

Assessment of the maturity of E-Government Websites in the DR Congo

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Abstract:- Many improvements to the connection between government and citizens are brought about by ICT evaluation. Through e-government websites, ICT has given citizens a new way to interact with the government at any time and from any location. In order to assess the maturity of e-Government and the advancements the Congolese government is making towards the supply of e-services, this paper evaluates the current condition of e-government websites in the Democratic Republic of Congo using the United Nations Maturity Model of Online development. The outcome demonstrated that Democratic Republic of the Congo (DRC) e-government websites is in the infancy stage as it performs well in the first stage, relatively well in the second stages, but achieve very little or nothing at the third and fourth stages.

Keywords:- e-government, website, maturity, DRC.

I. INTRODUCTION

E-government is defined as the use of information technology by government organizations that have the potential to revolutionize interactions with the public, private sector, and businesses. These technologies can be used for a variety of purposes, including better citizen service, citizen empowerment through information access, or more effective government administration. In addition, less corruption, greater transparency, greater convenience, income growth, and/or cost savings can all emerge from this (world Bank, 2009). All online government services utilizing ICTs are referred to as e-Government (ICT). The service supplier, service recipient, and service delivery channels make up the three primary parts of e-services (i.e. the technology). The term refers to digital interactions between governments and other government agencies (G2G), Government and citizens (G2C), Government and businesses (G2B).

Internet have revolutionized the way government interact with citizen as a result government service provision is supplied online where citizen can access 24x7 instead of physically visiting public offices through a website. Yet, many developing countries e-Government development are

in their infancy stage. According to the UN e-government survey 2020, the DRC placed 184th out of 193 nations in the e-government development index (UN, 2020). DRC was rated 176 in 2018 (UN, 2018). It indicates that e-government initiatives have not advanced any further. Similar to other developing nations, the DRC is working to improve its rankings in ICT sector even if there is still a lot to achieve. it is still having issues in this area. The year 2022 has marked the turning point in the history of DRC when the national e-portal was launched to serve as one stop shop to integrates all governments services as well as to public information. This is worthwhile given the development of the information and communication technology (ICT) age and the rapid increase in the number of internet users.

The main goal of this paper is to assess the level of maturity of e-Government development in DRC using the United Nations Maturity Model of Online development. Each selected institutional website was carefully reviewed and the findings were presented and interpreted. Some suggestions were provided to help improve e-Government current rankings deemed poor. The UN e-government survey 2020, placed the DRC 184th out of 193 nations in the e-government development index (UN, 2020). It was ranked 176 in 2018 (UN, 2018). From 2018 to 2020 the country lost 5 seats which indicates that e-Government have not advanced any further and needs improvement.

II. LITERATURE REVIEW

A. Review of Maturity Models

Abdoullah F. et al. (2014) defined an e-government maturity model as a set of stages (from basic to advanced ones) that determines the maturity of the e-government websites. The main benefit of those maturity models is to offer a way to rank e-government portals. It can also serve as a guide to help agencies enhance their e-government service quality.

Different models defined the maturity of e-government such as Layne and Lee (2001), World Bank (2002), Andersen and Henriksen (2006), Chen et al.(2011), United Nations (2012) etc. Each one proposed different stages and criteria that can define e-government maturity. Some of available maturity models are reviewed below.

➤ *Layne and Lee Maturity Model*

The model from Layne and Lee (2001) introduced a four stages maturity model of e-government which was inspired from US e-government initiatives.

- The 1st stage is “catalogue”: This stage features online presence including presentation features and downloadable forms.
- The 2nd stage is “transaction”: At this stage, the emphasis is put online transactions between government and citizen.
- The 3rd stage is “vertical integration”: This stage emphasizes on integration with higher level systems within similar functionalities or jurisdictions
- The 4th stage is “horizontal integration”: This stage requires interoperability across various government agencies forming a one stop shops for citizens.

➤ *Chen Maturity Model*

Chen Maturity Model Chen et al. (2011) introduced a three stages of e-government maturity model essentially based on theoretical research and the authors’ experience in China’s regional e-government (Abdoullah F. et al., 2014). In addition, it is built on top of the maturity model of Layne and Lee(2001) except the horizontal integration.

➤ *Andersen and Henriksen Maturity Model*

Andersen and Henriksen (2006) introduced a four stage maturity model of e-government. The model was inspired from Denmark e-government initiatives. The maturity model is defined as follows:

- The 1st stage is “cultivation”: This stage blends together horizontal and vertical integration leveraging the use of intranet.
- The 2nd stage is “extension”: This stage promotes the extensive use of intranet and the customization Web interfaces.
- The 3rd stage is “maturity”: This stage emphasizes on the transparency in information exchange.
- The 4th stage is “revolution”: This stage features data exchange between organizations and the share of applications across vendors.

➤ *World Bank Maturity Model*

World Bank developed a three stage maturity model of e-government defined as follows:

- The 1st stage is “publish”: This stage involves a various of information available in the Web site including rules, regulations, documents and forms.
- The 2nd stage is “interact”: This stage introduces user interaction including made possible through feedback and comment feature.
- The 3rd stage is “transact”: This stage emphasizes on financial transaction.

➤ *United Nations Maturity Model*

The United Nations(2012) introduced a four stage maturity model of e-government for ranking its member states. It is defined as follows:

- The 1st stage is “emerging information” services: This stage features static information in the e-government Web sites.
- The 2nd stage is “enhanced information services”: This stage involves the enhancement of web presence with one way or simple two way communication.
- The 3rd stage “transactional services”: In this stage, a two way interaction with citizens is enabled.
- The 4th stage is “connected services”: In this stage, Web sites are proactive in requesting citizens’ feedback via Web 2.0 tools. Government agencies are citizen centric and services are customer centric (Abdoullah F. et al., 2014).

B. *Choice of maturity model*

For the purpose of this work, the United Nations (2012) Four Stage Model was selected. The Researchers opted for this model as it encompasses important features such as user centricity, e-payment and e-participation or democratic participation of citizen.

The four stages from this paradigm that were considered in this study are comprehensively discussed below:

The first stage, emerging information services, represents the official static website of e-government with linkages to departments, ministries, and other parts of the executive branch. Citizens can easily find out what's new in the national government and ministries, including information on public policy, governance, legislation, regulations, pertinent documentation, and the various services the government offers. They can also follow connections to archived information.

Enhanced information services stage: at this stage, government websites are in charge of facilitating improved one-way or straightforward two-way e-communication between government and citizens, including the ability to search for policies, regulations, documents, download forms for government services, get in touch with the government via email, and submit applications. The websites support audio, video, and multiple languages. Using a few limited e-services, citizens can request paper forms or personal information that will be mailed to their home.

Stage of transactional services: This third stage pushes government websites to participate in two-way communication with its citizens (public), which includes asking and receiving input on policies, programs, rules, etc. from those citizens. To effectively complete the transaction, the citizen's identification must be electronically authenticated in some way. Non-financial transactions are handled via government websites, such as e-voting, downloading and uploading paperwork, submitting taxes online, and applying for certificates, licenses, and permits. They also manage financial transactions, such as the safe transmission of funds to the government.

The fourth and final level, connected services, introduces a modernized method of communication that governments use to interact with citizens. Governments are participating in improved citizen interaction thanks to the government websites. Using Web 2.0 and other interactive platforms, they are proactive in asking citizens for information and opinions. As a result, e-services and e-solutions are smooth in their integration with other departments and ministries. Through integrated applications, information, data, and knowledge from government entities are exchanged seamlessly. Governments now take citizen-centered strategy rather than a government-centric one, focusing on providing citizens with e-services that are tailored to their needs based on life cycle events and groups they are a part of. By creating an atmosphere where citizens will be more engaged with government activities and be able to participate in decision-making, governments contribute to the empowerment of citizens.

III. THE METHODOLOGY USED

In the context of this research, an evaluation of 39 websites including Presidency, Prime Minister Office's, Senate and National Assembly and central government ministries were suggested using the UN's e-Government maturity model. The procedure began by looking up each ministry's official webpage using the Google search engine. The search returned 26 URLs in total. Different search engines were used to find the remaining 13 institutions, but the result was unsuccessful.

For each stage of the UN model, the selection criteria were as described in the preceding section. To properly evaluate each feature, each website was reviewed numerous times on its own from June 05 to September 25, 2022. A weight was given to each feature (1 if the feature is implemented and 0 if the feature is not implemented). The outcome was input into an Excel sheet. Finally, descriptive statistical techniques were applied to the data analysis.

IV. THE FINDINGS AND DISCUSSIONS

65% of the 39 institutions' websites successfully retrieved by Google search engine were listed down respectively with their URLs. The remaining 12 institutions most of which includes ministries did not have any websites. The findings were presented on Table 1.

Table 1: Institutions and Websites URLs

N°	Ministries	Websites
1.	Presidency	https://presidence.cd/
2.	Premature	https://www.primature.gouv.cd/
3.	Senate	https://www.senat.cd/
4.	National Assembly	http://assemblee-nationale.cd/
5.	Ministry of higher education	https://www.minesu.gouv.cd
6.	Ministry of primary, secondary and vocational education	https://www.eduquepsp.education/v1/sige/
7.	Ministry of Justice	https://justice.gouv.cd
8.	Ministry of Agriculture	https://minagri.gouv.cd/
9.	Ministry of Health	https://www.sante.gouv.cd
10.	Ministry of Economy	https://economie.gouv.cd
11.	Ministry of Finance	https://finances.gouv.cd
12.	Ministry of Budget	https://budget.gouv.cd
13.	Ministry of Mines	https://mines-rdc.cd/fr
14.	Ministry of Transport	https://transports.gouv.cd/
15.	Ministry of Digital	https://numerique.gouv.cd/
16.	Ministry of Commerce	https://commerce.gouv.cd/
17.	Ministry of Interior	https://interieur.gouv.cd/
18.	Ministry of Gender	https://www.mingenre-rdc.org/
19.	Ministry of Cadaster	https://cadastre.gouv.cd/
20.	Ministry of Urbanism	https://urbanisme-habitat.cd/
21.	Ministry of Cooperation	https://cooperation.gouv.cd/
22.	Ministry of Post, telecommunications and New Information and Communication Technologies	https://ptntic.gouv.cd/ inaccessible
23.	Ministry of Hydrocarbon	http://hydrocarbures.gouv.cd/
24.	Ministry of smes	https://padmpme.cd/
25.	Ministry of Industries	https://www.minindustrie.gouv.cd/
26.	Ministry of foreign affairs	No website
27.	Ministry of employment, labor and social welfare	No website
28.	Ministry of Environment and Sustainable Development	https://medd.gouv.cd

29.	Ministry of public service, administration modernization and public service innovation	No website
30.	Ministry of human rights	No website.
31.	Ministry of Water Resources and Electricity	No website
32.	Ministry of scientific research and technological innovation	No website
33.	Ministry of fisheries and livestock	No website.
34.	Ministry of national defense and veterans affairs	No website.
35.	Ministry of rural development	No website.
36.	Ministry of the portfolio	No website
37.	Minister of infrastructure and public works	No website
38.	Ministry of planning	No website
39.	Ministry of tourism	https://tourisme.gouv.cd/

The table 2 and figure 1 summarized the findings. However, one ministry, the Ministry of Post, Telecommunications, and New Information and Communication Technologies, has a URL but access to it is

restricted. The same outcome was always achieved despite multiple efforts to reach this URL over the course of a month (from June 05 to September 25, 2022) to see if it was working.

Table 2: Online presence

Present on the web	Number of websites
Websites that are accessible	26
Only include the URLs of unavailable websites	1
Without a website	12

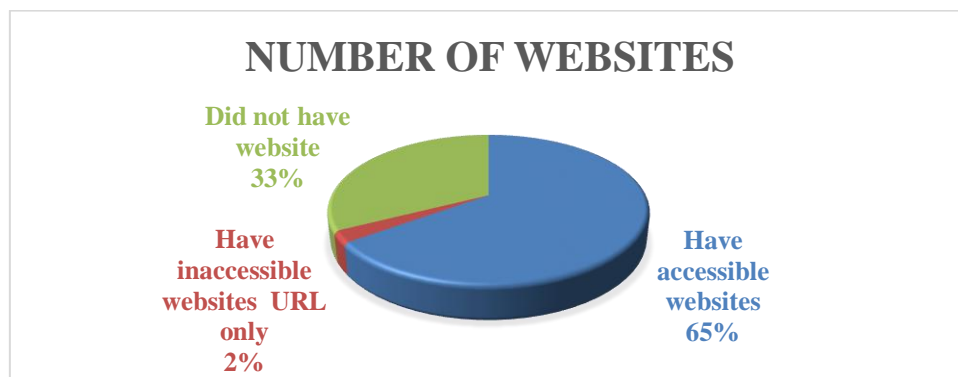


Fig. 1: Present on the web

A. First stage : Emerging information

Table 3 below assess different institutions website in accordance to the first stage of UN model of Online

development based on five features including information about the organization, Search facility, link to other organizations, updating culture and contact us.

Table 3: 1st stage: Emerging information

N°	Ministries	Infos about org	Search facility	Link to other organisation	Updating	Contact us
1.	Presidency	✓	✓	✓	✓	
2.	Prime Ministry		✓	✓	✓	✓
3.	Senate	✓	✓	✓	✓	✓
4.	National Ass.	✓	✓	✓	✓	✓
5.	Ministry of higher education	✓		✓	✓	✓

6.	Ministry of primary, secondary and vocational education	✓	✓	✓	✓	
7.	Ministry of Justice	✓	✓		✓	✓
8.	Ministry of Agriculture	✓	✓			✓
9.	Ministry of Health	✓		✓	✓	✓
10.	Ministry of Economy	✓	✓		✓	✓
11.	Ministry of Finance	✓	✓		✓	✓
12.	Ministry of Budget	✓	✓	✓	✓	✓
13.	Ministry of Mines	✓	✓	✓	✓	
14.	Ministry of Transportation	✓		✓	✓	✓
15.	Ministry of Digital	✓	✓	✓	✓	✓
16.	Ministry of Commerce	✓		✓	✓	✓
17.	Ministry of Interior	✓				✓
18.	Ministry of Gender				✓	✓
19.	Ministry of Cadaster			✓	✓	✓
20.	Ministry of Urbanism	✓	✓			
21.	Ministry of Cooperation	✓				✓
22.	Ministry of Hydrocarbon	✓			✓	✓
23.	Ministry of SMEs	✓	✓		✓	
24.	Ministry of Industries	✓		✓		✓
25.	Ministry of Environment and Sustainable Development	✓	✓	✓	✓	✓
26.	Ministry of tourism	✓	✓	✓	✓	✓

The finding highlights that 88 percent of institutions in total provide information about their organizations on of their websites. 62 percent of the 26 websites have accessible search function. Links to other organizations were present on 16

websites (62 percent) in total. Approximately 81 percent of ministries routinely updated their websites, and 81 percent have a functional contact us page (see figure 2).



Fig. 2: First Stage emerging

B. Second stage : Enhanced information services

The Enhanced information services stage encompasses four major features namely the presence of downloadable

forms, Audio/Video, Multilingual facility, Feedback and registration facility. The table 4 provides with the overview of the findings.

Table 4: 2nd stage: Enhanced information services

N°	Ministries Name	Downloadable Form	Audio/Video	Multilingual	Feedback	Registration
1.	Presidency	✓	✓			✓
2.	premature	✓	✓		✓	✓
3.	Senate		✓			
4.	National Ass.	✓				
5.	Ministry of higher education	✓		✓	✓	
6.	Ministry of primary, secondary and vocational education	✓		✓		✓
7.	Ministry of Agriculture	✓				
8.	Ministry of Health		✓			✓
9.	Ministry of Economy	✓	✓	✓	✓	✓
10.	Ministry of Finance	✓				

11.	Ministry of Mines	✓		✓		
12.	Ministry of Transportation	✓				
13.	Ministry of Digital				✓	✓
14.	Ministry of Cadaster	✓	✓			
15.	Ministry of Hydrocarbon	✓	✓	✓		✓
16.	Ministry of SMEs		✓			
17.	Ministry of Industries		✓			
18.	Ministry of Environment and Sustainable Development	✓	✓		✓	✓
19.	Ministry of tourism	✓			✓	✓

The finding shows that only fourteen websites (54 percent) offered downloadable forms. 35 percent of websites had audio and video functionality. Multilingual functionality is available on about 19% of the websites in total while barely

5 percent have registration function and 23 percent have of provide feedback within the timeframe of this research as shown on figure 3.

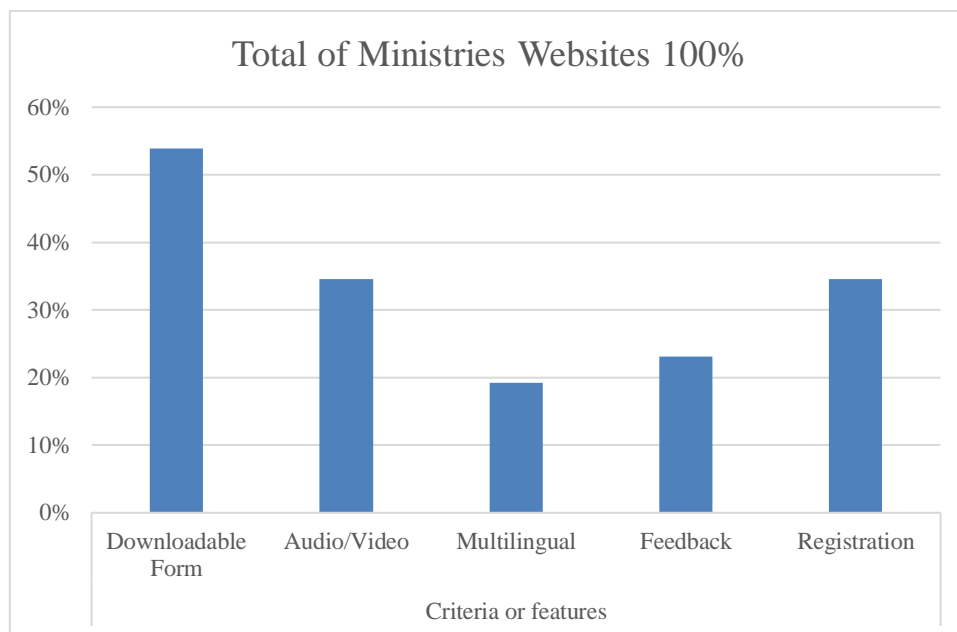


Fig. 3: Second stage enhanced

C. Third stage : Transactional services

The third stage of UN Online Development Model counts four criteria including Uploading forms/document, Financial

transactions, Applying for certificates and licenses, jobs and E-voting facilities.

Table 5: Third stage transactional service

Ministry Name	Uploading forms/documents	Financial transactions	Applying for certificates and licenses, jobs	E-voting
Ministry of primary, secondary and vocational education		✓	✓	
Ministry of tourism	✓	✓	✓	
Ministry of Environment and Sustainable Development			✓	

The Uploading of forms/documents functionality was applicable in the Ministry of Environment and Sustainable Development websites. The only institution that implemented the financial transactions and as a part of this stage were the

Ministries of Primary, Secondary, and Vocational Education as well as the Ministry of Tourism. At this time, no other website has added the additional functionality as shown on figure 4.

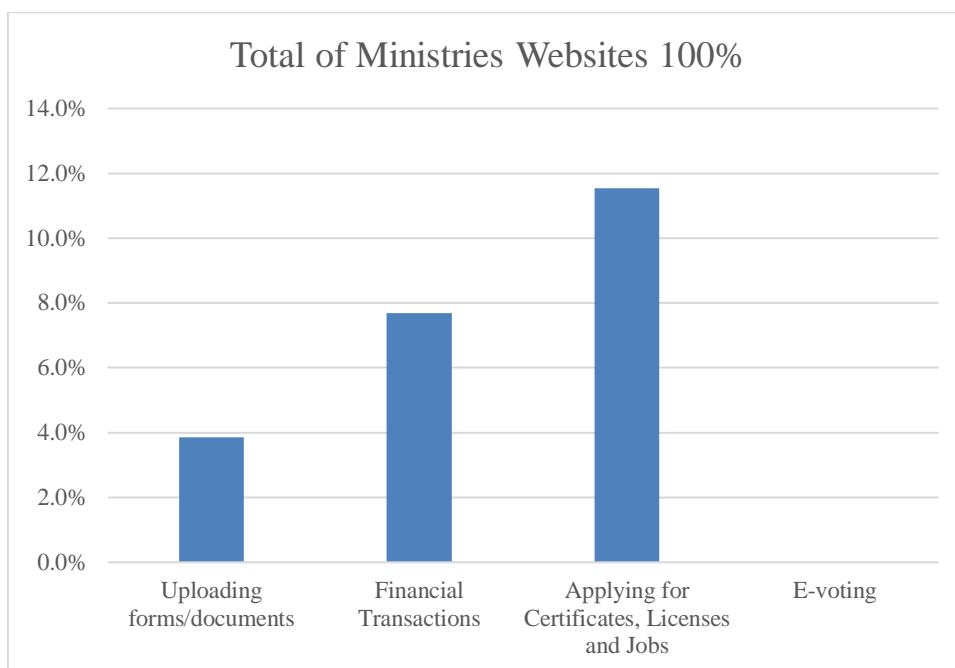


Fig. 4: Third stage transactional service

D. Fourth stage : Connected services

The following criteria are used in this stage: web comment forms, online consultations, public opinions, and democratic participation in decision-making. None of the institutions have advanced to this point based on the aforementioned characteristics.

The overall status of ministries' websites in the Democratic Republic of the Congo is shown in Table 6. In the first stage, respectively, only six institutions obtained 100 percent in the initial round. Eleven accomplished 80 percent and five reached 60 percent. Four institutions met the 40 goal,

while the remaining fell short. Only one institution (the Ministry of Economy) completed the second stage with 100 percent, while three completed with 80 percent, four with 60 percent, and three others with 40 percent. In the third stage, three institutions barely reached respectively 50,75 and 25 percent as shown table 6.

Table 6: Overall accomplishment

Overall accomplishment					
N°	Ministry name	First stage	Second stage	Third stage	Fourth stage
1	Presidency	80%	60%		
2	premature	80%	80%		
3	Senate	100%	20%		
4	National Assembly	100%	20%		
5	Ministry of higher education	80%	60%		
6	Ministry of primary, secondary and vocational education	80%	60%	50%	
7	Ministry of Justice	80%	0%		
8	Ministry of Agriculture	60%	20%		
9	Ministry of Health	80%	40%		
10	Ministry of Economy	80%	100%		
11	Ministry of Finance	80%	20%		
12	Ministry of Budget	100%	0%		
13	Ministry of Mines	80%	40%		
14	Ministry of Transportation	80%	20%		
15	Ministry of Digital	100%	40%		
16	Ministry of Commerce	80%	0%		
17	Ministry of Interior	40%	0%		
18	Ministry of Gender	40%	0%		
19	Ministry of Cadaster	60%	40%		
20	Ministry of Urbanism	40%	0%		
21	Ministry of Cooperation	40%	0%		
22	Ministry of Hydrocarbon	60%	80%		
23	Ministry of SMEs	60%	20%		
24	Ministry of Industries	60%	20%		
25	Ministry of tourism	100%	60%	75%	
26	Ministry of Environment and Sustainable Development	100%	80%	25%	

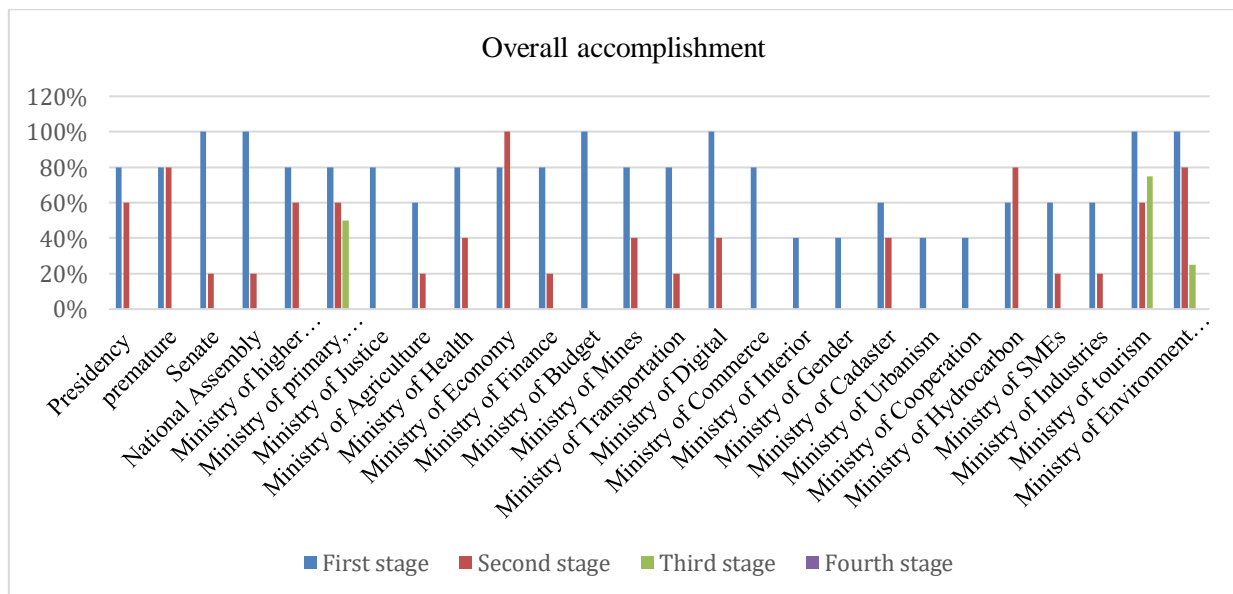


Fig. 5: Overall accomplishment

V. RECOMMENDATION AND CONCLUSION

Out of 39 websites, the findings indicated that 13 ministry websites are not online. The remaining 26 websites perform better in the first and second stages but achieve very little or nothing in the third and fourth stages, respectively. The study establish that government websites in DRC are partially usable and efficient as far as the design layout is concerned.

The study emphasized the urgent need for further effort and focus to be put toward improving (upgrading) these websites to meet the fourth stage of UN model. Failure to do this may make the entire website unusable for some users. Considering that it is crucial to build the initial confidence of the public in the ability of government websites to facilitate communication and speed up transaction completion. Therefore, the general public can keep up with the information technology era's rapid advancements and reap

the full benefits of these technologies. Additionally, it recommends that either the government accept the rules and models seen on current websites or create its own rules that are suitable for the situation. There should be one portal for all the government departments and affiliated agencies where citizens can find available public services in one click. Government website are expected to achieve the fourth maturity stage of e-government recommended by UN (2014) in order to deliver the full scope of modernization brought by ICT. In terms of front-end presentation, application interfaces are required to cater for the communication needs of both novice users and experts. In other way, e-services provided by the government should be user-centric. User-centricity involves also to encourage IT content in local languages and citizen ease of use should also be considered. This principle advocates that government websites should speak the users' language which includes words and concepts familiar to users, rather than using system-oriented terms. In addition, it should be resourceful at all levels of political, economic, social, cultural, environmental life, etc. To meet the abovementioned requirement, it is critical to benchmark successful model in some countries advanced in e-Government service delivery such as South Korea, Australia, Estonia.

In addition, it is derived from the results of the evaluation of the government websites that web designers should test all the web pages and related process of their websites with the participation users in order to ensure that user-friendliness and to be sure that, all elements and features work as expected (Baguma, 2008). Inclusion remains a challenge in many e-services deployed in developing countries, widening the gap among disadvantaged groups. The websites should make it possible for persons with disabilities to use. One way to achieve efficiency and increase user-friendliness is through the 'once-only principle'. Instead of redundantly asking citizens for information multiple times, The system should efficiently reuse the information databases and state registries they already have. The once only principle implies re-uses all data already available in the public registers hence, interoperability come on board. To prevent future fraudulent misuse of cyber criminals' access to personal data and users' identity, the Government should immediately begin strengthening the means of security authentication to citizens through: PKI-based Mobile ID or PKI-based Smart ID instead of passwords currently in use in most government websites. It is also necessary to continue adding new services as a result there should be a comprehensive, documented and approved roadmap – National E-services Catalogue for the complete digitalization of services.

VI. FURTHER RESEARCH

Further study will focus on the usability of these websites as well as online services in general including content analysis, efficient, accessibility and their contributions to the provision of business information to SMEs and private sector. Besides, citizen satisfaction assessment is also critical in this endeavor.

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