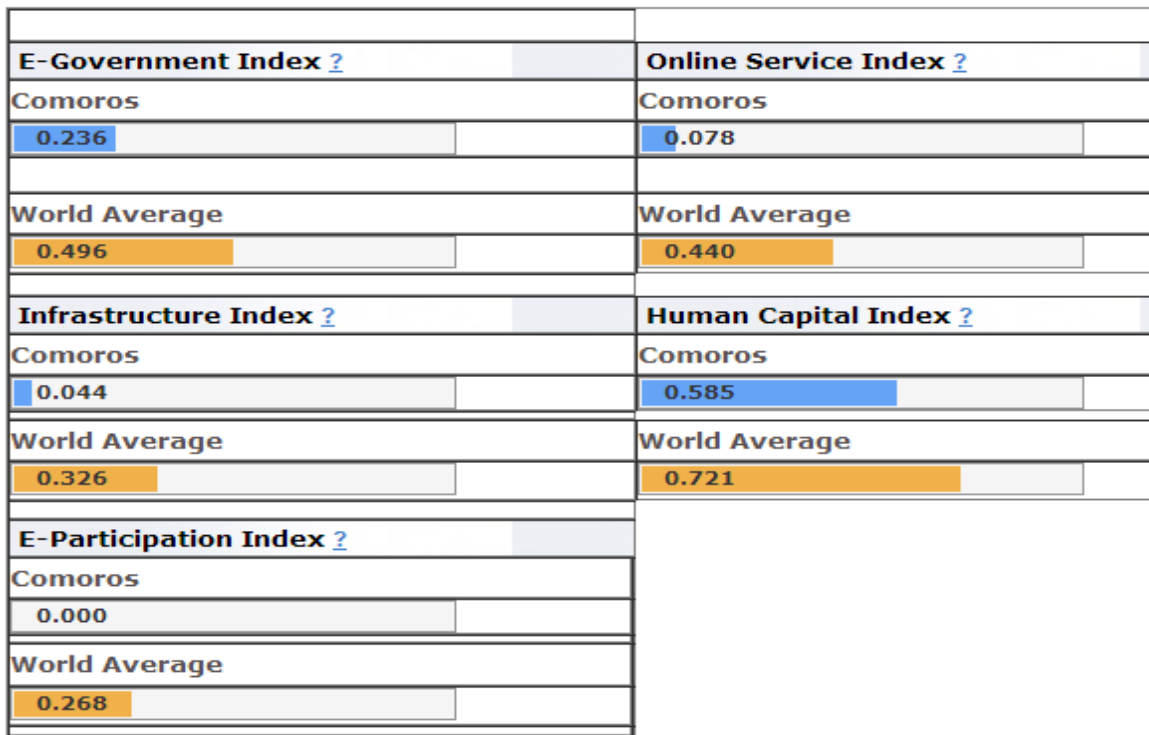


Figure 1.1 Comoros e-Government Index compared to World average

1.3 Problem Statement

Countries across the world offer huge investments in the development of information technology. This is the case of developed countries such as the United States of America, Canada, Australia, Japan, South Korea, and United Kingdom. Also developing countries including Malaysia, Singapore, India, Saudi Arabia, and Iran continue to improve their e-government status time to time. In the other hand least developed countries trapped with various challenges find themselves behind others. Comoros is one these countries where the e-government measurement criteria could not be satisfied. Measuring the performance of a country`s e-government is based on five categories as mentioned in (M. Anass Khoja). That is improving those measurement criteria ensures the success of one`s e-government to achieve its objectives.

Progress in e-government is being viewed among world countries as transforming service delivery towards a strong framework for an inclusive, smart, sustainable and increasing growth

in future generations. The trend focuses on institutional integration and online orientation of citizens in public services. The citizen is increasingly involved and viewed as an active online customer of public services. The trend is also involving the private sector to develop a more flexible and citizens oriented services which enables them to use the interconnected system features for their daily activities. Interaction is one of the top characteristics of good e-government systems. Another key driver of successful e-government is the efficiency in government to better expand their services. Integrated portals where the citizens find a variety of information and services is an important factor driving the development of more interactive systems with personalized and well-tailored services. The expansion of citizen inclusion in all directions whether horizontally or vertically was observed in many countries worldwide. The development and innovation in e-government is a promoting factor to determine the position of public sector as the key driver of demands for ICT infrastructure and human resources development and their applications to the development of national economy (UN e-Gov Survey 2012).

The e-government development in Comoros is recognized as a powerful tool for the growth of the Comoros economy through a successful governance of public finances. For this reason government institutions are moving from the traditional management of government services to the latest e-government technology. Till date few government institutions could develop some websites. However the current status of the Comoros e-government is still in its lower stages (K.A. Mohamed). The developed systems lack most of the criteria of a good e-government system. They provide information on different activities and services of Comoros government within a limited capacity. The lack of interaction between government and citizens is one of the most critical functions of an e-government system. To reach the objectives of the Comoros government an integration of government portals is highly required. This allows government institutions to efficiently share documents, services while delivering good services to the Comoros citizens. When integrated together in the same platform government institutions will communicate easily, effectively, cutting down different communication costs and improving their communication system. Another key feature to be addressed is the ability to handle online transactions through the official government portal. This includes both documents and financial transactions.

1.4 Research Question

We are currently in the zenith stage for technological revolution showing economic and technological success for the developed countries while the rest of the world finds themselves trapped with various problems such as corruption and poverty. This thesis report is addressing two important questions:

- The transformation process from the traditional government system to an advanced e-government system and
- A “TO BE” Public Finance Model based on most up-to-date modeling strategies

Basically the success of any e-government system is mainly based on how well the transformation process occurs during its development period. This is the most important task as it can determine the step by step conversion of a system to another effective system. Transformation includes planning, design, and implementation. A poor transformation process leads to a complete failure. Design and planning processes are key elements which are to be conducted according to the specifications, limitations, and conditions of the concerned environment. The importance of this question is much as compared to a pathway which you have to follow in order to reach a specific destination or target. Once it contains many obstacles the risk of being lost is much higher. One of the current objectives of the Comoros government is to develop a healthy economy. This objective as mentioned in the (Finance Ministry Strategic Plan Report 2009-2019) document can be achieved through a strategic management of public finances from different sources, internal or external. The focus is to have a cleaned input output process which satisfies the needs of the Comoros government and its citizens. This is what the second question of this report is based. A framework on the Comoros Government transformation has numerous advantages. It allows fast services delivery while enabling a high level of control. Furthermore this framework will work as an important step towards the prevention and elimination of corruption and other violations within the government body and between the government and its citizens. Note that both questions raised in this thesis do not address all the difficulties faced by the Comoros e-government. However they constitute a major part for the success of the Comoros e-government.