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The Challenges of e-Parliament Adoption and its Mitigation

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Abstract - The Legislature a fundamental aspect of democratic governance in any nation provides an interactive, participatory and consultative platform for citizens' input in the decision - making process by harnessing Information and Communication Technology (ICT) tools for improving parliamentary processes, services and functions. In this study, we investigate the extent of the application of ICT in parliament, particularly in emerging economies, making distinctions while identifying the most important requirements, technical challenges and proposing solutions to addressing the challenges. Some of the major challenges explored included limited resources available to parliaments, insufficient technical knowledge among legislative staff, little citizen engagement and lack of standardized software in addition to security issues. Solutions proposed include the introduction of s-parliament concept for a smarter parliament through better utilization of big data and Internet of Things (IoT), better document management and storage systems, use of XML-based standardized software, improved ICT security, increasing public trust and enhance citizen participation in the decision-making process.

Keywords - *e-parliament, ICT in parliament, Internet of Things, big data, XML.*

1. Introduction

1.1 Background

The Legislature is a fundamental aspect of democratic governance in any nation and is expected to provide a genuine interactive, participatory and consultative platform for citizens' input in the decision - making process. The legislature has three major functions:

- Law Making;
- Representation; and
- Oversight functions.

Two major models of legislatures are currently and generally practiced around the world: Unicameral (with one parliamentary chamber or house as practiced in countries such as Republic of Azerbaijan, Estonia, Finland, People's Republic of China and Finland) and Bicameral (with two parliamentary chambers or houses as experienced in France, Federal Republic of Nigeria, Republic of Korea, United Kingdom and United States of America, among others). Other models of legislatures can be described as either Tricameral (three parliamentary chambers) or Tetracameral (four parliamentary chambers). Former Tricameral parliaments were obtainable in China (pre-2005 Constitution), South Africa (as specified in the 1983 Constitution) and former Yugoslavia (Pre-1990) [1].

None of the legislatures practices Tetracameralism, while Saudi Arabia whose constitution is based on the Quran and Sunnah has an absolute monarch and a Saudi Consultative Assembly or Shura Council comprising of 150 members solely appointed by the King [2]. The Shura Council led by a Speaker, has a limited role in government and its major function unlike in other legislatures is to propose laws to the King [2]. The above models share the common goal of representing the interest and concerns of citizens and consequently place an immense pressure on elected representatives to perform effectively.

In view of this, the electorate expects the legislature to be representational, effective, efficient, open, transparent, and accountable to constituents. In this study, the term Legislature and, or Parliaments are used interchangeably to represent different law-making styles but they both refer to the National Assembly, the Legislative organ of Government.

Parliamentary Information and Communication Technology (ICT); and its associated applications refer to the harnessing of ICT and tools by parliaments for improving parliamentary processes, services and functions to strengthen and transform them. In this regard, ICT is an enabler because it capacitates the legislators and legislative staff to better fulfill their democratic functions through the creation of a robust platform for quicker access to legislative documents, business information processing and management of documents to become efficient, more transparent, accountable, easily accessible, and offer result-based representation. Some parliaments have digitized their procedures; however, several parliaments are yet to create such innovative practices and procedures to keep pace with the constantly changing digital era. Consequently, parliaments not only need to adopt ICT but ought to quickly consider the best technologies and standard for supporting parliamentary records and document management [3]. Furthermore, through these technologies, citizens should be able to have multiple channels such as websites, mobile devices, parliamentary search engines, and databases, archives, language support, feedback support, among others, to connect with their legislators.

While this is a cutting-edge concept, there is no assurance that the clear majority of the electorates, specifically those in developing countries who have been marginalized through poverty, poor leadership, corruption, among other infractions, can benefit from the application of ICT to participative democracy because it is still considered an expensive means of communicating and commonly restricted to those with access to resources and power [3]. Since the introduction of ICT technologies in parliament needs support and political will from the highest level of governance, political leadership must be engaged in the ICT strategic plan. The adoption of new technologies in any parliament always raises challenges. Some of the challenges apply to majority of parliaments around the world, most especially in emerging economies. They include: lack of financial resources leading to inadequate infrastructure; lack of proper ICT strategy for a successful adoption of new technologies; and insufficient technical knowledge on the new technology among legislators; legislative staff and support staff.

1.2 E-Parliament and the E-Government

To fully understand the concept of e-parliament, there is need to explore the model of e-government. E-government has various concepts and definitions. It can be defined as effectively utilizing ICT tools by government for improved service delivery and timely dissemination of information to citizens [4]. E-parliament can also be defined as a legislature that is empowered to be more transparent, accessible and accountable through ICT [3]. Direct relations and conflict can be identified between e-government and e-parliaments especially regarding systems of government. However, both can be tailored to specific systems of government and models of legislature. E-Government has a wider scope and is tailored to the type of services provided by the government while e-parliament mainly focuses on effectiveness of legislature and citizens participation.

The Assembly of Macedonia considers e-parliament an ecosystem where citizens play a central role [5] which implies that e-parliament is considered as citizens-centric because the parliament is expected to represent the views and interests of the electorate. Essentially, e-government's relation with citizens focuses on information dissemination and effective service delivery while e-parliament provides an open, more efficient, effective institution for citizens' representation, and increased citizens' engagement in the law-making process.

At the 2009 World e-Parliament Conference, former Speaker, US House of Representatives, Nancy Pelosi highlighted the importance of e-parliament: She noted that "…gives us an opportunity to break with old ways of thinking and engage in dialogue just as the young people of the world are." [3]. E-parliament can simply be regarded as a model of citizens-engagement used for improving the internal workings of parliament. One of the major aims of e-parliament is to ensure that democracy is participatory and deliberative through the aid of ICT tools such as web technologies. Lately, the internet has increasingly become an integral part of parliament because it facilitates interaction between the parliament and citizens.

1.3 Parliaments and Big Data

Recently, there has been an increase in the volume of structured and unstructured data, immediacy and accessibility of data. In future, public policy decisions will be increasingly influenced by 'Big Data' as more citizens are engaged in online services such as e-legislation, e-newsletters, e-petitions, e-consultations and e-voting among others. Parliaments must be able to support and analyze (analytics) increasing volumes of data as more information and services become online based by dedicating resources for putting the necessary

infrastructure in place. In addition, it will help bring about effective data-driven decision making in parliaments based on effective collection and analysis of quality data.

2. Literature Review

The 2016 world e-parliament report [6] highlight that inadequate funding and insufficient knowledge among legislators and staff remains one of the key challenges for parliaments to effectively use ICT [6]. The report also stated that the adoption of document management systems by parliaments is often hindered by lack of resources and cloud-based technologies which can directly impact on the process of document management in parliaments [3, 6]. Online interaction provides an effective means of reaching out to citizens; especially in countries with large populations located in both urban and rural areas.

In a study conducted by Aderonke et. al. [7], they observed that, in Africa, only the parliament of Angola made provisions for electronic submissions on its parliamentary website [7]. Majority of websites in African legislatures are unidirectional, primarily informational and predominantly used for the uploading of legislative documents for download by the public in portable format (pdf) [7]. This assertion is supported by the opinion of Tyumre [5] on a broader view that during the design and development phases of parliamentary websites, only a few parliaments receive feedback and initiate consultations with relevant stakeholders. A review of some parliamentary websites revealed that they are difficult to navigate or to locate specific information and parliamentary documents on the site.

There is insufficient evidence to indicate that legislators use ICT tools to effectively impact on their roles of representation including dialogue with constituents, remote participation on legislative issues in chamber and committee meetings; law-making function; and oversight functions over executive budget expenditures.

Tyumere [5] observed that, there remains a communication gap between citizens and elected representatives. This gap could also be due to non-availability of local content and legislation not being translated to local languages and simplified text for local communities. Effectively, lack of proper communication and interactive tools between certain parliaments and their citizens affect the ability of citizens to provide feedback and make inputs in the decision-making process. Conversely, Aderonke et al. [7] postulates that the realization of the full potential of e-parliament in general is greatly hindered by challenges such as inadequate infrastructural facilities and capacity building. The 2016 e-parliament report revealed that many parliaments around the world have embraced the concept of e-parliament, but many challenges persist in its implementation, particularly in parliaments of young and emerging democracies [6, 8, 9]. Some of these challenges are not only technical; they include lack of political will and non-commitment to the transparency of the business process of parliaments. In addition, some parliaments are not keen on providing full access to its citizens and being open to scrutiny.

2.1 Benefits of e-Parliaments to Legislative Institutions

E-Parliament has numerous benefits and elected representatives and their constituents need to be made aware of the benefits of adopting e-parliament for legislative institutions. Generally, it increases citizens' participation through engagement with citizens and effectively creates positive perception towards building public trust in legislative institutions [8, 10]. It provides legislators and legislative staff with a robust platform for easier and quicker access to documents, business information processing and management of documents for improved efficiency thereby streamlining processes and reducing cost. This is beneficial to majority of parliaments especially in emerging economies with insufficient resources.

The existing 4th Generation (4G) network and drive towards 5th Generation (5G) services in the future will effectively facilitate the work of MPs and staff by enabling them to access thousands of online resources and services, and multimedia relating to legislation at faster internet speeds; improved access to timely information for legislative research, scrutiny and analysis relevant to policy formulation and more informed decision making. Furthermore, it enables parliaments share information with other stakeholders across different locations without regard to physical presence and consequently save travel cost and reduction in carbon footprints from air travels.

3. Comparative Analyses

The emergence of e-parliament has created opportunities for legislatures to develop innovative ways of improving interaction with citizens and concurrently, legislatures face ICT challenges such as legislators and staff unfamiliarity with new technology, citizens' ignorance of

the legislative process and limited access to high speed internet. A review of various parliaments is presented below.

3.1 Estonia: Benchmark for E-Parliament

The parliament of Estonia, the Riigikogu comprises of 110 elected MPs on a 4-year term. The parliament has been able to leverage on the successes of e-government and has been considered one of the most efficient and effective in the world to successfully implement e-parliament-centered parliamentary website (www.riigikogu.ee). One of its unique features is that the parliament has implanted security features and the website is accessed through https for a more secure communication over the network, enabling users confidently browse the website. A review of the website shows the following: Website provides open data by displaying salaries of MPs and shows the seating plan of the parliament with each individual MP having his or her own seat.

The media section provides live broadcast but the viewership of the live broadcast averages below 1,000 views. E-voting for MPs is a permanent feature and fixture which supports greater transparency in the parliament as opposed to the more traditional voting system still practiced in some other parliaments. Additionally, the website also provides a working schedule which runs till 2019, with info graphs incorporated for easy comprehension by website visitors.

Search options can be customized by users according to fractions, committees or electoral districts while searching for MPs. On the page displaying list of all MPs, names, image, party, constitutional committee and email addresses of each individual MP is highlighted. Users will find this useful as they do not have to access the complete profile page of an MP to view his contact details. MPs page displays biography, draft legislations presented by each MP, interpellations, voting patterns, association, parliamentary groups, comments and social media details. First time users to the website may find the comments section under the MPs confusing because it does not clearly identify if they are MPs or users' comments.

The "Numbers talk" page provides statistics on: number of men and women MPs, interactive info graphs on parliamentary experience of MPs, stats on educational background and universities attended by MPs, as well as profession and age distribution of MPs. Majority of parliaments do not have a specific webpage providing all these data.

These observations show that some areas might need improvement such as the search feature which could be optimized to include smart search, especially when searching for a specific MP. This feature can be further enhanced to provide name suggestions (predictive text) while the user is typing in the search box. Furthermore, the committee pages display committee related news on top of the page, followed by bills and work of the committee, and committee membership at the bottom of the page. Users are more likely to be interested in viewing membership of committees, photos of the committee chairman and other members. There is a strong notion among citizens that the strength of a committee and its ability to fully function mainly depends on its chairman, and composition of the members. Additionally, the website coverage places more focus on the MPs and less focus on the parliamentary staff.

3.2 Finland: Issues of transparency and engagement with citizens

The Parliament of Finland or the Suomen Eduskunta, a unicameral legislature composed of 200 members of parliament (MP) has been struggling with decreasing levels of trust in recent decades [11]. It has been observed that parliaments, just as political party institutions suffer significantly if the image of political parties or MPs deteriorates in the perception of the electorates [11].

This can be best highlighted by the campaign expenditure scandal of the 2007 parliamentary elections which had profound negative effects on the image of the parliament [11]. Some of the challenges include finding innovative ways for citizens' initiative to increase citizens' interest in politics, weak role of Eduskunta in the oversight of the executive, transforming political culture into an expansive one, with further parliamentary debates and a more active opposition, and challenge of inaccessibility, particularly regarding the language of the Eduskunta [11].

Furthermore, there is need to address the issue of a more open and transparent decision-making process with citizens involvement in the legislative process and one-way communication between citizens and parliament [11]. Tapio believes that Finnish parliamentary culture is not ready for a more participatory channels of influence and based this on strong attachment to traditional representative democracy and an indifferent attitude towards democratic innovations, together with the

citizens' initiative because generally, Finnish MPs are less available to citizens compared to their counterparts in other countries [12].

This is partly supported by a review of 10 random online profiles of Members of Parliament of Finland, covering different electoral districts and parties highlighting that no details of assistants have been provided under each MPs profile (www.eduskunta.fi).

The website has a unit on citizens' initiative section guiding citizens on procedures of initiating and submitting draft legislations, however, there is no provision for online submissions. To submit an initiative to parliament for enactment as legislation, a citizen is required to acquire 50,000 registered voters' signatures within a period of 6 months before submission. This process would have been easier online as well as providing a faster system of instantly verifying the supporters of the citizens draft legislation as manual verification of 50,000 electorates can be time consuming.

3.3 Nigeria: e-parliament or online parliamentary news and information dissemination website?

Nigeria has a unique bicameral legislature comprising of 109 Senators in the Upper Chamber and 360 Members in the Lower Chamber. The Legislature or National Assembly (commonly known as NASS) is constantly faced with credibility issues; challenges of mistrust; and lack of transparency. To keep citizens informed, the legislature uses multiple media outlets and handles on twitter for reporting different versions of legislative activities which are reported based on interest and not actual occurrences.
The website of the National Assembly (www.nass.gov.ng) places more emphasis on news reporting and less on educating citizens on the legislative process, legislative agenda and business of the parliament. Although there is a page on legislative process, it is tailored more towards users already familiar with the legislature and its inner workings and less emphasis is placed on educating new users to the website. Documents are occasionally updated and in portable document (pdf) format, (though sometimes difficult to locate) and are not presented in well-defined universal standards for parliamentary documents.

Subsequently, there is a huge gap in the timely dissemination of information generated in the National Assembly and its receipt by constituents. Similarly, there is no feedback mechanism to engage citizens and means for constituents to communicate with their elected representatives. To inform the citizens, plenary proceedings of the Senate are sent to subscribers through WhatsApp which contains large volumes of information delivered to users' mobile devices without considering the different types of phones, memory size, screen size and display capabilities, thereby causing information overload on majority of devices.

In addition, Nigerian legislature is also faced with issues of mistrust by the citizens majorly due to the legislature's opaqueness on critical national issues [13]. Two examples suffice, for now. The citizens are interested in details of the budget of the National Assembly and salaries of legislators, but these are not openly made available to the citizens. Furthermore, it is also plagued by non-attendance of legislators at sittings and committee meetings just as the lack of open data on legislator's attendance impacts negatively on the credibility of the legislature.

3.4 Ghana: Parliamentary Watch application for better accountability

Parliamentary Watch was developed to enable users access detailed information about their elected MPs in Ghana and keep abreast of parliamentary activities. The application provides contents such as standing orders of parliament; overview of parliament of Ghana; parliamentary news and information; MPs data, bills, committees and their composition, legislative and executive instruments presented to the house; parliamentary reports and publications; other legislative documents, video streaming services.

A review of the application shows that it is informative and most of the features work but a few of them present challenges. The bills section presents the legislation in pdf document and makes it non-searchable. There is a good feature for highlighting the current stage of the legislation, but it does not distinctly show the current stage of all proposed legislations. There is provision for MPs profile with their bio-data and pictures but there is no information on their social media channels such as Facebook and twitter.
The news section is not constantly updated. Therefore, the links to the leadership and committee are broken and almost non-existent. One suggestion would be for better enhancement to enable users customize the menu (dashboard) for enhanced user experience. In addition, MPs biographies can be better structured for a more consistent format for all profiles.

Furthermore, some of the references were clipped from Wikipedia whereas all data should be generated from the parliament. Generally, it is expected that Wikipedia should reference parliamentary data from the parliament and not vice versa. The Committee section ought to have a uniform naming convention because committee-specific functions should be stated to enable users understand the roles and mandate of individual committees, and updated with details of committee clerks, secretary of the committee or committee contact.

3.5 Australia: Effectiveness of ParlWork

Australian Parliament ParlWork application provides chamber information online, order of business, features live updates, Notices of Motion, Bills pages, Question on Notice and Questions in writing [14]. The Menu option enables users access the Help, About Us, FAQ, Tip sheet, Feedback and Contact Us pages. This reduces reliance on physical document and accessibility issues. ParlWork would have been more effective if users can customize their home screens and if it was fully developed into an application which would be always on (connected) and would be able to send alerts to users and for portability [14].

3.6 South Korea: Promoting Civil Participation People Parliament and Communication

South Korea is one of the major leaders in e-government and some of the challenges facing its adoption were reviewed by its government. The findings highlighted five (5) major issues: threats to digital privacy; digital divide among the populace, cyber threats such as hacking, Distributed Denial of Service (DDoS) attacks; Internet addiction and cyber ethics [15, 16].

A few proposals have been offered that will attempt to solve these challenges. Staff were educated on preventing recurrence of cybercrimes while DDoS defense systems and cyber-attack systems were installed; used personal computers were distributed, information network villages were set up in rural areas and IT was made accessible to the less privileged to address the issue of digital divide [15, 16]. To ensure citizens awareness on cyber ethics, awareness campaigns were launched for volunteers on cleaning the internet and cyber ethics. Trainings were conducted on prevention of internet addiction with additional support through counseling [16].

3.7 The Role of Civil Society Websites in the Legislature

Civil societies have become the “eye and ear” of citizens by providing them with accessible information for monitoring and scrutinizing the work of parliaments and their elected representatives for better accountability. Civil societies are also synonymous with Non-Governmental Organizations (NGOs) and they focus on promoting transparency and citizens’ participation in governance by providing access to parliamentary open data and legislative documents such as Acts, Bills, Petitions, Motions, Committee Reports and Hansards. Some parliaments are indisposed to collaborating with civil societies and are of the view that the role of these organizations is to expose parliament to public ridicule and cynicism.
Conversely, other parliaments have been able to establish good working relationships with civil societies, enhance their public image and increase citizens’ participation in these parliaments.

Odekro is an independent, non-governmental civil society organization in Ghana that makes parliamentary data easily accessible, helping citizens scrutinize parliamentary proceedings and parliamentary roles and the responsibilities of their elected representatives by enabling them to access information on their MPs as well as publishing verbatim reports of parliamentary debates (www.odekro.org).

Placng is an independent nonpartisan and non-profit organization in Nigeria which promotes citizens participation in public policies and engagement with the legislature through citizens’ access to open parliamentary data and educating electorates on the role of parliament. (www.placng.org).

4. Challenges

In the adoption of e-parliament; the challenges of limited resources and; insufficient technical knowledge among legislative staff have been described in the literature review. Other challenges that have not been highlighted include ensuring the accuracy and timeliness of data, identifying of key users for requirement gathering, storage and archiving, as well as usability of parliamentary websites. Some of these will be discussed in chapter 4.

E-parliament has not been able to fully cover the three (3) major functions of the legislature: law making, oversight, and representation. Currently, there are no successful e-

parliament tools to support oversight functions (template) and generate oversight reports. There is need to address issues affecting citizens participation and find innovative ways of enhancing it. Another challenge is that there is no clearly defined XML-based standardized software or platform for e-parliament adoption as they are currently different open standards. Some of these issues are general, others are technical, but both will be examined in detail.

4.1 Open Standards

XML, open data and managing social media requires new skills and knowledge and this is a major challenge in emerging economies plagued by issues of cost and complexity. In addition, to encourage parliaments to adopt the use of XML, a standard need to be fully developed and agreed on while considering successes of other parliaments in adopting XML standard.

4.2 Bill Tracking in the Legislature

One of the major challenges confronting some legislatures is lack of effective bill tracking process. When a bill is presented by the executive to the legislature, the bill usually undergoes several amendments involving addition and deletion of clauses on the original legislation presented. Since these amendments are not usually communicated to the executive, interest groups and monitoring organisations, it becomes difficult, if not impossible to track the bill from inception to its passage. Most often, they are presented with a totally different version of the final bill which has been passed, making them unable to scrutinize the draft legislation before it becomes law.
The process should be fully automated from the initial submission of the draft legislation until its passage and publication in the official gazette for easy tracking of each stage. This will enable citizens to be informed at every stage of the life cycle of the legislation.

4.3 Security Challenges

The security of e-parliament is essential to the sustainability of the system. Users will not trust the system if it is not secured. Some important security issues that require attention include:

i. Protection of unauthorized access to sensitive information through the public domain;
ii. Challenge of parliamentary system having poor scalability;
iii. Insufficient skills among parliamentary staff and required resources to manage security issues and disaster recovery; and
iv. Low availability of parliamentary systems and applications.

4.4 Parliamentary Mobile Applications (Mobile Apps)

Mobile application is a useful tool in citizens' engagement, especially in countries with wide digital divide. More people now use mobile applications at an increasing rate and these devices have become affordable to people in emerging economies. Parliaments can leverage on this by developing mobile applications to keep citizens abreast of latest parliamentary activities, legislation, policy issues and open data. This can also give parliaments a new look and transform them while making them appeal to the electorates.

A detailed search on the Apple, Android and Microsoft application stores, indicate that only a handful of parliaments have deployed applications. A recent survey conducted by US Library of Congress on parliamentary websites of 50 countries from all regions of the world including the EU Parliament showed that only 14 of these countries have parliamentary apps [17].

5. Recommendations

There is need for parliamentary institutions to develop strategic planning processes that are embedded, responsive and continuous to adapt to the ever-changing environment. There are different types of parliaments and each has different business processes and procedures. Therefore, e-parliament needs to either have the capacity to handle all of these or be tailored to handle the business processes of parliaments. ICT strategy, just as all other strategies need to take into consideration, individual, institutional and network approaches.

5.1 Legislative Document Management and Storage

Cloud based technologies are becoming increasingly common in many parliaments and their adoption will aid the process of document management while distributed databases will manage large volumes of data. For bill tracking, XML should be used to ease the process. This enables the bill to be tracked throughout its life cycle from initiation to passage. XML based system have technical and efficient advantages in terms of efficiency and query processing.

Several parliaments, especially in emerging economies, do not have existing policies for archiving documents and it has become imperative for parliaments to adopt an information retention policy to properly archive all legislative documents and resources to build legislative knowledge and more, importantly archives and institutional memory. A reliable and robust infrastructure is required for effectiveness of the system.

5.2 Security Issues

The security of e-parliament is essential to the sustainability of the system. Users will not trust the system if it is not secured. Some the important security issues to be addressed include:

i. Use of certificate services for issuing digital certificates for authentication between internet enabled devices, users and applications;
ii. Enable secured exchange of information to prevent unintended disclosure of sensitive information;
iii. Use of Intrusion Detection Systems (IDS), firewalls, content filtering and access control, mail gateway;
iv. Continuous patching and update of Secure servers and workstations;
v. Regular update of Antivirus and Anti-spyware software;
vi. Network Access Protection (NAP) to enable parliamentary administrators define system health requirements policies to restrict or deny network access to devices that do not comply with the set policies; and
vii. Use of Virtual Private Network (VPN) to prevent unauthorized access and encrypt data over unsecured networks to ensure confidentiality.

5.3 Social Media

To avoid information overload, information should be simple and not cumbersome. Therefore, parliaments should use social tools which are familiar to the public. Citizens experience difficulties using tools different from those which they are currently know. MPs with insufficient computer knowledge deprive themselves of being better informed, especially when making decisions which will affect their constituents. Most MPs have legislative assistants who assist them in maintaining their email, twitter and Facebook accounts and receiving feedback from citizens. However, this widens the gap between the MP and their constituents. Therefore, it is significant for MPs to have means of directly contacting their citizens.

Essentially, this implies that MPs need to develop their skills in ICT to fully utilize their social media accounts. This does not necessarily mean a series of ICT related training by the parliament because most of the MPs may not have the time to attend such trainings, and ultimately a waste of resources. MPs can take the initiatives and learn basic computer skills and knowledge from their colleagues, legislative aides or parliamentary staff, so that they gain first hand practical and direct one on one knowledge and skills.

As earlier stated in chapter 4, plenary proceedings of the Senate in Nigeria's National Assembly are sent to subscribers through WhatsApp which causes information overload. One of the proposed solutions would be to send the information as a summary of the proceedings in XML format to subscribers with tags and links to the online verbatim report and document for download in different formats.

5.4 Parliamentary Applications

Parliaments can take advantage of the countless opportunities offered by mobile applications to develop citizens-centric parliamentary applications for more effective representation, better accountability and greater transparency of legislative activities. A search of Apple, Android and Microsoft application store, shows that only a handful of parliaments have deployed applications.

6. Conclusion

In designing and developing websites an important component of e-parliament, it is important for parliaments to first determine the ever-increasing demands of the citizens as parliamentary websites are meant to be citizens- centric, accessible, easy to use, open and transparent to engage the electorates in the democratic process. Only few parliaments consider it important to publish open data on their websites including data on salaries of MPs, MPs attendance, committee reports, expenditures and oversight over the executive. ICT offers benefits to parliaments and is the first step towards the adoption of e-parliament.

The adoption of XML by parliaments will be more beneficial to them in areas of collaboration, tracking of amendment to proposed legislation while also enabling complete text search with smart tags and semantics of all

parliamentary information. This study makes comparative analyses among parliaments of Estonia, Finland, Nigeria, Ghana, Australia, South Korea, and the role of Civil Societies in the Legislature while examining ICT challenges faced by these parliaments in deploying their services to citizens. Some challenges facing several parliaments include limited resources, insufficient skills among MPs and parliamentary staff, lack of parliamentary open data and archived parliamentary data, issues with timeliness of data and ICT related security issues.

The study also proposes a few solutions to addressing the challenges towards the full adoption of e-parliament for a smarter, more effective, responsive and representative, more open and transparent, more accessible, participatory, efficient, more accountable and more advanced legislature. These challenges include use of cloud-based technologies and distributed databases for storage and back up in ensuring data security, and for archiving parliamentary data. It also proposed building more responsive websites that will integrate Web 3.0 services and provide e-services while leveraging on social media to enhance citizens' participation. Securing the network through authentication; encrypting parliamentary data and ensuring confidentiality. In addition, it is necessary to develop parliamentary applications for better optimization of mobile devices as majority of citizens use mobile devices to access the internet. Furthermore, the study advocated the need for better engagement with civil societies to support parliament's linkage with the electorates and enhancing the image of parliament.

If these highlighted challenges and proposed recommendations are considered by various legislatures in the adoption of ICT towards realizing e-parliament, it is expected that they will be able to successfully address future challenges. However, there is need for further research to determine the distinct or localized benefits of the adoption of e-parliament in specific legislatures and the need to review the successes and lessons learnt from parliaments that have successfully deployed open standards.

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