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**Business Process Automation for Legislative and Procedural Services in the National Assembly:
Case of the Kenyan Parliament**

Nduati, Paul Njaaga

**Submitted in partial fulfillment of the requirements for the Degree of Master of Science in
Computer-Based Information Systems at Strathmore University**



**Faculty of Information Technology
Strathmore University**

Nairobi, Kenya

April, 2018

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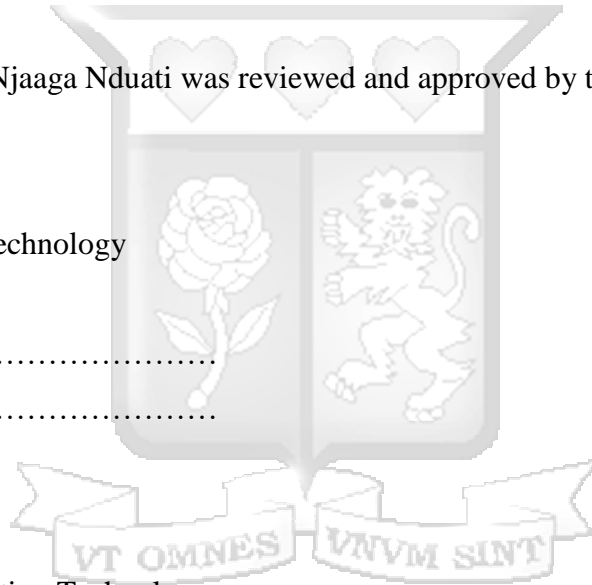
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DEDICATION

I dedicate this research to my departed parents for laying a strong foundation in education from an early age, my wife and extended family for the support and encouragement during the studies. Special dedication to my son, Nathaniel, you were my motivation to succeed. I also dedicate this research to my friends and classmates, who we labored together in this journey, and to God for enabling me to pursue this and getting me this far. To God be the Glory.



ABSTRACT

Parliament as an institution and as the legislative arm of government still uses paper-based office processes to conduct its business. This accentuates the problem of meeting deadlines as stipulated by the constitution and failure to meet these deadlines result in Parliament forfeiting its mandate. This research proposed to develop a prototype automating the table office processes in the Legislative and Procedural Services (LPS) Department in the Kenyan Parliament. Secondary research on existing literature was gathered and analysed about key implementations in parliamentary systems mainly Portugal, Armenia and the United Nations. A conceptual framework was developed based on the secondary data. Primary research on the viability of such a system was done incorporating key stake holders in the Kenyan legislature. Finally, a prototype was proposed, designed and developed. The system prototype aims to improve productivity and efficiency by creating and automating the workflows derived from the paper-based processes in the LPS department in the Kenyan Parliament. The goal of the system is to have a paperless office work environment for Parliamentary staff. The system was tested by the research participants from the Legal and Procedural Services' Department of the Kenyan parliament. Further, changes and improvement were proposed such as the inclusion of biometric processes as well as the development of inter-governmental systems to automate communication between different parliaments. All these steps proved that indeed table office automation can be a great improvement of the existing processes in the Kenyan parliament as well as globally.

Keywords: E-Parliament, Automation, Workflow, e-democracy, table office

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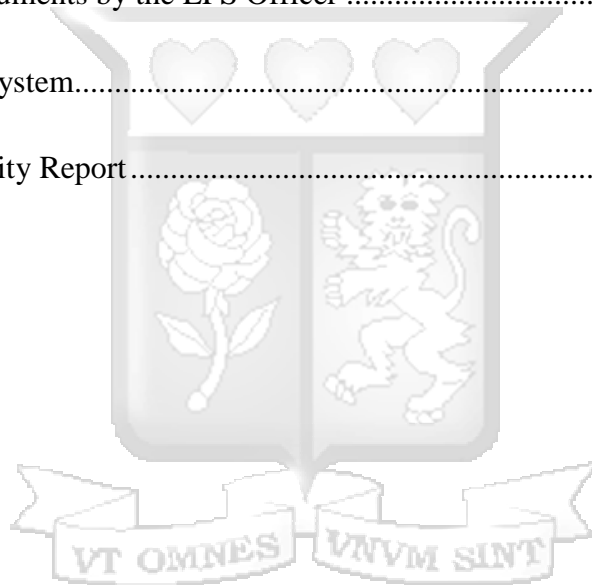
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ABBREVIATIONS

ASPA	American Society for Public Administration
BPC	Business Process Change
CA	Communications Authority of Kenya
C2C	Citizen-to-Citizen
CLP	Common Legislative Process
CRM	Customer Relationship Management
DBMS	Database Management Systems
DMS	Document Management System
ERP	Enterprise Resource Planning
EAI	Enterprise Application Integration
EDI	Electronic data interchange
FLoWPASS	Framework to Laws Workflow Process Automation System
G2G	Government-to-Government
G2C	Government-to-Citizen
G2B	Government-to-Business
G2CS	Government-to-Civil Societal
HoR	House of Representative
ICT	Information and Communication Technology
IPU	Inter-Parliamentary Union
LAN	Local Area Network
LPS	Legislative and Procedural Services
MP	Member of Parliament
PC	Personal Computer
PKI	Public Key Infrastructure
RAD	Rapid Application Development
SSL	Secure Sockets Layer
WBI	World Bank Institute
WPA	Workflow Process Automation
XML	eXtensible Markup Language

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

Parliamentary reforms to attain autonomy and independence from the Executive started in 1991 and these reforms culminated in the Eighth Parliament enacting the Constitution of Kenya (Amendment) Act No. 3 of 1999. This act established the Parliamentary Service Commission and the Parliamentary Service. Since its establishment, the Parliamentary Service Commission has attempted to streamline parliament proceedings. One way to do this has been to automate processes that were otherwise manual and cumbersome. The Hansard for instance used to be a set of employees with listening aids who record and transcribe what is said in the house floor. It has since been automated to auto-record and transcribe deliberations on the house floor. Parliament has also invested in live proceedings that have greatly enhanced the role of the parliamentary broadcasting unit (PBU). The Legislative and Procedural Services is a department in the Parliamentary Service structure. It offers various legislative, procedural, correspondence, guidance, representation and other related services through the Table Office. The Table Office of the National Assembly is an office of the Directorate of Legislative and Procedural Services under the Office of the Clerk responsible for marshalling of Bills, Statutory Documents such as Regulations, periodical Audit Reports of government agencies, and Sessional Papers, together with the processing of Questions, Motions, Communications from the Chair (i.e. the Speaker), selected Correspondences for the Clerk of the National Assembly, and Petitions. In addition, the Table Office handles Order Papers, as well as the archiving of selected crucial journals and records. The Table Office plays a critical role through the provision of reliable and well-researched information based on the Standing Orders, practices of Parliament, inter-jurisdictional analysis of various Parliaments globally, among other knowledge and information platforms.

These tasks are all paper-based and there is no computerized system in place to assist in their productions. The Parliamentary Service Commission Strategic Plan (2008-2018) in its report outlined various strategies aimed at providing efficient services. Objective five in the report seeks to enhance service delivery and one of the strategies proposed is to increasingly automate processes using Information and Communication Technologies (ICTs). Objective nine breaks down specifically steps to be taken to enhance use of ICT in operations and communications. Processes outlined for automation include: digitization of the Hansard Production System,

computerization of the management of Parliamentary Papers and having an electronic voting and attendance register system.

The Parliamentary Service in implementing the strategic plan between 2008 and 2011 has enhanced ICT Services by upgrading the public facing website and acquired computers and printers for Members of Parliament (MPs) and staff among other achievements. Despite this good progress, the website is not interactive and does not have any interface with the internal processes. The internal processes provide data for the public facing website. Due to the huge workload derived from the paper-based internal processes, Parliament lags in provide real-time information through its website to the public.

1.2 Problem Statement

Within the Parliamentary Service Commission in Kenya, the Directorate of Legislative and Procedural Services undertakes numerous tasks to perform its role in offering legislative and procedural services. These tasks constitute legislative work and are all done on paper by the Table Office who checks the documents for errors and determines the right format for tabling of documents in the parliamentary floor. The number of parliamentarians was increased from 210 to 418 from both houses that require technical support to facilitate their constitutional mandate. The LPS department prints out various documents such as Bills, Orders, Motions, Petitions, among other documents for each parliamentarian as part of their job to support. This translates to approximately 500 documents being printed as part of daily routines. This is not an effective use of resources and lots of energy and time is wasted. This results in huge workload and impacts on productivity of personnel. Drafting of bills, flow of file on bills, peer review and supervision of the drafts represent a workflow that can be automated across various approval stages which can save on time and resources.

Gau (2011) asserts that knowledge sharing and creation may be hindered in a routine environment especially in the public sector. He further argues that if the public sector has no appropriate learning mechanism to retrieve tacit and explicit knowledge, the government will not be able to provide the public with qualified services. The LPS department handles petitions from the public which are received on a regular basis. Most petitions require redrafting to the right format despite the required format being outlined in the Constitution. The petition document can be converted to an eXtensible Markup Language (XML) document paving way for electronic petitions that the public can interact with through the public website.

Business Process automation at the Directorate of Legislative and Procedural Services will automate the identified routine processes and be used to interface with other internal systems. This will ease the burden of legal officers and clerks who have to manage the queuing of documents and prioritization of order papers. The system can also help in enhancing collaboration among teams by creating a platform for inter and intra-communication and coordination which has proven to be a challenge as reported in the Parliamentary Service Commission strategic plan (2012).

1.3 General Objective

The purpose of this study was to develop a business process automation prototype that can be applied in the legislative and procedural services department in the Kenyan Parliament using an E-Parliament System.

1.3.1 Specific Objectives

- i. To investigate the challenges of the existing process of document handling at the Legal and Procedural Department of the National Assembly in Kenya.
- ii. To analyze ways of developing and implementing an electronic parliamentary procedure management system and challenges accrued thereof.
- iii. To develop a prototype for business process automation of the LPS table office processes.
- iv. To test the developed prototype.

1.4 Research Questions

- i. What problems exist in the existing process of document handling at the Legal and Procedural Department of the National Assembly in Kenya?
- ii. What process automation techniques can be adopted in parliament?
- iii. How can a Table Office Management System be developed and be implemented in the Kenyan Parliament?
- iv. What efficient testing and implementation strategies can influence successful adoption of the E-parliament system?

1.5 Justification

Parliament is a critical level of government. It acts as the bridge between the other two levels of government: The Executive and the Judiciary. Moreover, Article 118 clause 1 (a) requires Parliament to conduct its business in an open manner, and its sittings and those of its committees be in public and (b) facilitate public participation and involvement in the legislative and other business of Parliament and its committees. An E-Parliament system solves the problem of productivity among staff which in turn helps Parliament meet its Constitutional mandate and provides a platform through which the public can interact with Parliament.

E-Parliament forms part of an E-government that addresses the question of the digital divide especially in this part of the world. Kenya as a country has made significant strides in embracing technology. Per data from the Communications Authority of Kenya, 74.2 per 100 inhabitants of its population has internet access making her one of the highest in Africa. (CA, 2015). Having a system leverages on the existing technologies and provide for integration with other e-government systems.

1.6 Scope

A paper on e-Parliaments by the World Bank Institute (WBI, 2003), advocates for application of ICT to Parliaments centered on three main areas: Increased administrative efficiency, Increased information access and dissemination and Enhanced interaction with citizens. (WBI, 2003). Using this approach, the E-Parliament system will focus mainly on automating key processes in the legislative and procedural services department. Due to the department's cross-functional support role, the system interacted with other departments, particularly the ICT department.

1.7 Limitations and Delimitations

The research was limited by the potential complexity of the system due to the amount of data presented coupled with many entities in the LPS department. The research scope was limited to system development of a prototype to automate Table Office functions.

Time constraints necessitated by academic requirements were also a limitation to the research. The research scope was limited to system development of Table Office functions.

Potential bureaucracy when collecting data from various sources in Parliament arose limiting the research. This was dealt with by using good networks to get access to information.

Developing the system would have resulted in high costs as the research proposal is also a potential business solution and the tools for implementation may be out of reach. This was overcome by use of free open-source applications.



CHAPTER 2: LITERATURE REVIEW

2.1 Overview

The Inter Parliamentary Union (IPU) World e-Parliament Report 2008 defines e-parliament as “a legislature that is empowered to be more transparent, accessible and accountable through ICT, which empowers people, in all their diversity, to be more engaged in public life by providing greater access to its parliamentary documents and activities”. E-Parliament brings out the emergence of e-democracy which is one of the key functions in the table office of parliament. The term e-democracy has been incorrectly used to refer to e-government. E-democracy is the use of information and communication technologies and strategies by “democratic sectors” within the political processes of local communities, states/regions, nations and on the global stage (Clift, 2004). In this section, the empirical literature review will assess various aspects of digitization models, barriers to adoption, business process management in government as well as frameworks of some e-parliaments in the world and how these two can enhance e-democracy.

2.2 Models for automating Parliamentary functions

Various models have been designed to automate functions of the legislature in government. The legislative role of the National Assemblies around the world is often similar thus research has been developed in different parts of the world revolving around the automation of the table office functions for efficiency of government. Several studies have been done on models of e-parliament implementation. E-parliament is a continuous process that cannot be fully actualized at a go. According to Jayashree and Marthandan (2010), e-parliament is evolutionary in nature, involving multiple stages or phases of development. They go on to summarize the stages of e-parliament development by comparing models developed by the United Nations, the World Bank, the Gartner Group, e-ASEAN Task force and individual researchers of Hiller and Belanger, 2001; Layne and Lee, 2001 and Moon, 2002.

In his article, *E-government research: Reviewing the literature, limitations, and ways forward*, Yildiz (2007) has discussed various literature reviews of e-parliament where he compares various models as developed by researchers. He assesses the same models as cited by Jayashree & Marthandan and determines that efficient development of government models requires sufficient bureaucracy and static procedures in government departments.

2.2.1. Layne and Lee 2001 Model

The Layne and Lee (2001) advocates for four stages of development as the structure of the legislative arm of government continues to grow. The first stage is cataloguing. This is the use of government agency Web sites to provide government information. This stage provides only one-way communication between the government and its citizens. The second stage which is transaction provides online transactions with government agencies. This stage makes two-way communications possible. Transaction and Cataloguing create an electronic interface for government information and services which leads to the third stage. Integration of table office operations within functional areas in parliament where agencies working in the same functional area integrate their online integration. The fourth stage is horizontal integration where different functional areas are integrated within the same electronic system and use through a central portal.

2.2.2 UN and ASPA 2002 Model

The United Nations and the American Society for Public Administration; UN and ASPA (2002, p. 2) propose a five-stage model of development. The first stage is the ‘emerging stage’ where an official online parliamentary presence is established. The second stage is the ‘enhanced’ stage where the number of legislative sites increase in number and become more dynamic. The third stage is the ‘interactive’ stage enabling users to download forms and interact with officials online. The fourth stage is the ‘transactional’ stage that allows users to make online payments for transactions. The fifth and final stage is the ‘seamless’ stage where integration of electronic services across all the arms of government is made possible.

2.2.3 Schelin 2003 Model

Schelin (2003) assessed the UN and Lee Models and recognized the overlaps presented in the models. The ASPA-UN ‘emerging’ and ‘enhanced’ stages are similar to the Lee’s cataloguing stage. The ‘interactive’ and ‘transactional’ stages match with the ‘transactional’ stage of the Lee Model. Based on this Schelin (2003) organized a typology of e-parliament using the two models. The typology looks at the stage, orientation, services, technology and citizens in each stage. Emerging web presence is stage one and is purely administrative in orientation and few if any services are offered at this stage. The technology used is the Web and citizens go it alone in

trying to access the government. Stage two is through enhancement of Web presence. The kind of orientation here is administrative and informational. Services you find at this stage are just a few forms but no transactions. Technology grows to use of the Web and email and citizens can find links to other local agencies from this stage. Stage three involves interactive Web presence which not only provides administrative and informational orientation, but users are now onboarded. Services include online submissions and there is an increase in the number of forms. More links to state and federal sites are now accessible by citizens at this stage.

Stage four is transactional Web presence that builds on stage three by offering more forms and transactions. Digital signatures, Public Key Infrastructure(PKI), portals, Secure Socket Layer (SSL) Web in addition to email and the Web technology will be found at this stage. The stage provides citizens with some links to state and federal sites just like in stage three. The final stage five is seamless Web presence purely for users and mirrors all services provided in person, by mail and by telephone. Similar technology in use in stage four is used here and citizens can access cross departments and layers of government from the Web.

2.2.4 Gartner's 2000 Model

Gartner and others (2000) lay out four stages that can be used to develop an e-government system. The first stage is for government agencies to have Web presence to provide basic information to the public. The second stage is Interaction where users can contact agencies via websites or self-service. The third stage is Transaction where businesses and customers can transact online and the final stage is Transformation focusing on operational processes to be transformed to provide more efficient, integrated, unified and personalized service.

2.3 E-Parliament Digitization Cases

According to Kanthawongs (2004), academic literature on 'e-Parliament' is limited due to the fact that information systems for the parliament level are gradually developing. This literature review section will include reports from the UN and Inter-Parliamentary reports that assesses the state of parliaments across the world. It will also focus on the link between e-parliament and e-democracy by e-petitions.

2.3.1 World e-Parliament Reports

The World e-Parliament Report 2008 was launched on the second high-level meeting of the Board of the Global Centre for ICT in Parliament (UN Press, 2008). The report represents the first effort to establish a baseline of how parliaments use or plan to use ICT in their mandate of lawmaking and oversight responsibilities. The report is drawn from information provided by 105 assemblies from around the world.

The World e-Parliament Report 2016 is the fourth report since the first in 2008 and builds on the reports in 2010 and 2012. It documents how parliaments are using ICT to support their internal and external functions and processes. It contains analysis and discussion of the survey of parliaments drawn from 114 parliamentary chambers in 88 countries. The report details findings of how digital and social technologies have contributed to changes in the operational environment and cultural landscape of parliaments. The challenges parliaments are beyond the simple adoption of technology. The challenges are strategic and need to be addressed at a systemic level. It requires political as well as institutional commitment. The research highlights that very few are fully implementing end-to-end strategic planning processes and do not value the counsel of their ICT staff in terms of overall leadership and direction of change. Digital processes are seen as a technical function yet for ICT to be transformative for parliaments, MPs must provide political leadership to promote openness and citizen participation.

2.3.2 Case of Portuguese Parliament

Nascimento, Martins, Pinto, and Almeida (2004) developed a framework called FLoWPASS-Framework to Laws Workflow Process Automation System in which they analyzed the workflow, metadata and multimedia documents of the Portuguese Parliament. The framework main idea was to separate the workflow process logic from the application components using workflow process management techniques. These techniques were based on Java programming to implement the process logic and XML Data Representation for data and metadata management system of the Portuguese Parliament legislative processes. The study was based on Workflow Process Automation (WPA) defined as a sequence of structured or semi-structured tasks executed in series or in parallel for two or more individuals to obtain a common goal.

The FLoWPASS architecture is defined using the classical logical model of three layers (Data, Logic and Presentation). The Data Layer contains storage services and data indexes. XML Search Engine is used as the back-end system useful in the integration and interaction of the

Document Base with legacy files of data. The Logic Layer contains logic business services that include the rules and logic of the business that will generate specific ASP.NET forms or Java programs. This is where you will find the FLoWPASS Applications that will execute some workflow process activities based on the case study. At the Presentation Layer, services to establish the interface with the users and manipulate the input data are found here. XSL files are used to transform the returned XML documents into an HTML file that can be open at the user front-end browser. The architecture is summarized using Figure 2.1

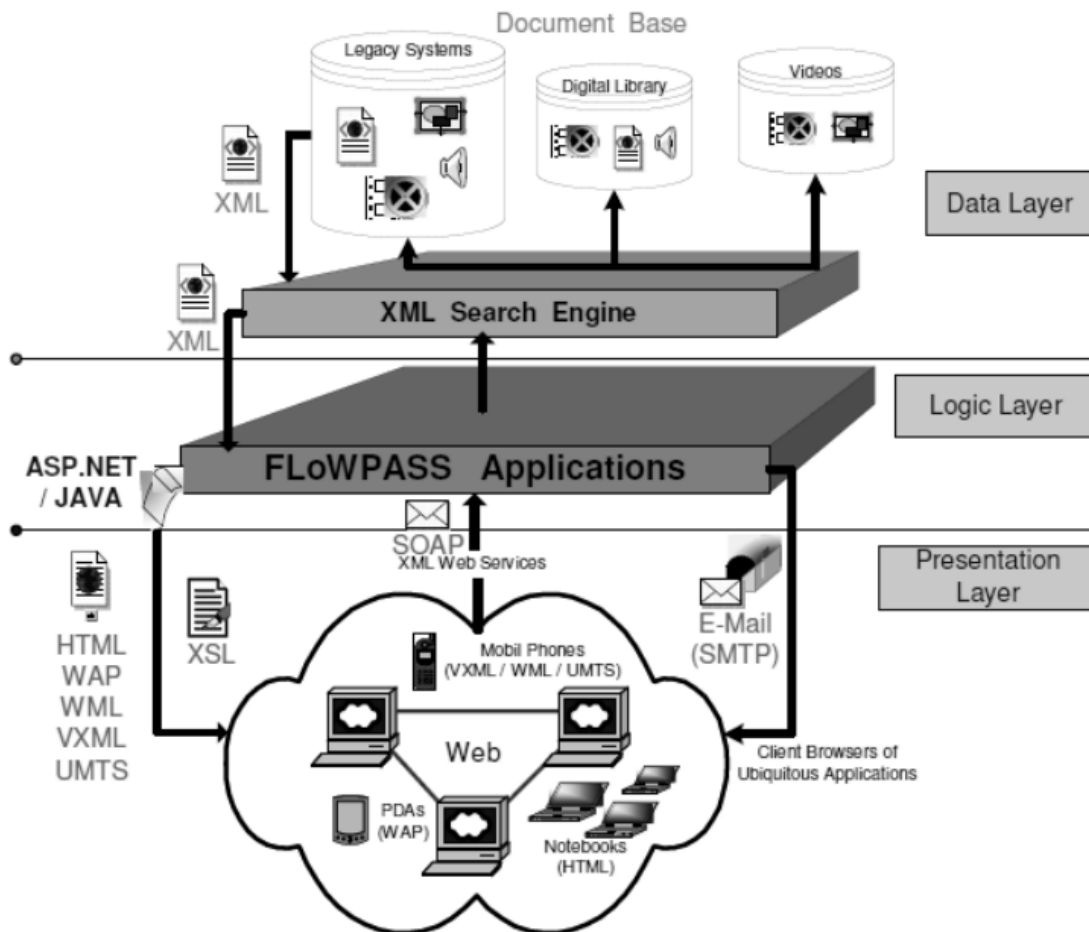


Figure 2.1: FLoWPASS Framework

Source: Kawathongs (2004)

Using the Portuguese Republic Assembly Rules, an XML document was generated: the FLoWPASS XPD L Schema. The document contained a template workflow of all possible

activities involved in the approval of a CLP-Common Legislative Process from Portuguese Republic Assembly. Microsoft Visio Add-on tool was used to design and test the FLOWPASS XPDL documents related to possible outcomes of the CLP workflows. This is visualized using Figure 2.2

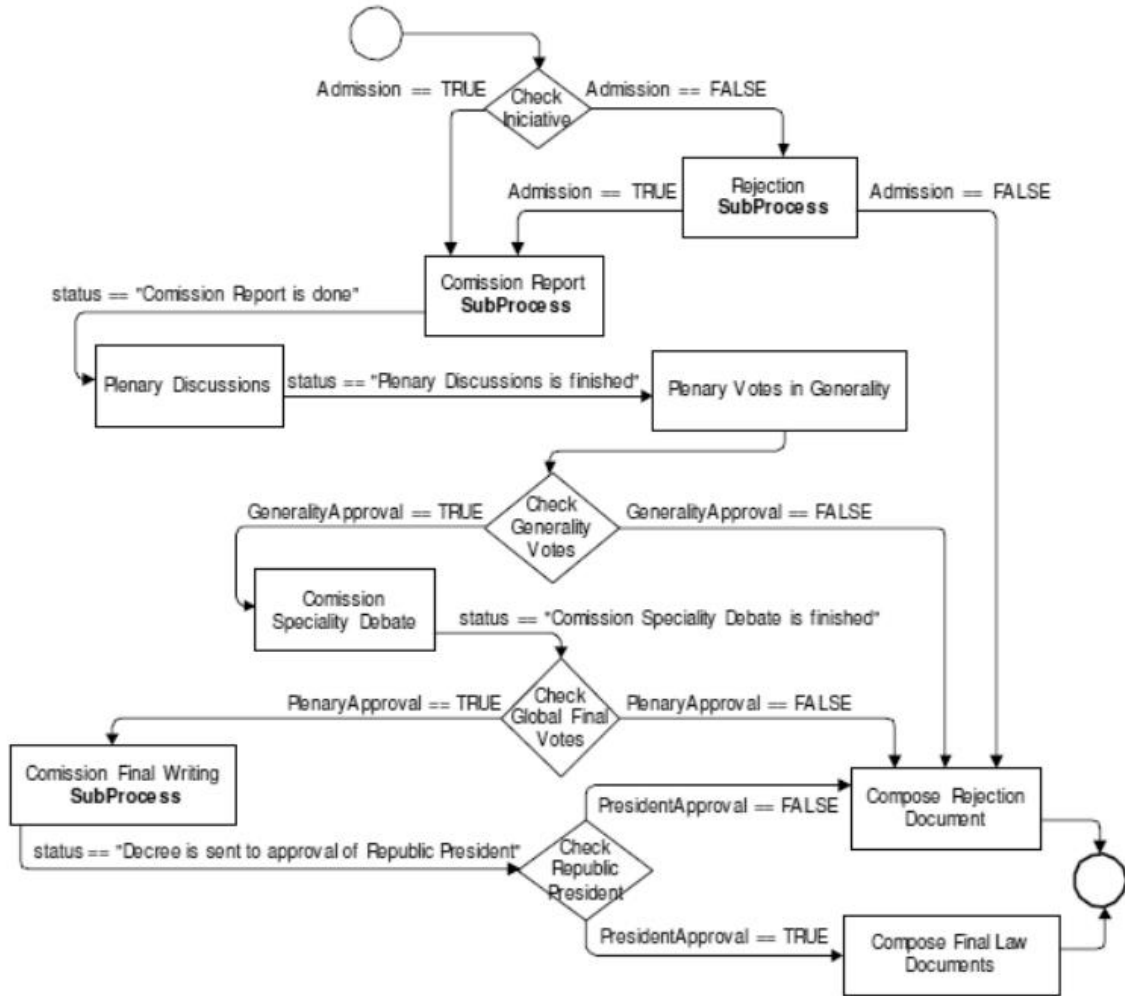


Figure 2.2 Main Workflow Process of the Portuguese Republic Assembly in the approval of a CLP;

Source: Nascimento et al. (2004)

The study includes sub processes such as the rejection process and commission report sub process. Nascimento, et al. (2004) continue testing their framework with the Portuguese Parliament legacy system. A synergy solution involving XML Web Services, XML databases

and Java to implement a WPA system had not been found in any academic work at the time of publication.

2.3.3 Case of Thailand Parliamentary System

Kanthawongs (2004) came up with a model for e-Parliament systems consisting of e-Parliamentary Library, e-Communications, e-Reports, Web Site Management, and Security and Privacy. The framework was tested through qualitative approach based upon interviews with members of the e-Parliament Committee, House of Representative (HoR), parliamentary library staffs and Thai citizens. In her article; *An Analysis of the Information Needs for E-Parliament Systems*, Kanthawongs (2004) proposes a conceptual framework for the information needs of the House of Representatives (HoRs). The HoRs main work is to make laws and monitor the activities of government. This system is similar to the model depicted in figure 2.1.

2.3.4 Case of Scottish Parliament

Seaton (2005) in her article discussing the Scottish Parliament and e-democracy looks at the initiatives of the Scottish Parliament in the field of e-democracy. It became the first Parliament in the world in September 2004 to offer short biographical films of MPs. The Parliament web pages include links to MPs personal websites. It was also the first Parliament to offer comprehensive webcast access to its proceedings in July 1999. It has enhanced e-democracy through interactive online forums for discussions with participation ranging from 10 posts to over 400. E-Petitioning system has been setup that deals with petitions from individual citizens. The system started by sending email via a contact given in the website. It allows a petitioner to gather signatures to develop a discussion about the topic before the petition is formally lodged with the Parliament. The Public Petitions Committee accepted its first e-petition on March 14, 2000 becoming the first statutory body to formally accept e-petitions (McMahon, 2004). It has been developed in partnership with the International Tele democracy Centre at Napier University and was formally launched in February 2004. As a new Parliament established in 1999 it prides itself on its ability to innovate but do it cautiously only when resources and opportunities permit.

Building on the idea of e-democracy, Clift (2004) came up with a e-democracy conceptual model focusing e-Citizens interacting with the government, the private sector and

political groups as depicted in Figure 2.5. The idea is to leverage on the internet age that we live in today and this model can be seen at play in the Scottish parliament.

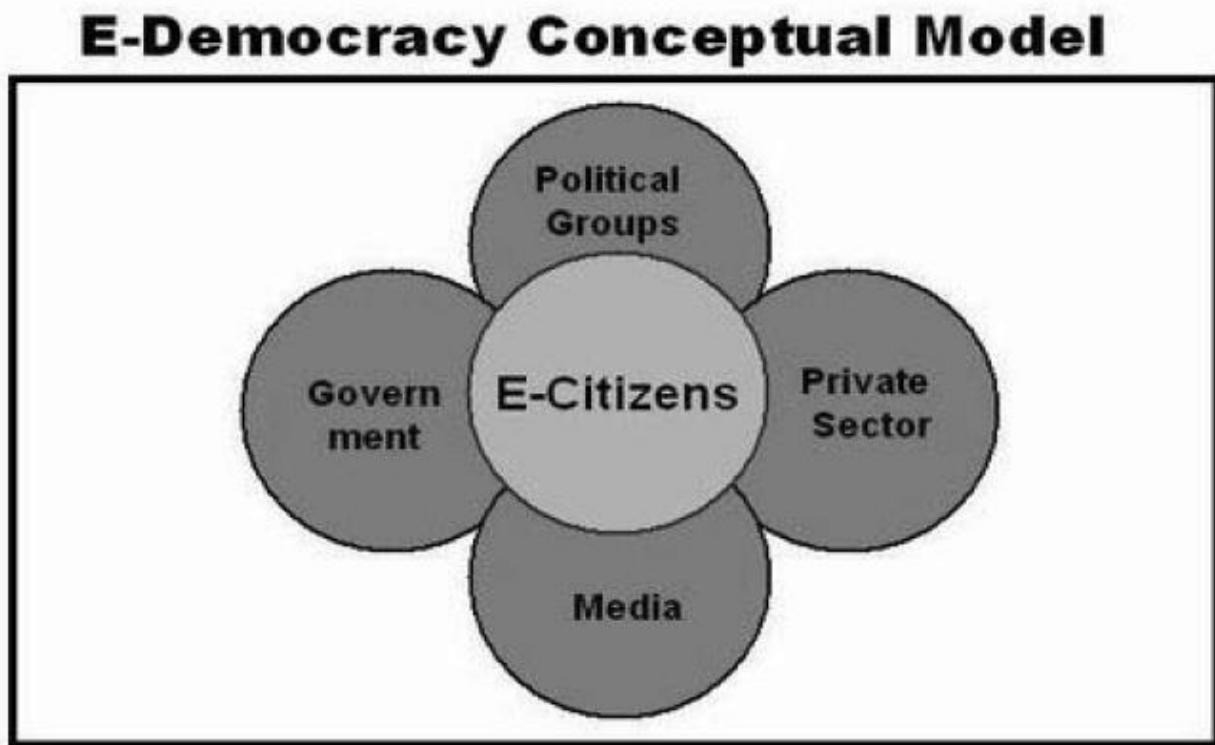


Figure 2.3 E-Democracy Conceptual Model

Source: Clift (2004)



2.3.5 Case of the Canadian Parliament

According to Whyte (2017), the Canadian parliament has often faced the challenge of ordering deliberations in the house of commons. As such, it has been the prerogative of the elected representatives to find a solution to model an automated response queuing system for discussions in the house floor. Whyte (2017) adopts a model used by Egers & Spirling (2014) on how to manage interruptions and discussions in the floor of the house. The model suggests modeling parliamentary debates in a Markov chain structure. Within the chain is series of events sharing a set of possible states. These states are interlinked in a manner that the outcome of one state determines the next state or event. Two states are thus linked by an inter-state probability

referred to as the transitional probability. Five possible states model the deliberations in parliament; the government backbencher (Gb), the government minister (Gm), the opposition member (O), the Speaker (S) and interruptions (I). From the model, the appropriate functions can be drawn to grant ample time for contributions from all members of the house. In so doing, every house representative gets a chance to have their opinions heard without being interrupted unnecessarily. The modelled interruption-handling structure is as shown in figure 2.4

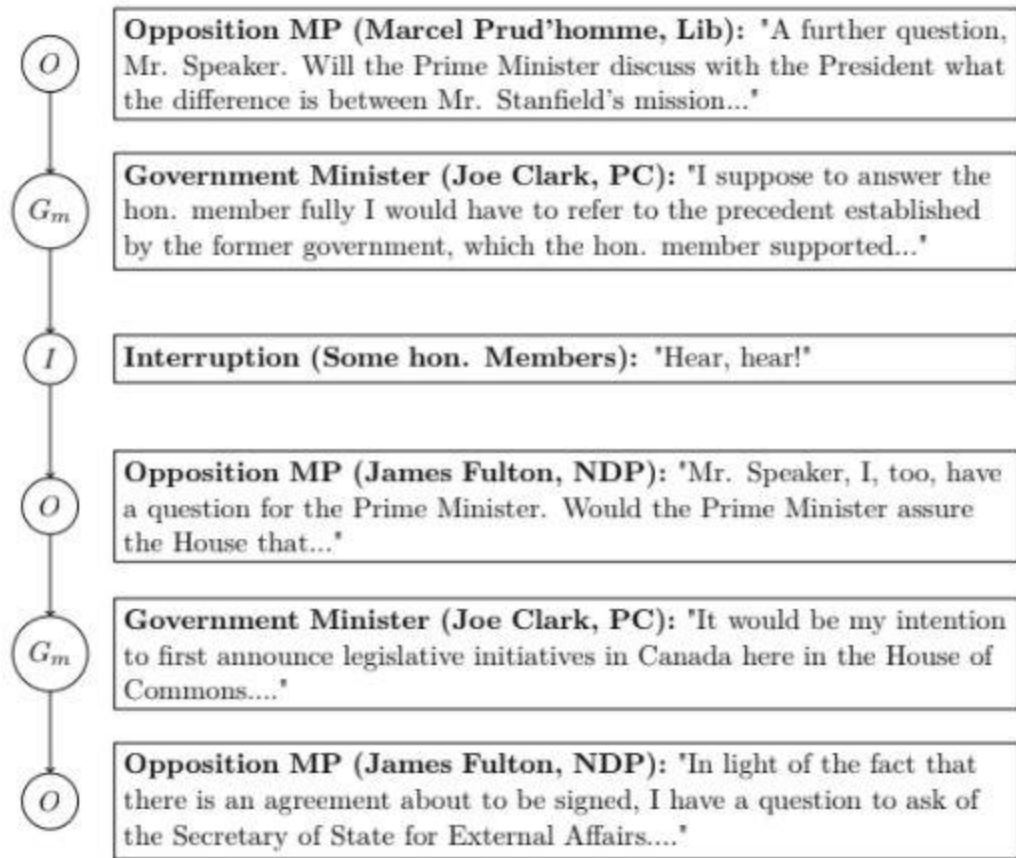


Figure 2.4 Interruption handling in the Canadian parliament

Source: Whyte (2017)

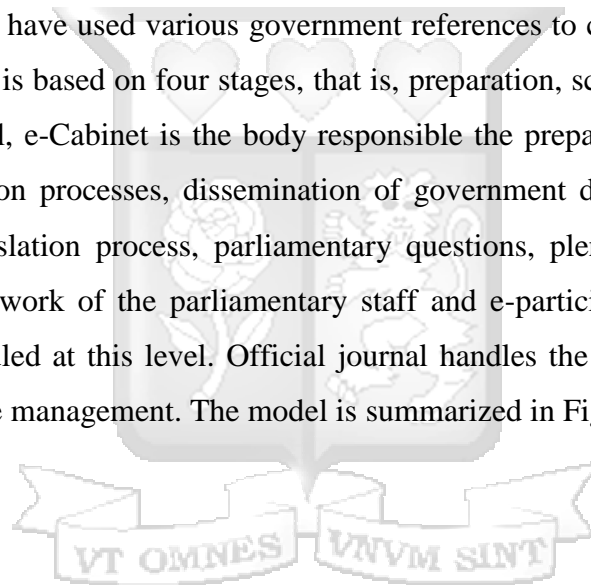
2.3.6 Case of the Armenian Parliament

The Armenian parliament consists a legislative framework with a highly formalized legislative process with a rigid time limit. This poses a challenge to proper drafting and debating on legislations. There is also insufficient policy making at the initial stages of the legislative process. The Armenian parliament faces similar challenges to those in the Kenyan context due to the highly institutionalized bureaucracy of processes that slows down the legislative process.

According to Uhlmann, Page, & Chilingaryan (2014) the drafting process is one the major concerns that lead to slow expedition of the legislative process. As a result, the overall table office process is much slower and ineffective in managing government legislations on time. The need for legislative information systems is thus not a third world problem but common among many nations in the world where the table office is yet to be automated.

2.3.7 Legislative Information Systems

NextSense limited, a Macedonian IT company has specialized in building complete e-business solutions to improve business performance. During the World e-Parliament Conference in Washington in November 2009, the Macedonian e-Parliament system was presented by the Vice-president of Assembly of the Republic of Macedonia. The e-Parliament system was developed by Nextsense. Nextsense have used various government references to come up with a model for e-parliament. The model is based on four stages, that is, preparation, scrutiny, adoption and then publishing. In this model, e-Cabinet is the body responsible the preparation stage that includes law drafting, collaboration processes, dissemination of government decisions. E-Parliament is concerned with the legislation process, parliamentary questions, plenary sessions, committee sessions, automation of work of the parliamentary staff and e-participation. The scrutiny and adoption stages are handled at this level. Official journal handles the publishing stage through the legislative knowledge management. The model is summarized in Figure 2.4 and 2.5.



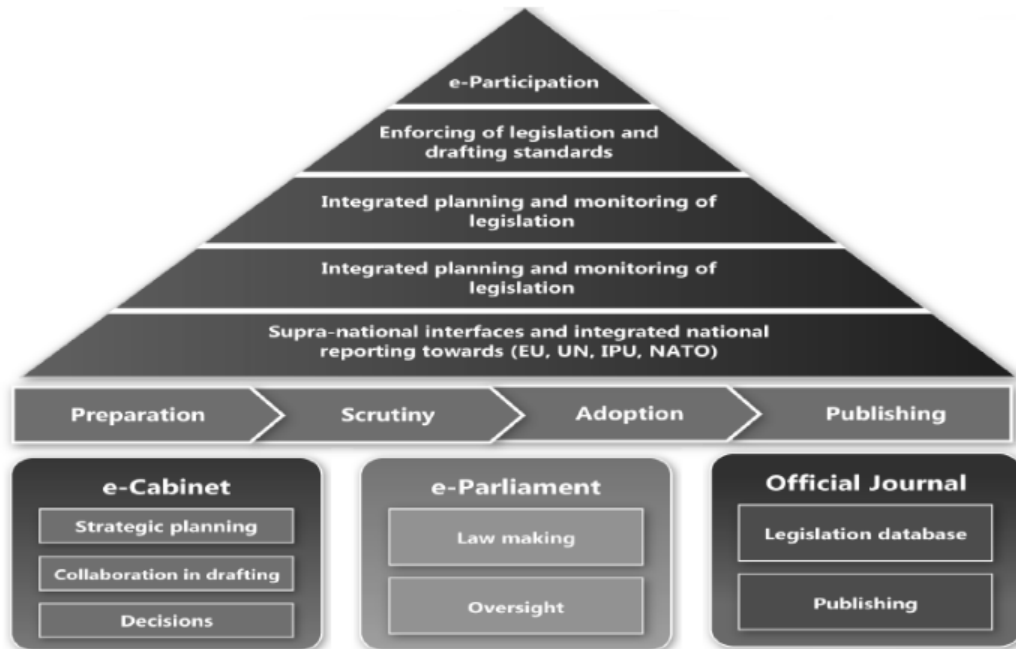


Figure 2.5 Nextsense Integrated Legislative Information System

Source: Nextsense.com

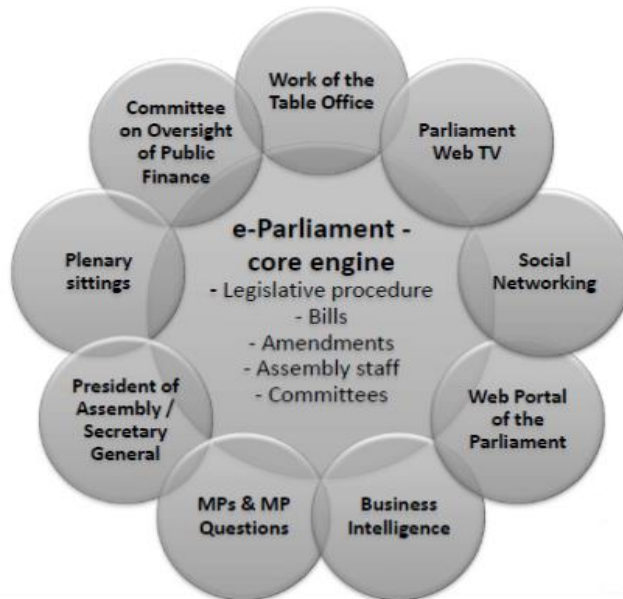


Figure 2.6 Nextsense e-Parliament Information Systems model

Source: Nextsense.com

Biasiotti, Francesconi, et al. (2008) in their paper, *‘Legal Informatics and Management of Legislative Documents’* discuss the state of the art and prospects of the application of ICT in the legislative domain especially the legislative documents. They argue that ICT plays a fundamental role in the working of parliaments and parliaments are now moving into relying upon ICT-based information systems. The pivot of the systems involves various agents-internal and external to parliaments. This interaction is shown in Figure 2.6

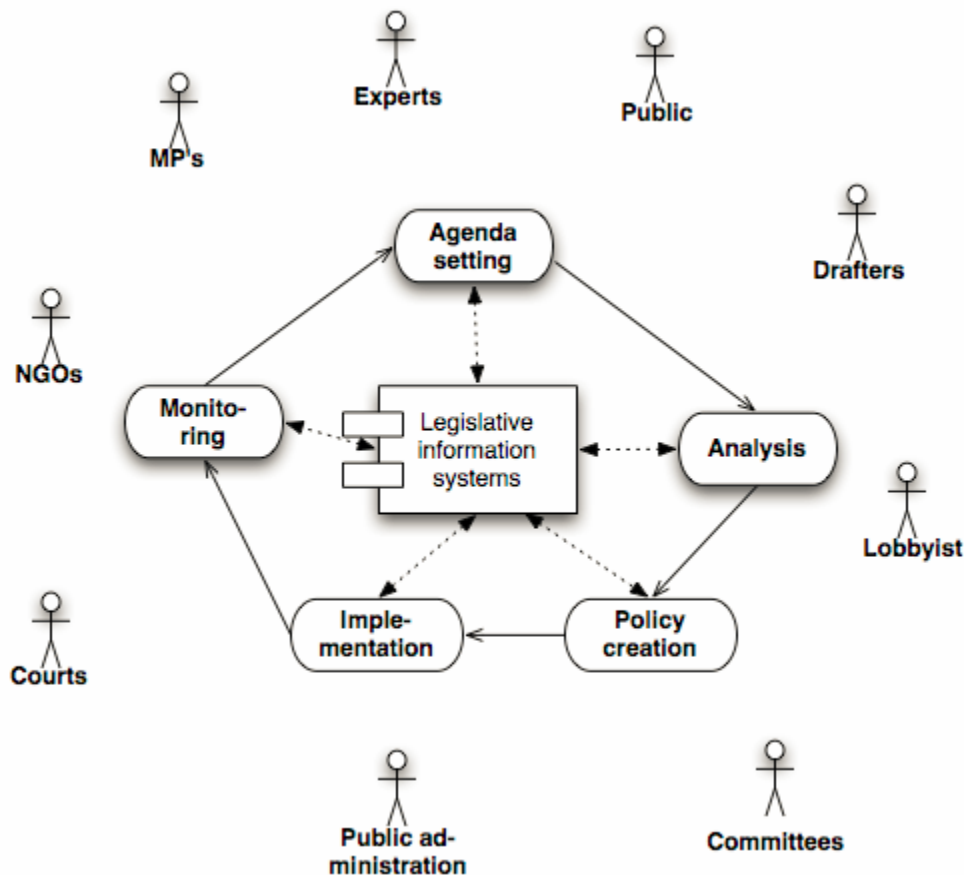


Figure 2.7 Biasiotti Legislative Information System

Source: Biasiotti et al (2008)

They advocate that a parliamentary information system needs to have two sides; one side that handles the internal side of the parliament and support all parliamentary activities and the other side looks outside to provide citizens with information on parliament’s activities and outputs as well as provide opportunities to participate in parliamentary activities. The parliamentary

Intranet and the parliamentary Extranet can use the same technologies and protocols. They propose the use of semantic Web to make legal information available over the internet where information is processed according to its content and not only as pure text. This helps to overcome the limits of the current web, facilitating humans to access information, and enabling various activities over the web.

2.3.8 Case of German Parliament E-Petitions

Linder, Ralf and Riehm (2011) study on, *Broadening Participation Through E-petitions* discusses the petitioning system in use by the Bundestag, German parliament that was introduced in 2005. The e-petitions are submitted, signed and discussed on the Internet. The study evaluated the e-petitioning pilot scheme centered on four main fields of investigation; (1) the software system, (2) the petitioners, users, and the general public, (3) the staff of the parliamentary services and administration, and (4) the petitions committee. The key elements of the pilot scheme were technical and procedural and the software system for the petition process involved the establishment of an email and web interface, publication of certain e-petitions on the website of the petitions committee, a functionality to co-sign public e-petitions and moderated online discussion forums associated with each public e-petition. The procedural aspects of petitioning the German parliament, the reform was well integrated into established processes. It was noted that the main procedural innovation was the introduction of public e-petitions. The petition system in place in Bundestag in the pilot depended upon the Internet by providing an online channel for petitioning. The study found that in order to use the e-petitioning system, citizens not only needed access to the Internet but also needed to be informed about this participation channel.

2.4 Conceptual Framework for E-Parliament System in Kenya

Based on the models for e-parliament discussed in the literature review, a conceptual framework was derived that was used to implement an e-parliament system for the Kenyan Parliament focusing on legislative documents as seen in Figure 2.8

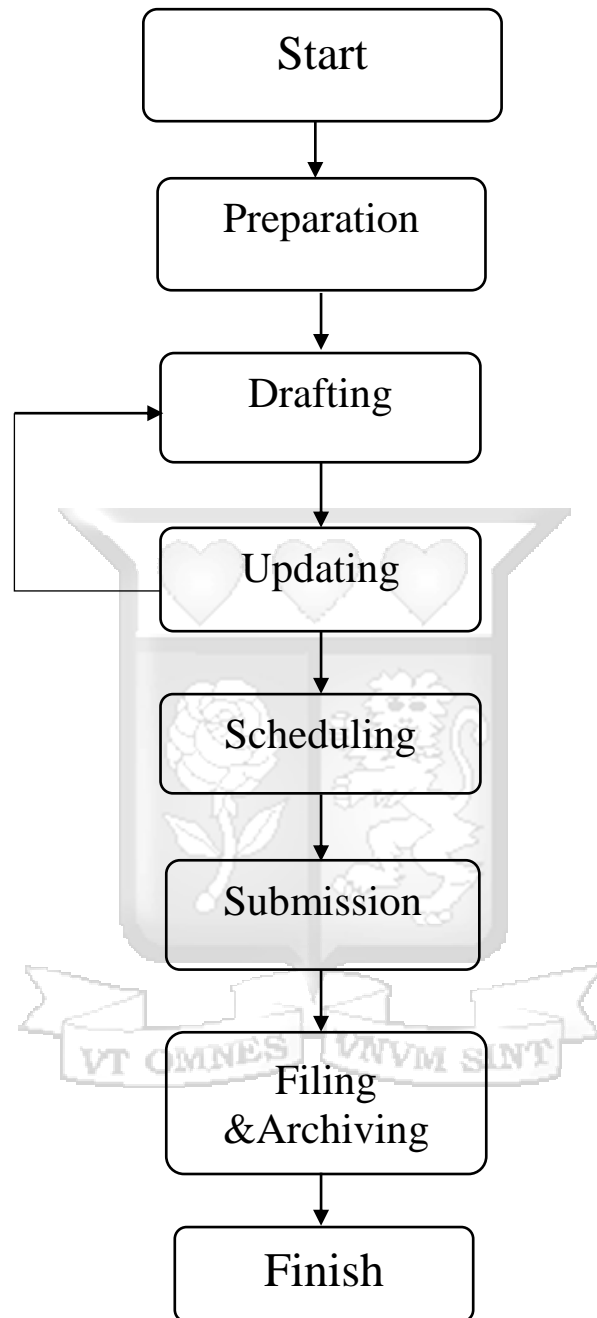


Figure 2.8 Proposed Business Process Automation for Kenya e-Parliament System

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the research design; including the system design, the target population, the sampling techniques, the proposed data collection methods and data analysis methods that were used for purposes of this research dissertation.

3.2 Research Design

Creswell (2014) in his book, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* describes quality research as, "... an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Pg. 6)." Based on the research questions, this study was a qualitative research seeking to understand the barriers of adopting e-Parliament systems and find a model that can be used to implement the system.

3.2.1 System Design

The system design proposed was rapid application development design which is in favor of rapid prototyping. Mackay, Carne et al. (2000). Rapid Application Development (RAD) is an approach which offers a dynamic approach to system delivery, and in a shorter time than happens with existing approaches based on the 'waterfall' model. Due to academic time constraints, this presents the best approach for the prototype. RAD advocates for greater flexibility regarding changing requirements and the changing environment. The users are not outside the development team just supplying information but are actively involved in the development process. The system analysis was done through entity-relationship diagrams, use-cases and data flow diagrams.

3.2.2 Case Study Research Design

Zainal (2007) argues that case study method of research is appropriate when the geographical area of study is small or there exists very limited number of individuals as the subjects of study.

Zainal discusses the advantages of using case study research method. One such advantage that is relevant in this study was the fact that case studies not only help to explore or describe the data in real-life environment but more importantly help to explain the complexities of real-life situations which may not be captured through experimental or survey research. This research focused on the National Assembly of Kenya and specifically, on the Legislative and Procedural Services Department and the ICT department in the Parliamentary Service Commission. This therefore qualifies the study as a use case study as its research design method.

3.3 Population and Sampling

The target population in this study was the staff in the Parliamentary Service Commission sitting in the National Assembly offices in the Central Business District in Nairobi, Kenya. Particularly, members of the ICT department (4) and Legal and Procedural Services department (18) were considered for the study and therefore this tallied the population size to 22. This represents a finite population since the number is known. According to Bove (2009), the sample size n should be greater than five percent of the population sampled and is determined using the finite population correction factor as per the formula below

$$n = \frac{n_0 N}{n_0 + (N - 1)}$$

Equation 1 Population Sampling Formula

Where (n) is the sample size

(n_0) is the estimated sample size

(N) is the population to be sampled

3.4 Research Quality

Stenbacka (2001) argues that there are four generally accepted quality concepts. These are validity, reliability, generalizability and carefulness. These concepts have materialized to claim a study as part of proper research. This section will seek to show how these can be achieved.

3.4.1 Research Validity

Research validity can be looked at in terms of construct validity, internal validity and external validity. Riege (2003) advises that researchers avoid subjective judgements during the periods of research design and data collection to enhance construct validity. Internal validity was achieved by not only highlighting the major patterns of similarities and differences between respondents' experiences or beliefs but also identifying what components are significant for those examined patterns and what mechanisms achieved them. External validity was achieved by extrapolating particular research findings beyond the immediate form of inquiry to the general.

3.4.2. Research Reliability

According to Riege (2003), “reliability refers to the demonstration that the operations and procedures of the research inquiry can be repeated by other researchers which then achieve similar findings, that is, the extent of findings can be replicated assuming that, for example, interviewing techniques and procedures remain consistent.” This was achieved by reviewing relevant literature and using appropriate interview questions.

3.4.3 Research Objectivity

To maintain research objectivity, personal bias was avoided by basing conclusions on the results of the research. Efficient design of the questionnaires as well as consistent sampling will ensure that the responses given are in line with ethical principles and credible to substantiate an analysis and cause of action in the design and development of the system.

3.5 Data Collection and Analysis

3.5.1 Data collection

According to Creswell (2014) many qualitative studies require the researcher to collect multiple forms of data and spend considerable time in natural setting gathering information. He further breaks down the data collection methods into four types and discusses each in detail. The first collection type is observations in which the researcher records in an unstructured or semi structured way activities at the research site. The second type is through qualitative interviews where the researcher conducts face-to-face interviews with participants or by use of telephone interviews. The interviews include unstructured and generally open-ended questions. The third collection type is the use of qualitative documents such as public documents like official reports

or private documents such as e-mails. The final data collection type discussed is by use of qualitative audio and visual materials. This data may take the form of photographs, art objects, or any forms of sound. He argues that a researcher will need to consider the strengths and limitations of each type to select the best choice. Since the research took a case study approach by focusing on the Parliament of Kenya, data collection methods were semi-structured interviews and questionnaires. Data analysis was done using statistical packages.

3.5.2 Data analysis

In the analysis of the data, the Software Package for Social Sciences (SPSS) was used. This involved the inferential analysis of grouped data that will take advantage of measures of central tendency and measures of dispersion to create correlation between the variables in the research. The key variables that were analyzed for correlation were designed in the questionnaires that were then included in the appendix section of the document. Eventually, the correlation scores were used to justify the need for the development of the said system based on positive responses from the parliamentarians and the IT department that formed the data sample.

3.6 Ethical Considerations

The study was conducted under guide and supervision by the Strathmore University ethics guideline and based on the global standards of conducting research. Questionnaires and interviews were only administered after acquiring formal consent from the parties and privacy was maintained through anonymity. The research acknowledges all literature used in the study.

CHAPTER 4: ANALYSIS AND FINDINGS

4.1 Introduction

The fourth chapter is an extension of the research methodology. It details the outcome of the findings from the survey done on members of the IT department as well as the members of the Legal and procedural services department at the National Assembly. All the respondents were active employees of the National Assembly and thus have a significant understanding and knowledge on house procedures and rules. The chapter details information about their demographics, their responses and detailed analysis using SPSS.

4.2 Survey Response Rate

Google form surveys were used to get information from the respondents. Out of the sample of 22 chosen for these surveys, a total of 17 respondents took time to respond to the Google form surveys and give their feedback. This represented a return rate of 77.27 percent. The survey was undertaken in a series of emails that were sent to the respondents at the same period of time to all the 22 respondents, providing them with a link to access the Google form from which the data would be collected. The 77.27 % return rate represented the Google form responses that were given over a period of two weeks from the time the emails were sent. The possibility that there will be more responses much later still exists. However, this possibility is inconsequential as these results shall not be taken into consideration. This return rate is further represented in Table 4.1.

Table 4.1: Response Rate from the Survey

Category	Frequency	Percent (%)
Emails sent	22	100
Replied emails	17	77.27

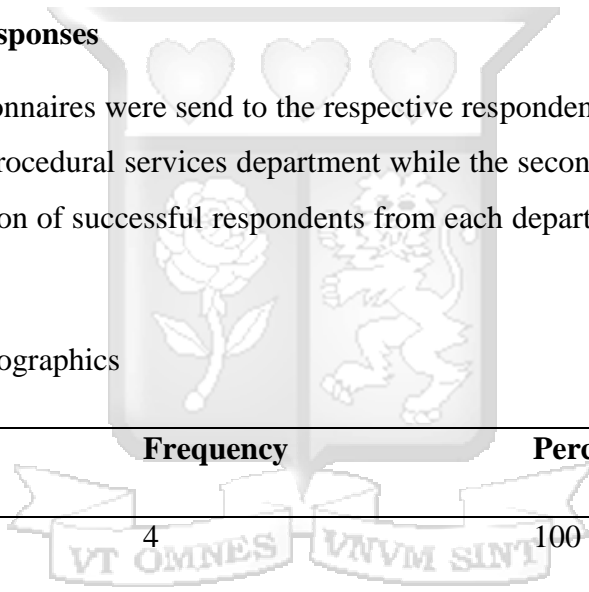
4.3 Summary of Demographics

The determination of demographic summaries is important to the research as it reveals the biases in the responses given in a survey. The demographics assessed in the research include; work experience, level of training, and frequency of challenges with existing system. These reveal the nature of respondents that gave their input to the research. The represented information in the analysis includes responses from the surveys taken from both the ICT staff as well as staff from the legal and procedural services department. A total of 17 respondents were involved in the survey. The rest of the sub-chapter represents their views on the subject matters discussed in the questionnaire.

4.4 Categories of the Responses

Two categories of questionnaires were sent to the respective respondents. The first category was meant for the legal and procedural services department while the second category was meant for the ICT staff. An indication of successful respondents from each department is as shown in table 4.2.

Table 4.2: Category Demographics



Gender	Frequency	Percent (%)
ICT Staff	4	100
Legal and Procedural Services	13	72
Total	17	86

Of the 17 respondents surveyed, 4 of them were from the ICT staff. This represents 100% of the total ICT staff involved. The legal and procedural services had 13 respondents sample, which gives men a majority representation in the research. This represented an average 86% of the turnout for the respondents given the google form to fill out. Generally, all the ICT respondents responded to the survey, while 72% of the Legal and Procedural services department responded.

4.5 Legal and Procedural Service Respondents

This section represents the respondents from the 17 participants from the Legal and Procedural Services Department at the National Assembly.

4.5.1 Experience working at the National Assembly

The study sought to determine the level of experience the respondents had working in their different roles at the National Assembly. Three categories of experience presented for the respondents to were used to group the respondents into their different respective ages. The categories include; Below 5 Years, more than 10 years, and 5-10 Years. The findings are illustrated in Table 4.3.

Table 4.3: Work experience categories

Age (Years)	Frequency	Percent (%)
Below 5 Years	4	23.5
5-10 Years	9	53.0
More than 10 years	4	23.5
Total	17	100

The findings from the age demographics survey indicated that 23.5% of the respondents; 4 of them had been in the legal and services department for less than 5 years. This number was similar to the number of respondents who had served in the legal and services department for more than 10 years. However, a majority of the respondents (9) had been in the legal and procedural services department for 5-10 years. This represented 53% of the respondents.

4.5.2 Training on Table Office Management

The respondents from the legal and procedural services were also quizzed on whether or not they had been trained on table office management. The purpose of the question was to gauge the level of understanding on table office functions in order to know how best to model a system around

it. The question received significantly positive response from the respondents as shown in table 4.4.

Table 4.4: Training on Table Office Management

Training on Table Office Management	Frequency	Percent (%)
Yes	13	76.5
No	4	23.5
Total	17	100

These statistics indicate that most of the respondents have had training on table office management. Of the 17 respondents quizzed on the matter, 13 reported to have been trained while 4 argued that they had not received any training whatsoever. This meant that only four members of the legislative and procedural services department would require significant training if a new system were to be introduced. It also meant that a great number of respondents would be available to give insight on how best to model their work functions into an automated system. This was necessary for the development of a fully functional and consumer-centric system.

4.5.3 Improving the existing system

The respondents were quizzed on whether or not they thought the existing system required improvement. This question sought to guarantee that the respondents were willing to welcome change to the paper-based process that brought about a lot of filing and manual documentation. Although the question did not indicate which kind of improvement would be implemented, it would get the feelings of the respondents about the existing system. The information was analyzed and tabulated as shown in table 4.5.

Table 4.5: Need to improve existing system

Should existing system be improved?	Frequency	Percentage
Yes	11	65
No	6	35
Totals	17	100

The number of years the respondents believed that the system should be improved were 11. This represented 65 percent of the sampled population. This meant that a majority of the respondents would be willing to support efforts to improve the existing system and make it better. It can be extrapolated to mean that the members of the legal and procedural services department were inherently supportive of automation and business process improvement using Information Technology.

4.5.4 Frequency of challenges with existing system

The question was put to the respondents to gather their challenges with the existing system. The question sought to know whether if left unchanged, the existing system would continue to pose additional challenges to the legal and procedural services department. As such, two options were provided; rarely and periodically. The responses from the participants are as shown in table 4.6

Table 4.6: Frequency of challenges with existing system

Frequency of table office challenges	Frequency	Percentage
Rarely	3	18
Periodically	14	82
Totals	17	100

From the statistics, it was established that most of the respondents (14) experienced periodic problems with the existing system. This represented an 82% response rate from the respondents. This was a confirmation that the existing system indeed had significant challenges that needed to be addressed. Generally, the issues with the existing system made it occasionally bring about problems that needed to be addressed effectively.

4.5.5 Complaints about existing table office management system

Table 4.7 represents the statistical analysis of responses on the frequency of complaints about the existing system. Given that the table office system served members of parliament and other stakeholders within the parliamentary service commission, it would be important to understand how different sets of people felt about the system based on the responses the legal and procedural services respondents gave.

Table 4.7: Frequency of complaints about existing system

Frequency of Complaints	Frequency	Percentage
Daily	3	18
Weekly	7	41
Monthly	7	41
Totals	17	100

From the study, the results indicated that the complaints about the existing table office management system were mostly experienced on a weekly and monthly basis. Generally, about 14 of the 17 respondents were equally split on the frequency of the complaints, with 7 a piece indicating that the complaints were monthly and weekly respectively. This was a significant frequency as it represented a constant problem with the existing system's inconsistencies.

4.5.6 Rating the existing table office operational Efficiency

The study sought to gather from the respondents; their views on the operational efficiency of the existing table office management system. A Likert scale was provided for the respondents to select the particular responses to rate the existing system. On the issue of efficiency, the response categories; very efficient, efficient, average, inefficient and highly inefficient were ranked as 5,4,3,2,1 respectively. The responses indicated by the respondents are as shown in Table 4.8.

Table 4.8: Efficiency of existing system

Efficiency of existing system	Frequency	Percentage
Very efficient	1	6
Efficient	4	24
Average	4	24
Inefficient	5	28
Highly inefficient	3	18
Totals	17	100

The findings indicate that the efficiency of the existing table office system was rated at inefficient (5) majorly, with several respondents indicating; average (4) and efficient (4), as the common responses from the respondents. Generally, 54% of the respondents felt that it was efficient and okay. However, given that the average rating was neutral, then the percentage of respondents who expressed concern with the efficiency of the existing table office system (46%) was quite high.

4.5.7 Proposed features for an Automated Table Office Management System

The study sought to gather from the respondents; the features they would propose for inclusion in the Automated Table office management system. In order to ensure effective understanding of pertinent development needs, the responses were grouped into four possible outcomes;

interactive interface, fast processing, ease of feedback and proper coordination. The findings on the respondents' indications on the four responses were tallied and are as represented in table 4.9

Table 4.9: Expectations on the Automated Table office management system

Expected features in the proposed automated table office management system	Frequency	Percentage
Interactive interface	4	23.5
Fast processing	3	18.0
Ease of feedback	6	35.0
Proper coordination	4	23.5

For this analysis, the respondents were equally split on the matters on proper coordination, fast processing and interactive interface presence in the proposed automated table office management system. However, a good number of the respondents (35%) believed that the most relevant issue of concern would be the feedback feature, to enable better automation of their communication process as the documents were processed in the table office system.

4.6. Correlation Analysis

Pearson product correlation was used in the study to scrutinize the need for business process automation for the table office system at the National Assembly. The summary of the analysis as performed using SPSS is as indicated in table 4.10. The analysis of the findings indicates the final relevance of the data as is testament to the relational inferences drawn from the data. In the analysis, the variables were categorized based on their mean responses from the responses given by the respondents. The scale used to determine the relationships was the standard deviations, as drawn from the nature of responses given by the respondents.

Table 4.10: Pearson Correlation Analysis

		Interactive interface	Fast Processing	Ease of Feedback	Proper coordination
Interactive interface	Pearson Correlation	1	.576	.393	.457
Fast Processing	Pearson Correlation	.576	1	.583	.339
Ease of Feedback	Pearson Correlation	.393	.463	1	.577
Proper coordination	Pearson Correlation	.457	.339	.611	1

From the findings in Table 4.10, a strong positive correlation was found between ease of feedback and proper coordination of the system, as indicated by a correlation of 0.611. This infers that appropriate software to be developed needs to implement the two features as a matter of priority. The findings also found a strong positive significant correlation between fast processing and ease of feedback, with a correlation of 0.583. This suggests that fast processing is the third-most important aspect that needs to be implemented in the newly-developed system.

4.7 Conclusion

The findings indicate a great support for the intended automated table office management system by the relevant stakeholders in the parliamentary legal and procedural services department. The responses could justify the development of a new system to improve the existing business process by automating repetitive task as well as minimizing the amount of paper work necessary to ensure proper revision of bill before they can be presented to the floor of the National Assembly. Based on the responses from the respondents, a design of the new system was in order, one that would ensure ease of feedback, proper coordination and fast processing as the urgent considerations required by the anticipated system users.

CHAPTER 5: SYSTEM ARCHITECTURE AND DESIGN

5.1 Introduction

This chapter was designed to examine the logical and physical setup of the system to be developed. The design of the system takes into consideration various important factors that are necessary to ensure effective delivery of table office functions in an automated context. Indeed, the table office process is a concise procedure that can only be modelled as is in the physical manual design that the system currently embellishes. However, in order to ensure greater appreciation of existing technologies, it is necessary to have all the different tools and designs necessary for an effective Automated Table Office Management System as has been discussed in the literature. This chapter presents a model that can then be implemented into the prototype solution suggested in the research objectives. A detailed understanding of the system will thus be realized by assessing the various diagrammatic representations of the system. These diagrams will show the modular flow of data from the different persons involved in the refining and editing of parliamentary bills before they can be tabled.

5.2 System Architecture

The architecture of a system presents its interactions between the input, processes and outputs anticipated. Figure 5.1 represents the system architecture of the Automated Table Office Management System. This design is best suited to ensure that the system fully caters for the legal and procedural services' departmental needs. The design takes into consideration the different aspects of the system model and how best to make it user-friendly and reliable in the long term.

For the optimal running of the system, there is need for both local and remote access to the system. This will enable various users to be able to use the system regardless of their location or dispositions. Members of parliament for instance may need to upload documents to the portal for them to be reviewed. In order to do this, they will need to access the system at whatever point of contact they may have with the system. The system is also supposed to store all documents uploaded for safe-keeping. For better compatibility and portability, all documents in the system shall be presented in the extensible mark-up language format (XML).

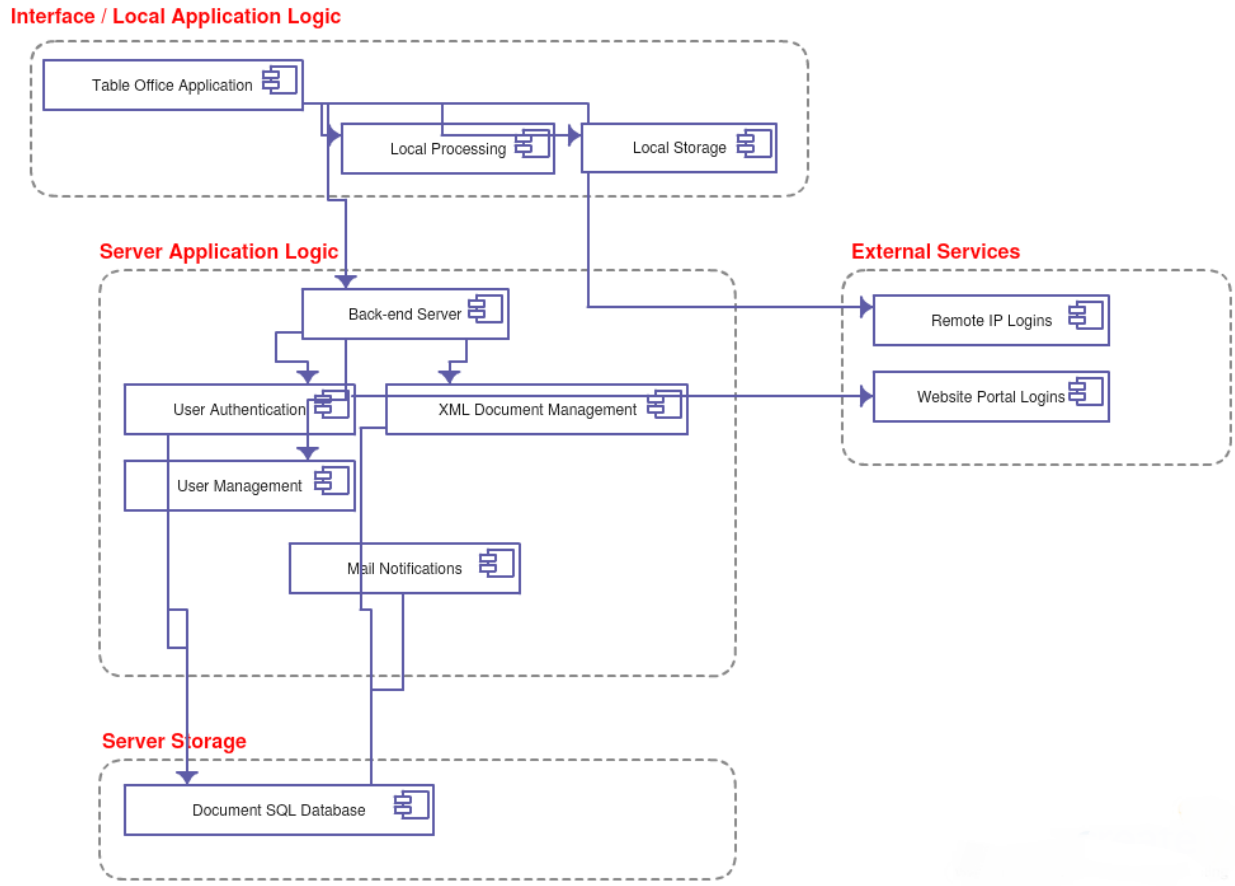


Figure 5.1: System Architecture Diagram

5.3 System Design

The design of the proposed Automated Table Office Management System shall be done using the Unified Modelling Language (UML). This will enable the design have visual descriptions of the various objects and their encapsulated methods as used in the prototype development. Various diagrams are represented in the rest of this subsection, as part of the overall system design setup. The first of these diagrams drawn to UML standards was the Use case diagram as shown in figure 5.2. The diagram illustrates the different players in the system and the relationships between players.

5.3.1 Use Case Diagram

The use case diagram models all system use cases as anticipated in the actual design and development of the system. The use cases were developed as a result of interrogating the

members of the Legal and procedural services and IT team. All actors and the methods they interact with are clearly represented in figure 5.2

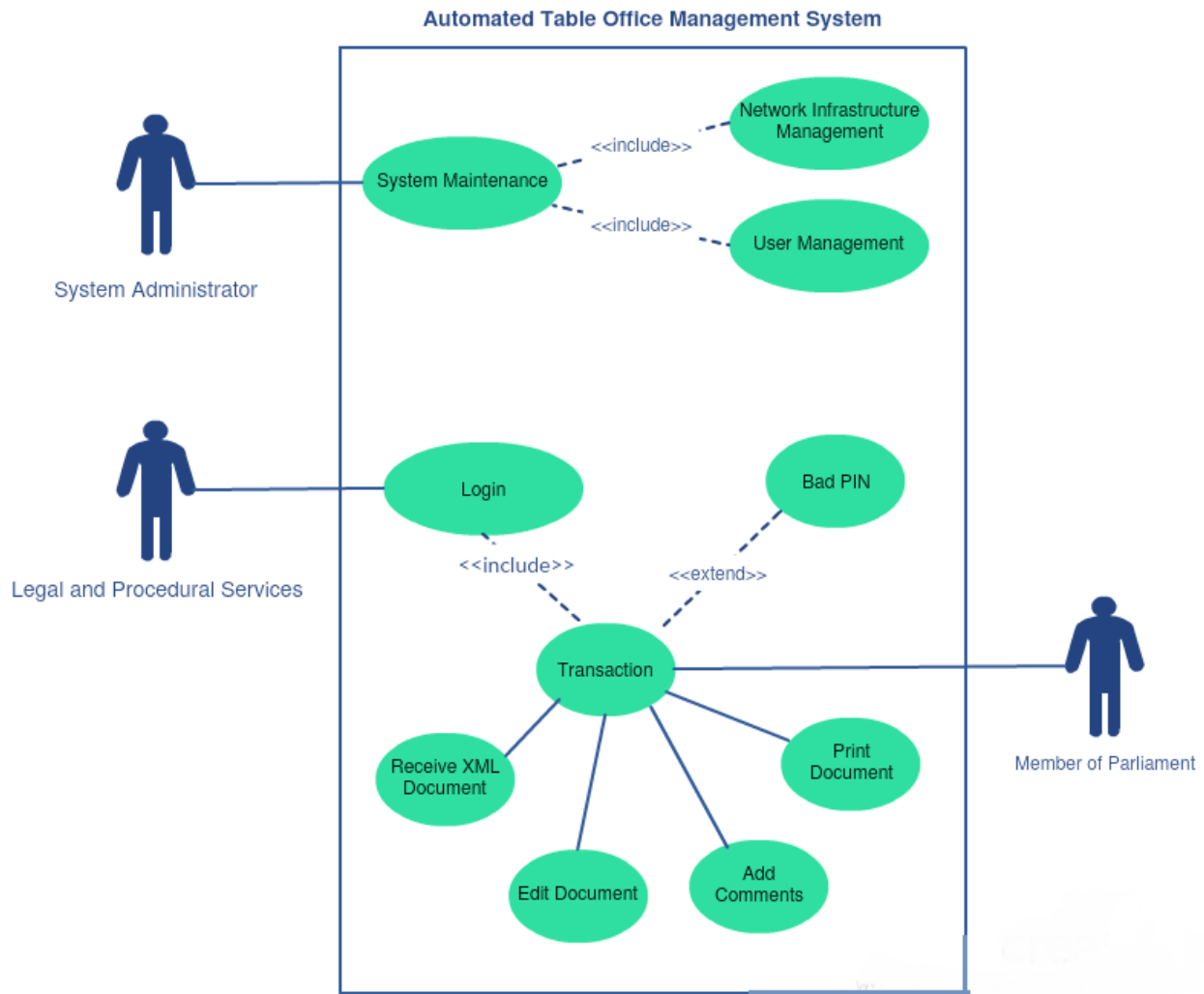


Figure 5.2: Use Case Diagram

Fig 5.2 shows the design of the use cases the system will have. There shall be three main actors in the running of the system processes. The system administrator will be an independent actor concerned with the proper running of the system to ensure that there are no network issues or security threats associated with unauthorized use. The other actors shall be members of the legal and procedural services as well as the members of parliament, who will be involved in the automated table office management process.

5.3.2 System Sequence Diagram

The main functionalities and activities of the system shall follow a certain sequence of steps. The sequence diagram will map the processes the document will take before being approved for tabling in parliament. This will ensure that there is interaction between the members of parliament and the legal and procedural services team without the need for paper documentations and physical presence at the LPS offices. This shall be as shown in figure 5.3.

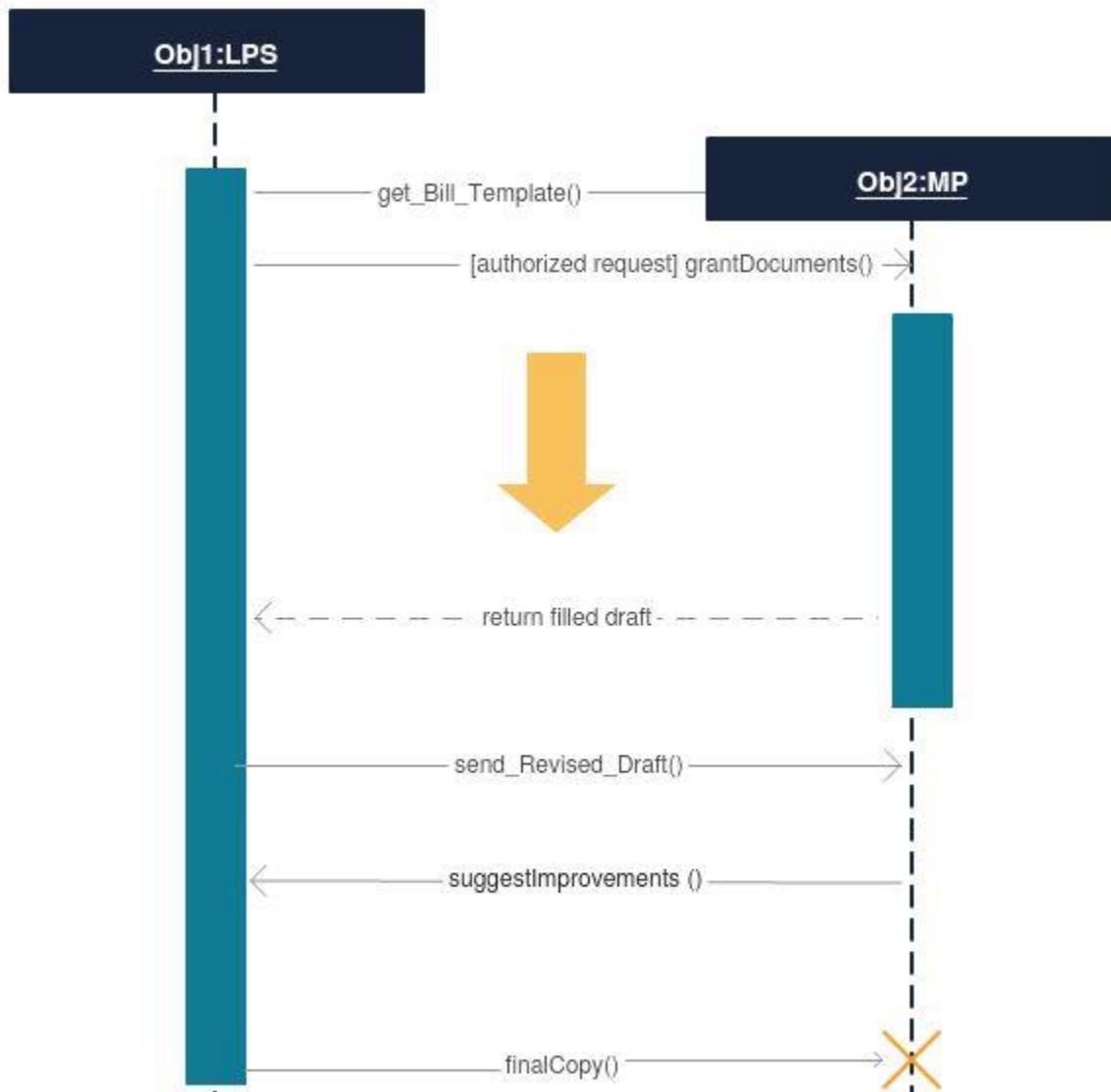


Figure 5.3: Sequence Diagram

5.3.3 Entity Relation Diagram

The entity relation diagram models the different tables in the system as well as the relationships these tables have as pertains the effective running of the system. The relations (tables) are modelled around different system objects in order to capture the layout of the database and how best to approach construction of the system in its innate form. The prototype takes advantage of the relations in the database SQL schema. Figure 5.4 effectively represents the entity relation diagram as modelled into the Automated Table Office Management System.

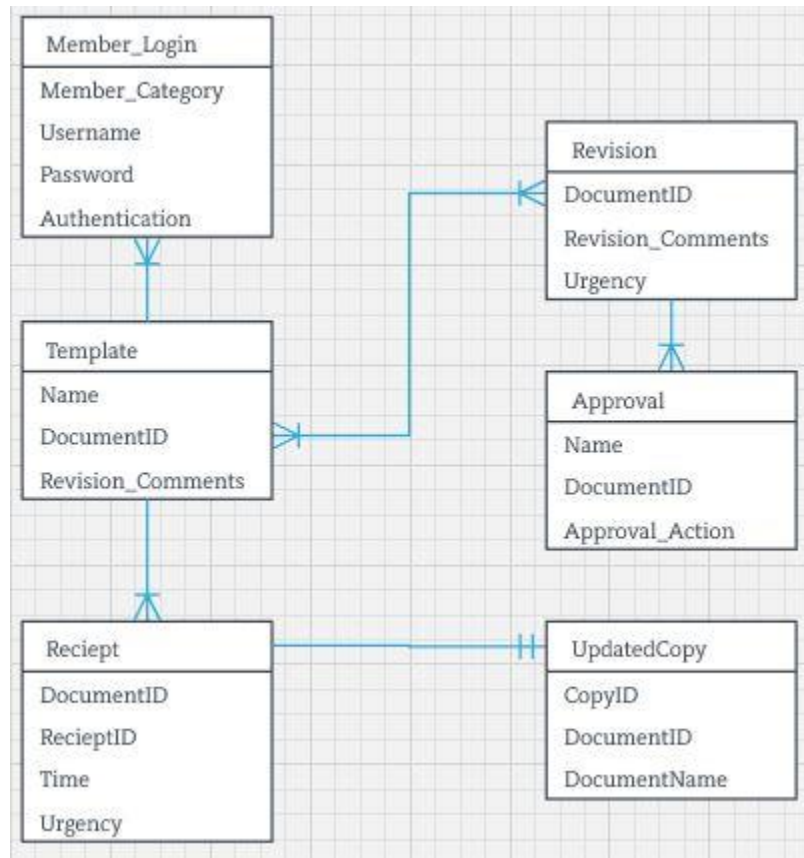


Figure 5.4: Entity Relationship Diagram

The entity relationship diagram on Figure 5.4 shows the various entities of the proposed Automated Table Office management system. These entities will later be transformed into actual classes during the prototype design. The class diagram however shall be modelled in a similar fashion for easier encapsulation. All the entities in the relation represent the major system functionalities. However, additional entities may be incorporated into the prototype model for effective functioning of the system.

5.3.4 Class Diagram

The class diagram represents the encapsulated members and member functions necessary for the modelling of the efficient system. The methods in the class design will model the various algorithms and functions applied in the functioning of the system. The figure shown in 5.5 depicts the class diagram for the Automated Table Office Management System.

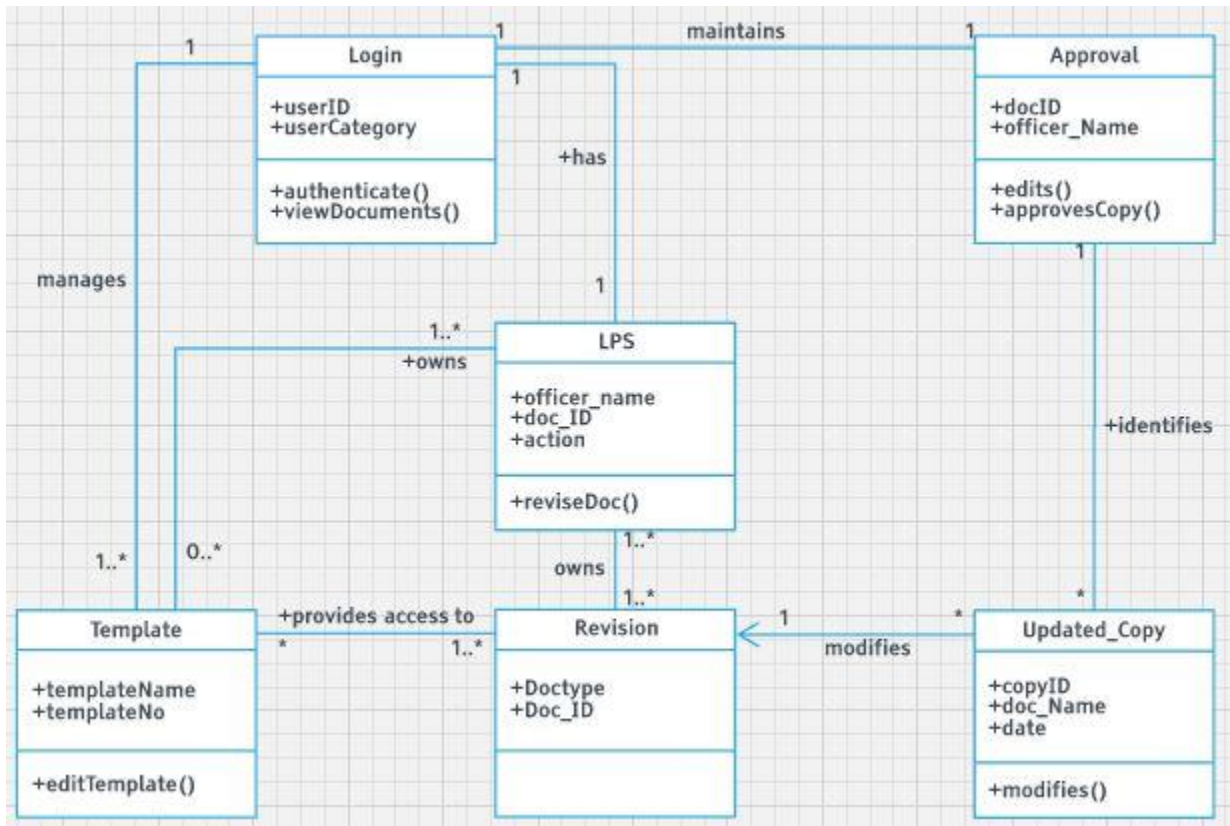


Figure 5.5: Class Diagram

The class diagram in Figure 5.5 illustrates the classes that will be in play for the Automated Table Office Management System. Each class has its members (objects) and member functions (methods) that will enable the manipulation of attributes within the member objects. The overall approach to the class design is to ensure that the different processes in the system are specifically modeled into objects that will make it easier to design dashboards from which the tools for data manipulation can be accessed. The system seeks to ensure that every activity takes place within the confines of the system for guaranteed system privacy and enhanced security.

5.4 Database Design

The database schema is modeled on an SQL setting. This is based on the entity relation diagram represented in figure 5.4. The database used in the system models all objects and member functions to ensure efficient interaction between the objects and member functions, thus making it easier for the users to navigate different objects within the system. The database schema is thus the underlying code from which the system is run. The system also guarantees conversion of documents into the appropriate format when being downloaded for printing. However, the template so used in the system is in an XML format and stored in the database for authorized access and manipulation by members of parliament as well as the Legal and Procedural Services' team.



CHAPTER 6: SYSTEM TESTING AND IMPLEMENTATION

6.1 Introduction

Before the prototype could be implemented, it had to be tested to ensure that it served the purpose intended. System testing thus was necessary to ensure that the respondents were content with the designed system. This meant that they had to take another survey to indicate the feel they had with regard to the use of the system. This exercise was necessary to ensure that the system design was in tandem with the expectations earlier indicated in the system survey questionnaires analysed in chapter 4. However, in order to give their views on the system, system testing had to be done to demonstrate effective understanding of the system's functionalities.

6.2 System Testing

6.2.1 Unit Testing

Unit testing involved in testing the actual components and modules of the prototype to confirm that they are in proper working condition. The system was developed as a combination of various subsets and units. As such, these modules were tested by the developer and confirmed to be functional and effective. They would then be presented to the system users for successive testing and recommendations made based on their views as well. However, these recommendations would be implemented in the development of the actual system, an extension of the existing prototype.

6.2.2 Integration Testing

Integration testing is the testing of software modules as a group. In order to test the integrated components of the system, the members of the Legal and procedural services' team were expected to assume the roles of the Member of Parliament as well, and take the document through the different stages, from the template editing to the final submission of the draft bill. There would only be one use case for these aspects of the system and thus all respondents were expected to test these functions and report on the productivity of the system with regard to how well it mapped the table office functions.

6.2.3 User Acceptance Testing

Testing user acceptance was quite a challenge as the system was prematurely presented to the members of the Legal and Procedural Services team. However, the question presented to the

users required them to appraise user acceptance on a scale of 1-5 within which, the Likert attributes [very effective], [effective], [moderate], [ineffective] and [highly ineffective] were captured. The user acceptance and testing question thus sought to understand the level to which the respondents thought the developed prototype was effective in addressing their needs.

6.3 System Implementation

6.3.1 System Development

Coding for the system was done upon completion of the design. The code was developed in basic Structured Query language for the tables stored in the database. Hypertext Pre-processor was used in the development of the dashboards and the main functionalities implemented in the system prototype. The database and the front-end connection was established using PHP sockets as well. The development was initiated by the design phase but also influenced the design of the system as well, as it was a cyclic process based on the waterfall model.

6.3.2 System Security

In order to secure the system, there were login credentials and validation required for all system users. At the same time, the interaction between the system and the various users also required some level of communication in order to ensure proper coordination between the different players involved in the drafting of the bill from the template to the final copy that could be presented to parliament. As such, security threats to the system were minimized by the interactions between the various system users.

6.4: Results and discussions

6.4.1 Respondents who tested the system

In as much as the researcher sought the audience of all members of the legal and procedural services as well as the IT department staff involved in the first survey, not all were present. Of the 21 respondents invited, only 15 were able to give their views on the system, upon getting a chance to test it and have a feel of the different components in the system. The representation of the respondents that showed up to test the system and give their views is as shown in figure 6.1

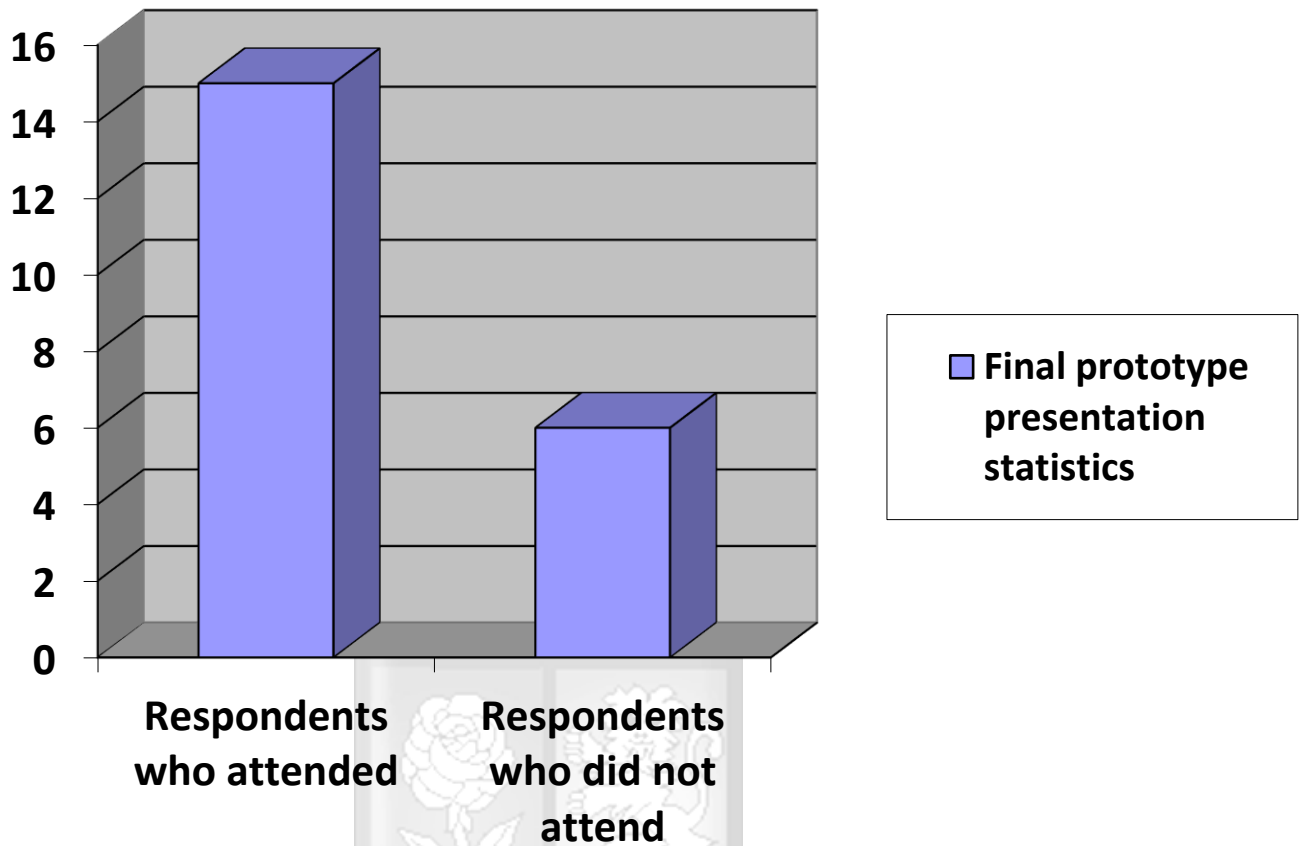


Figure 6.1: How respondents reacted to final prototype presentation invitation

6.4.2 Applicability of prototype to automating table office functions

The respondents were quizzed on the applicability of the prototype developed. The researcher sought to find out how effective the prototype was in regard to automating table office functions. Of the 15 respondents, 8 thought it was very effective. 3 respondents thought it was effective. 4 respondents thought it was moderate while no respondent thought it as inefficient or highly inefficient. These results are as represented in figure 6.2

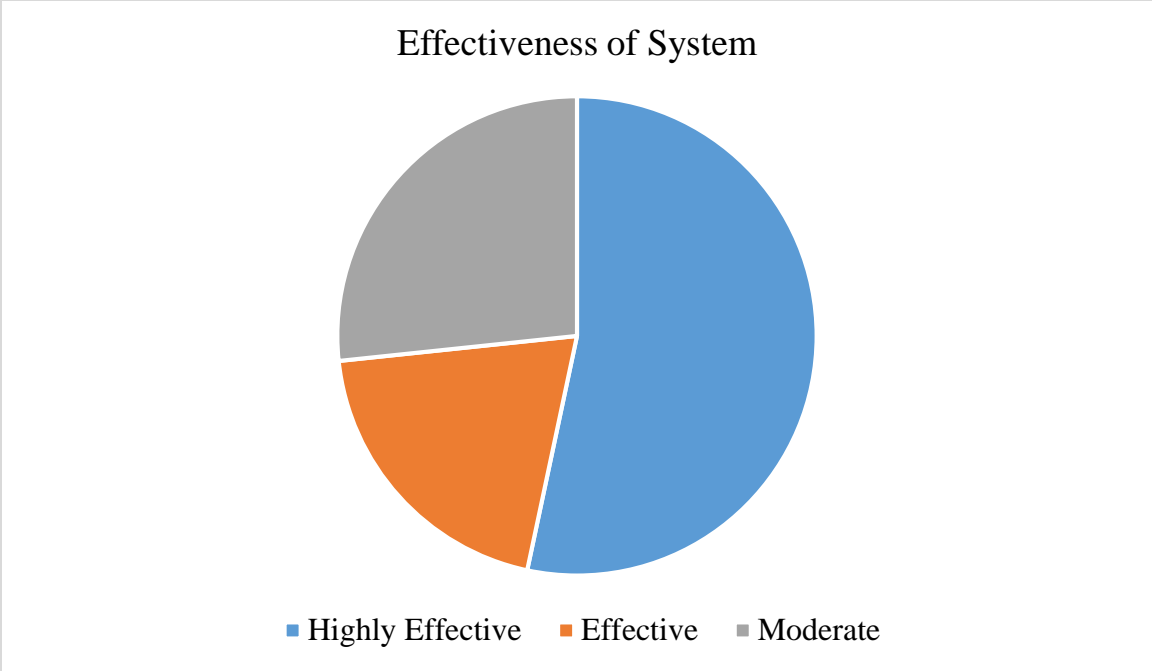


Figure 6.2: Effectiveness of the system

6.4.3 Willingness to implement the actual system

The respondents were further quizzed on the willingness to implement the prototype into a complete system. The responses are as shown in figure 6.3

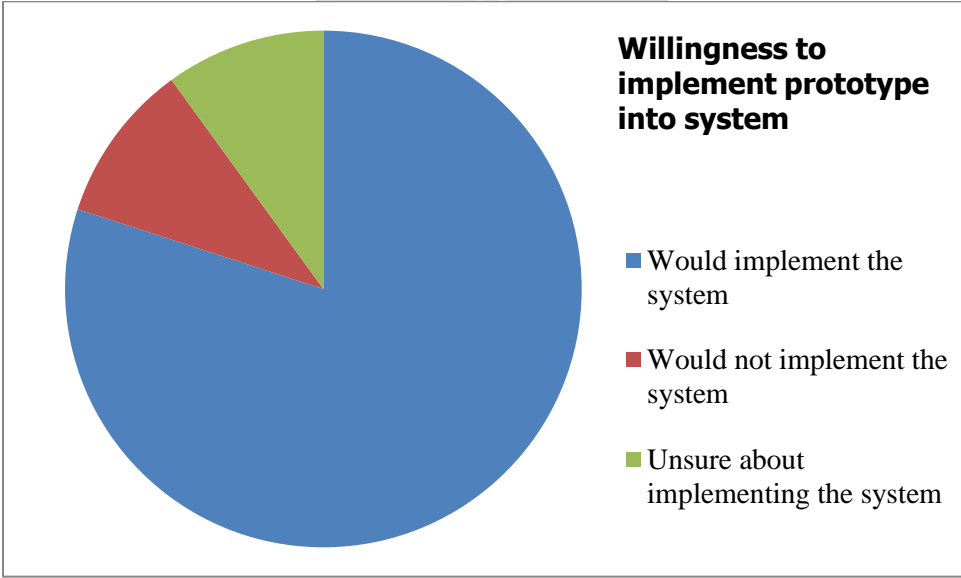


Figure 6.3: Willingness to implement prototype into system

6.4.3 Changes proposed to prototype

The respondents were further asked to propose changes they would make to the prototype if it were implemented into an actual system. The responses given are as graphed in figure 6.4

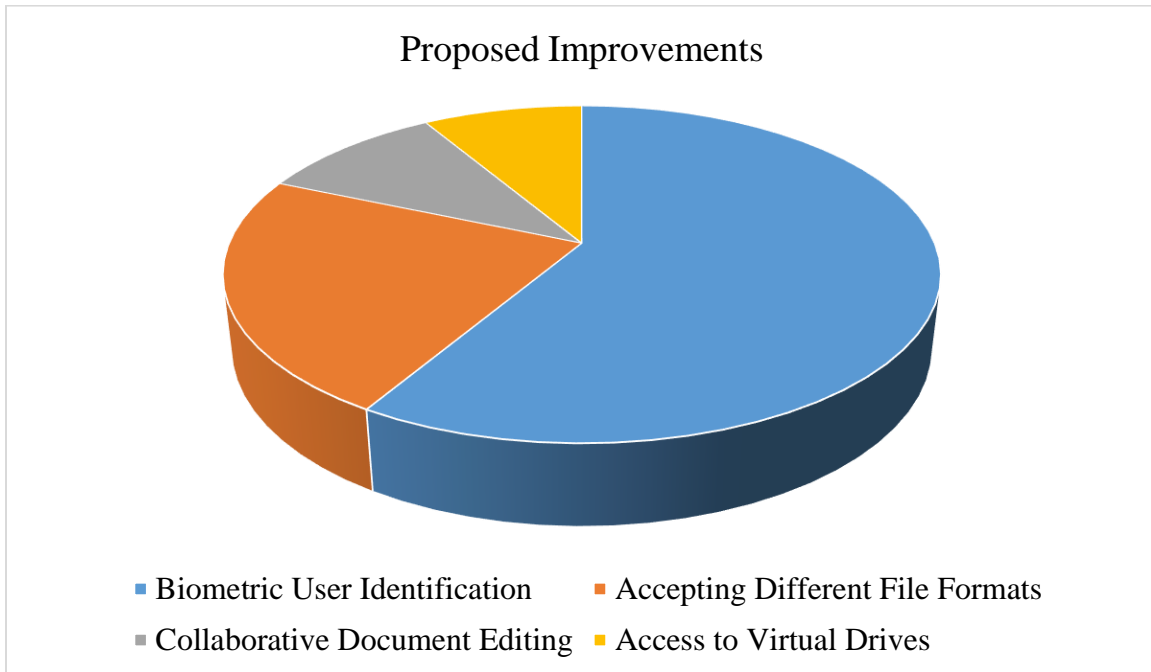


Figure 6.4: Proposed changes to the prototype

6.8 Summary on Findings

From the responses given by the members of the LPS and IT teams, the respondents were content with the prototype developed. However, for the prototype to be modelled into an effective system, there was need for several features to be included into the final system. These include; ability to enforce and support biometric user identification, the ability to accept different file formats such as PDF and CSV, as well as collaborative document editing to allow different persons to work on the document at the same time. This feature of parallel computing was suggested by the IT team at the National Assembly. Access to virtual drives such as google docs and drop box was also suggested as an avenue to share documents. All these suggestions would be considered in the final system development. Of importance however was that the respondents appreciated the prototype thus developed and would be willing to use it.

CHAPTER 7: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

7.1 General Research conclusions

The research done in this project pertained the use of mixed methods data gathering and both primary and secondary sources of information. In order to acquire primary data for the research, the use of questionnaires was entertained. These questionnaires were designed for two different sets of respondents. All the respondents were however directly involved in the parliamentary legal procedural services department and the information technology department in parliament. The goal was to pitch the idea of the proposed automated table office system in a bid to gain an understanding of their support for the system and willingness to aid in the development and testing. Successful responses from these participants enabled the development, testing and deployment of the prototype. Although system development is still in the making, the prototype proved to be both effective and efficient for the anticipated tasks. As such, it was a successful research process leading to the development of the anticipated prototype as anticipated by the research objectives. It proved to be a challenging but equally successful process as well.

Secondary data revealed that there have been different systems deployed for automated parliamentary functions across the world. The Greece parliamentary system was especially an effective design of the anticipated table office prototype designed. Several other attempts to automate parliamentary system have been made in the European parliaments, especially to do with the models for automating parliamentary functions. Some of the popular models discussed in the literature review include; the Layne and Lee model of 2001, the UN and ASPA model of 2002 to automate functions in the United Nations' Assembly, as well as the Schelin model of 2003. From these models, systems such as the Portuguese parliament, the Scottish parliament and the Armenian Parliament have been developed as well. It was from these systems that the design of the proposed table office system was modeled to automate commonly done functions at the National Assembly. The secondary data was thus very key to the development of the prototype and the guarantee that its use cases were efficient and desirable.

7.2 Achievement of Research objectives

7.2.1 Exploring existing challenges regarding document handling at the National Assembly

The exploration of existing challenges pertaining to document handling at the National Assembly was done in earnest by conducting a pre-research of the parliamentary legal and procedural services department. From this study, the challenges revealed were used to aid in the development of the prototype, as a solution to address the problems members of the department faced. By ascending to the fact that the prototype addressed the problems, members of the legal and procedural services department helped achieve the first research objective.

7.2.2 Analyzing ways of developing and implementing an automated table office at the National Assembly

This part of the research was the most difficult. Several prototypes were proposed for implementing the automated table office system. This was through secondary research on existing systems. This was from the study on existing models as well as similar systems implemented elsewhere around the world. However, many of these systems were pre-emptive thus the researcher settled on the automated table office system model designed in the system design chapter of this document. The reliability of the system was discussed by the legal and procedural services team as well as IT experts within the Kenyan parliament in various presentations and questionnaires, throughout the system testing phase documented in the sixth chapter. It was found to be efficient and reliable for the research. However, only a prototype could be developed with the time given.

7.2.3 Examining Business process automation techniques adopted in various parliaments across the world

The design of the implemented system took advantage of past systems from other jurisdictions around the world. Although the systems applied in other countries do not necessarily automate table office functions, they present a framework for document handling as well as the process of legislation that is necessary for the prototype to implement an efficient system to handle the different stages of bill drafting and submission to the stages of parliamentary committees and deliberations. The systems adopted by other parliaments around

the world however do offer a consistent guide to the implementation of modern systems that can aid in the development of a working prototype for the Kenyan use case. The Armenian use case provided a significantly close use case model from which to model the development of the prototype as anticipated by the new system. These parliamentary system cases shall also be applicable in the development of the final system upon investment in an automated table office system applicable in a larger use case scenario as well as intranet and extranet applications.

7.2.4 Development of a prototype to automate table office functions

The development phase of the system engineering process began with a study of possible prototype solutions, upon which the most efficient designs were chosen. A use case was drawn up, as well as other logical designs using the Unified Modelling Language syntax. The development was then done using a combination of languages, mostly focusing on hypertext preprocessor (PHP) and JavaScript. The combination of languages was efficient to model a web-based solution within the Hypertext Markup Language context. The solution was designed in a phased approach, taking into consideration the need for security, efficiency and reliability of the system. The system documentation in this document includes a user manual at the appendix section of the document.

7.2.5 Testing of the Developed Prototype

The prototype testing bit has been documented in the sixth chapter of this documentation. It details the testing methodology as well as the resultant findings from the participating respondents who also took part in the investigation on the need to have the automated table office system in the first place. However, there is a concise gap in the system's actual capabilities as the prototype does not fully model the complete system. As such, it has been found that more needs to be done to improve the functionalities as well as the use cases that are currently served by the existing system. Nonetheless, it is vital for the system design to incorporate features that can accommodate more use cases and players as well. Regardless, the prototype does mirror a complete table office system and was found to be highly efficient by the respondents that took part in the system testing exercise.

7.3 Development of the Automated Table Office System

The automated table office system was feasible in terms of the time limitations as well as the existing technologies applied to develop it. It required achieving cost-effectiveness while maintaining efficiency and productive applicability of the aforementioned functions. The system marries into the existing research and bears resemblance and practically all anticipated functionalities that had been discussed in the system scope within the first chapter of the dissertation. All these functionalities were achieved simultaneously with the system design process in order to ensure compatibility and general synchrony of functions as they were documented. The presented prototype needs to be further developed into a full-blown automated table office system.

7.4 Recommendations

The recommended solutions to improve the table office functions and instill process flow and productivity at the Kenyan National Assembly include;

- i. Introduction of an automated table office system to replace the existing bill and motion drafting processes at the National Assembly as well as the Senate, in order to minimize the work log at the Legal and Procedural services departments in both houses of parliament.
- ii. Improvement of the existing prototype using research and modeling system use to accommodate technologies such as Android and iOS in order to support use of the system in a varied scope that includes both intranet (MPs and other parliamentarians) and members of the public as well, hoping to file petition and motions as provided for in the constitution.
- iii. Use of biometric systems for capturing user identities and mitigating security risks associated with users in the system. This will allow motions filed by the public to be distinguished from motions filed by the parliamentarians (Members of Parliament)
- iv. Use of smart technology such as smart phones and personal digital assistants to monitor the dashboard as opposed to having computers which offer minimal portability

7.5 Areas for further study

Among the areas noted for further study research include; the use of Android and iOS technologies to leverage on the use of mobile phones. It is also necessary to study on how to implement secure intranet solutions within the Legal and Procedural Services department of the parliament, in order to safeguard the system if it were to be implemented. It is also critical to have an efficient ordering system for the different players in the legal and procedural service department of parliament in order to coordinate document handling in the different stages of the table office process. Above all, it is vital to have an efficient communication system that allows for automation of coordinated table office functions between the National Assembly and the Senate. Studies on how to implement integrated parliamentary systems across regions can also be of vital contribution to modern democracy in the digital age.



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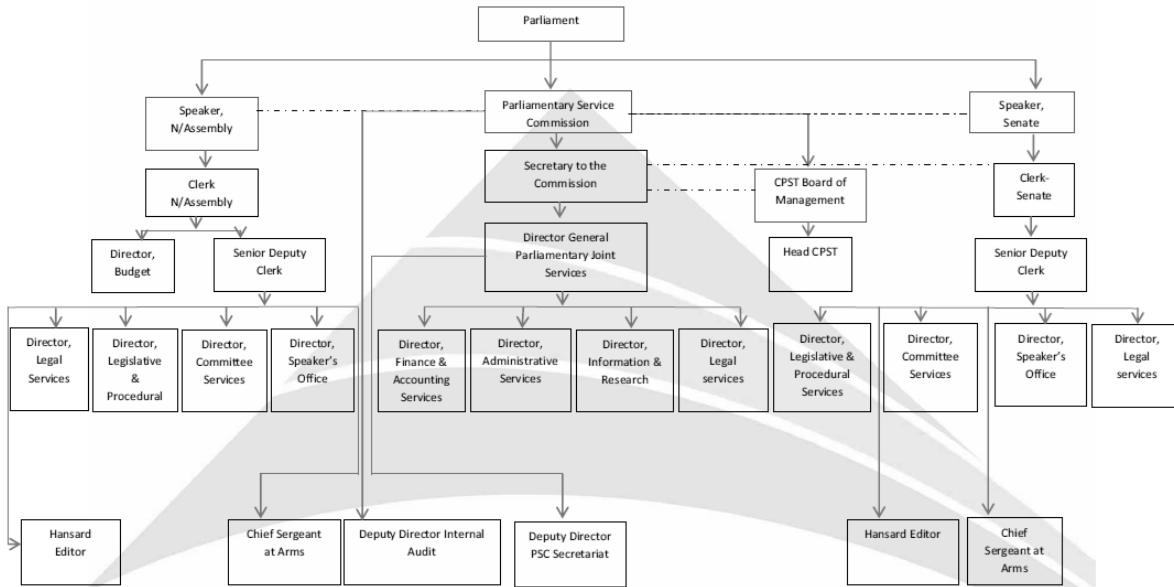
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APPENDICES

Appendix I Overall Structure of the Parliamentary Service 2012



Appendix II Questionnaires to be used in the study

A.1 Questionnaire for the Legislative and Procedural Services Department

A questionnaire shall be given to respondents from the legislative and procedural services department (National Assembly) to give their input on the research objectives and questions asked. The questionnaire below shall be given to the respondents from the department for their input.

Legislative and Procedural Services Staff Questionnaire

Hi, my name is Paul Nduati. I'm a student at Strathmore University. In partial fulfilment of the requirements of the Degree of Master of Science in Computer Based Information Systems at University, I am doing a dissertation on Business Process Automation for Legislative and Procedural Services in the National Assembly

Kindly NOTE, all your answers are completely confidential, and you are free to skip any question or to end the survey at any point. No personally identifying information will be released and the result will be reported only in aggregated percentage form.

1) How long have you worked at the National Assembly?

a) 5-10 years

b) More than 10 years

c) Less than 5 years

2) Were you trained on legislative and procedural services?

a) Yes.

b) No.

3) Do you believe that the table office processes currently being used require improvement?

a) Yes.

b) No.

4) How often do you find challenges with the existing process of table office?

a) Rarely

b) Periodically

5) How frequent are complaints about the existing table office process?

a) Daily

b) Weekly

c) Severally every month

5) Based on your assessment of the table office procedure, do you think business process automation is necessary?

a) Yes.

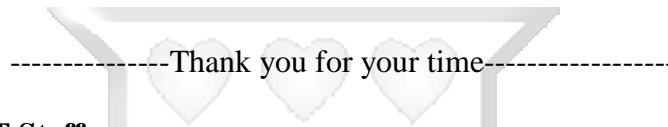
b) No.

6) On a scale of 1 to 5; how do you rate the existing table office management process?

a) Functionality _____

b) Operational Efficiency _____

7) What new features would you propose for a new Automated Table Office Management system?



A.2 Questionnaire for IT Staff

The IT staff at the National Assembly shall be given a separate questionnaire that sought to gather data about the existing table office system applied at the national assembly. This questionnaire is as indicated below;

IT Questionnaire

Hi, my name is Paul Nduati. I'm a student at Strathmore University. In partial fulfilment of the requirements of the Degree of Master of Science in Computer Based Information Systems at University, I am doing a dissertation on Business Process Automation for Legislative and Procedural Services in the National Assembly

Kindly NOTE, all your answers are completely confidential, and you are free to skip any question or to end the survey at any point. No personally identifying information will be released and the result will be reported only in aggregated percentage form.

1) Are you formally trained as a software developer?

a) Yes.

b) No.

2) Do you have working experience on computer systems?

a) Yes.

b) No.

3) How often do you interact with systems?

a) Once a month.

b) Once a Week.

c) 3 times a week

d) More than 3 times a week

4) With regard to functions at the National Assembly

(a) How conversant are you with table office processes?

a) Well informed

b) Informed

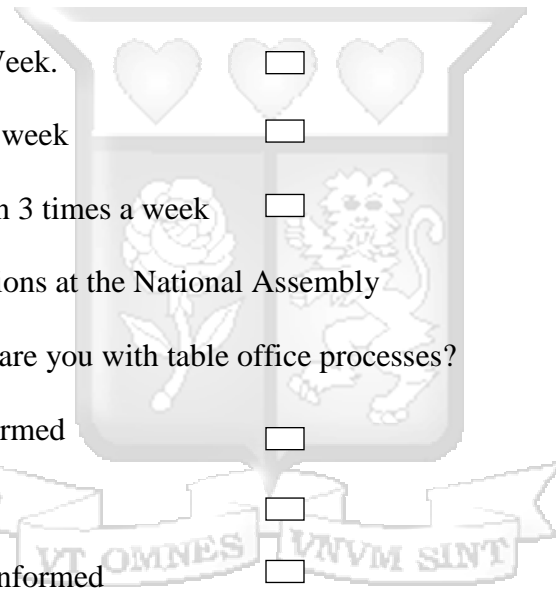
c) Slightly informed

d) Uninformed

(b) Would you suggest automation of the table office process?

a) Yes.

b) No.



5) With regard to automation

(a) Has there been an effort to automate the table office process?

(b) Yes.

(c) No.

(b) If yes, what has been the most significant challenge to automation of the table office?

a. Budget constraints

b. Bureaucracy

c. Inadequate expertise

6) Would you consider new technology for automation if procured elsewhere?

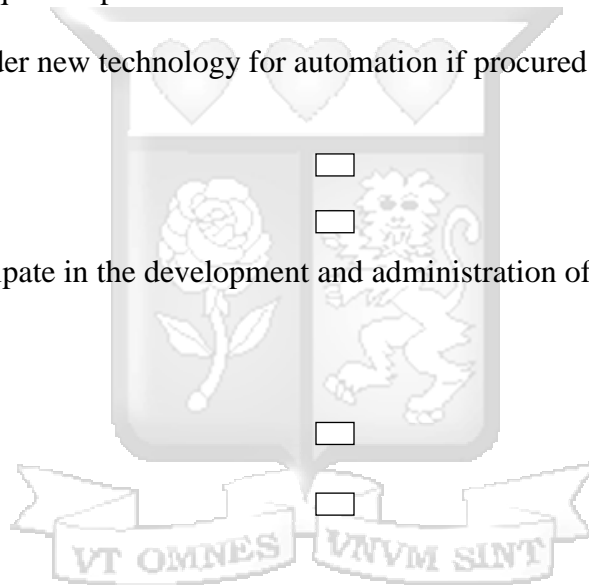
a) Yes

b) No

7) Would you participate in the development and administration of a computerized table office system?

a. Yes

b. No



-----Thank you for your participation-----

B. Prototype Testing Questionnaire

Thank you for your participation in the design and development of the system. The system is now developed and ready for deployment. However, before implementation, I wish to request that you take some to time to view the system, perform test on the prototype and give us some views on the performance of the system by responding to the questions on this questionnaire.

1) Are you happy with the design of the system?

a) Yes.

b) No.

2) Do you believe that the prototype consistently automates table office functions?

a) Yes.

b) No.

3) What would you want improved about the prototype?

(i) Dashboard

(ii) Responsiveness

(iii) Usability

(iv) Security

4) With regard the concept of the National Assembly

(a) Would this prototype appeal to Parliamentarians?

(i) Yes

(ii) No

(b) Would you suggest prototype development into a parliamentary table office system?

c) Yes.

d) No

5) Which features would you suggest for a system, if one were to be developed from the prototype?

-----Thank you for your participation-----

Appendix III: System User Manual

This section details the different use cases as they apply to the interactions between the different actors and the system. Here is a look at the different dashboards within the automated table office system.

C.1 Login into the system

In order to log into the system, the user has to input their code in the dashboard and press the return key (Enter). The dashboard is as shown in figure C.1

Welcome to LPS System TABLE OFFICE MANAGEMENT SYSTEM Home Staff Mail Bill / Debates Portal

LEGISLATIVE AND PROCEDURAL SERVICES DIRECTORATE
TABLE OFFICE MANAGEMENT SYSTEM (TOMS)
Parliament of Kenya

USERS CLIENT AREA (SECURE LOGIN TO ACCOUNTS)

LPS STAFF LOGIN AREA

Internal StaffID:

Password:

Reset Your Account
[LPS Login Now](#)

MEMBER OF PARLIAMENT

Members LoginID:

Members Password:

Cannot Access Account?
[MP Login Now](#)

Benefits of the T.O.M.S

- > Audit trail and Document Versioning
- > Supporting Document Work Flow
- > File Tracking and Document Trail
- > Integration with 3rd Party System for Document Submission
- > Smart Reports Generation

© Table Office Management System. (T.O.M.S) A Project By Paul

Figure C.1: The system dashboard

Upon login to the system, the interface shown in figure C.2 Appears for an MP to request for a bill or motion

Document Type: Motion /Bill or Statement from House Cannot Be Modified Once Submitted

DOCUMENT TYPE*

MOTION

ENTER MOTION NAME*

MOTION REQUEST ON THE SHOOTING OF A GIRL

MOTION COMMENTS*

Kindly find below attached document for Reference on the Above Request

BILL/REQUEST BY*

HON JOHN KALUMA

Upload Document*

Browse... PeterKaluma.doc

SUBMIT DOCUMENT

Figure C.2: Form to request for bill, motion or statement from the House

C.2 Editing Legal Documents by the LPS Officer

In order to edit a document, the LPS officer has to log in with their respective credentials. They then need to work on the document as requested by the MP and undergo various stages of supervision by both the supervisor and approver. Once this is done, the officer then submits to document to the MP or petitioner. This can be demonstrated as shown in figure C.3

LPS DOCUMENT REVIEW / DRAFT REVIEW / SUBMISSION

Document Name:	Number of Bill Request/Motion:	Latest Comments
Pending Submission	1	[To be Completed by LPS Officer [Jesse Karuki]]
Successfully Prepared	45	[All Requests Processed]
Returned Documents	49	[No Documents Referred Back]

SELECTED DOCUMENT

Document Draft By: **Hon Peter Kaluma**

Submission Date: **Monday 05 2018 19:46:47**

Name	Number or Requests	Comments	Document Type	Document Actions
MOTION REQUEST ON SHOOTING OF A GIRL	1	Kindly Find document attached at the end of the Form For Reference	Hon. Peter Kaluma - shooting of a girl.docx	Download

[Edit Document](#)

[Submit Document](#)



Figure C.3: Editing Legal Documents

C.3 Log out from the system

From the settings tab, one simply selects; **logout** in order to log out from the system. This is as shown in figure C.4

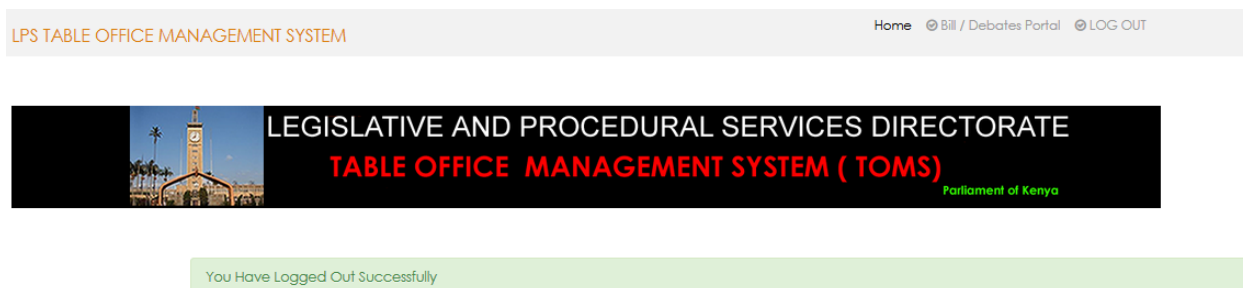


Figure C.4: How to log out from the system

Appendix IV: Originality Report

Here is a summary originality report as published by turn-it-in software

feedback studio Paul Njaaga Nduati Business Process Automation for Legislative and Procedural Services in the National Assembly Case of the Kenyan Parliament

**Business Process Automation for Legislative and Procedural Services in the National Assembly:
Case of the Kenyan Parliament**

Nduati, Paul Njaaga

**Submitted in partial fulfillment of the requirements for the Degree of Master of Science in
Computer-Based Information Systems at Strathmore University**

**Faculty of Information Technology
Strathmore University
Nairobi, Kenya**

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Match Overview

22%

Match #	Source	Match %
6	www.ipu.org Internet Source	1%
7	www.ictparliament.org Internet Source	<1%
8	scholar.sun.ac.za Internet Source	<1%
9	Submitted to University... Student Paper	<1%
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11	www.un.org Internet Source	<1%
12	Submitted to Brunel Un... Student Paper	<1%
13	Submitted to Massey U... Student Paper	<1%
14	www.lsu.edu Internet Source	<1%

Text-only Report

Figure D.1: Summary originality report

