

## **An Evaluation of Web Accessibility: The Context of Tanzanian Public Websites**

*Herman Mandari\**

### **Abstract**

Inaccessible websites tend to present a big challenge to users, particularly in the electronic government era. Inaccessible websites tend to segregate disabled and other people from accessing online public contents. The Tanzania government is currently using electronic government strategy that involves the use of websites, among others, to disseminate public information and services to stakeholders. However, the issue of web accessibility has been given little attention. This study assessed the web accessibility status of 21 public websites under the auspices of Tanzania National Portal and Ministries by using WCAG 2.0 Level A conformance guideline. Manual and automatic evaluations were used to evaluate homepages for selected websites. A-checker and Cynthia-Says were used in the automatic evaluation process. The result shows that none of the evaluated websites homepage is accessible, yet with a variation in the inaccessibility levels. This study provides a more holistic understanding on the importance of web accessibility on public website, shades lights on various web accessibility guidelines, provides status of public websites in terms of web accessibility, and lastly gives recommendations for improvement to allow more people to access public web contents in Tanzania.

**Keywords:** *mobile money, mobile phones, microenterprises, Moshi, Tanzania*

### **1. Introduction**

Web technology has become a major platform for information sharing within a particular society. Public and private sectors are using web technologies to communicate with customers about their services and other important information (Flowers et al., 2000). Accordingly, designing and developing websites needs to be considered carefully, otherwise services provided through inaccessible websites may discriminate others from accessing the web contents (Freire, Fortes et al., 2008; Ramano, 2002). In addition, inaccessible websites tend to present barriers to disabilities —i.e., visual, hearing, physical, cognitive or neurological — and other users —i.e., those with changing ability due to aging. Signore and Leporini (2004) explain that design for accessibility means design for all; this means accessible websites tend to benefit all, disabled and non-disabled users. Not only do accessible websites

provide social values for the disabled, but they also provide economic opportunity and technological access for all users (WAI, 2012). Furthermore, web accessibility ensures a simple use to its users since an accessible website provides an easy and standard way to use it (Kautzman, 1998). Kautzman added that if a website owner is not able to reach potential customers, then it will be difficult for the expansion and growth of her/his business, which equally applies to public websites as well.

Inaccessible public websites limit a large number of stakeholders in accessing public contents and participating in various public activities. As a result, various countries in the world have formulated regulations and guidelines that deal with accessibility of web contents. These guidelines include the UK Equality Act 2000 (The National Archive, 2010); the US Federal Government Section 508 (US Federal Government, 2000); the Nigeria Federal Government Website

---

\*Assistant Lecturer, Computer Science Department, Institute of Finance Management: [mandari@ifm.ac.tz](mailto:mandari@ifm.ac.tz)

Guidelines (Federal Government of Nigeria, 2012) and the India Government Website Guidelines (National Informatics Center, 2009). These specific guidelines are there to ensure that all people have the same fundamental right to access information in the community. However, the situation is different in Tanzania: there is no official government guideline on the design and development of accessible websites in the country. As a result, public websites have been designed and developed with little knowledge on web accessibility issues. Consequently, there is a need for more studies that will provide more understanding on the need of web accessibility guidelines in developing public websites in Tanzania.

Empirical results show that most of the public websites worldwide are not accessible (Nurmela et al., 2013). Still, various countries as discussed above have invested a lot to ensure that public websites are accessible. Studies show that most developing countries are facing this problem. For example, a study conducted by Latif and Masrek (2010) in Malaysia revealed that there is no any government website that passed the Web Content Accessibility Guidelines (WCAG) Priority 1 accessibility checkpoints. This means public websites' users are struggling to access online contents in Malaysia. Another study applies WAVE evaluation tool to evaluate selected public websites in Nigeria. The result shows that none of the government websites were accessible, and most were having more than eight web accessibility errors (Mundy & Musa, 2011). Evidence from a study conducted in Morocco shows that most public websites do not meet minimum criteria for web accessibility (Boussarhan et al., 2014). For that reason, similar study needs to be conducted in Tanzania to evaluate the accessibility status of public website. The results of the study will identify areas of improvement to serve better public needs through the web.

### **The Need of Accessible Public Websites in Tanzania**

The Tanzanian government is currently using electronic government (e-government) strategy to communicate with different stakeholders. The e-government strategy uses different technologies, including websites, as media to disseminate information to stakeholders. The Tanzania Electronic Government Agency (eGa) was established in 2009 with the aim of making sure that all public services are easily accessible to the society by using various technologies, including websites (URT, 2012). One of the main goals of the agency is to ensure that all government institutions have an accessible website that will be used to communicate their information and services (ibid.). As long as the government has decided to move to e-government, the issue of accessible website is no longer an option if it wants to benefit from using web technology.

Evidence shows that about 25% of Tanzanians have different disabilities (NBS, 2008). Consequently, the presence of inaccessible public websites will eliminate such people from accessing online government services. Moreover, other users who may face difficultness from using public websites will also be eliminated. To date, little attention has been given to ensure that public web contents are accessible. Evidences from past studies have shown that most public websites are not compatible, and as a result most people do not use them to access public services (Yonazi et al., 2010). Therefore, the study that will uncover accessibility violation guidelines in Tanzania and provide the recommendations for improvement so as to enable easy accessibility of public website is very important and useful.

### **Web Accessibility Guidelines**

Various bodies provide different guidelines and standards that are used to enhance web accessibility. First, these guidelines provide information to web designers and developers

on how to design and develop an accessible web page; and second, they enable other web practitioners to evaluate the accessibility levels of existing websites. The most common used guideline is the Web Content Accessibility Guidelines (WCAG) from World Wide Web Consortium (W3C) (W3C, 2008). The Web Accessibility Initiative (WAI) is a working group under W3C. The group deals with developing various WCAG that are considered as international web accessibility standards, and are used when designing and developing any website (WAI, 2012). The WAI developed WCAG 2.0 checkpoints that are used for the evaluation of website accessibility (W3C 2008). WCAG 2.0 contains 12 guidelines that are organized in 4 principles: perceivable, operable, understandable, and robust.

There are two types of evaluation: (1) Easy checks, which is the initial web accessibility level that checks the basic features of web accessibility instead of definitive assessment; and (2) Conformance evaluation that is used to confirm the given web accessibility priorities which are priority 1, priority 2 and priority 3. Web accessibility conformance is in three levels: Level A— meaning all priority 1 guidelines are satisfied; Level AA— meaning all priority 1 and 2 guidelines are satisfied; and Level AAA— meaning all priority 1, 2 and 3 guidelines are satisfied.

### **Methodology**

The Tanzania government has different ministries, departments, and agencies that use different websites to communicate with their stakeholders. By May 2015 there were 23 ministries, government departments and agencies that were using websites. In the current study, Tanzania government portal and all government ministries websites were evaluated for accessibility conformance. The Tanzania government portal provides a number of various online services to its stakeholders, and it is considered to be a one-stop-centre for online public services, thus its

importance for the inclusion in this study. Due to limitations of time, and since most of public services are accessible under various ministries, only ministries websites were considered for evaluation. Additionally, ministries' websites act as a bridge between the government and stakeholders. Therefore, 24 ministry websites were considered for this evaluation study, and only homepages were used for web accessibility evaluation. The reason for homepage selection is that the homepage is considered to be an entry point to any website: if it is not accessible it may limit continuation to other linked WebPages. Furthermore, homepage tends to provide users with an impression of the entire website (Childres, 2007). Therefore, an accessible homepage provides the way for a user to keep on using the website.

WCAG 2.0 Conformance level A was used to evaluate the web accessibility of the selected websites' homepage. This conformance level was selected because most public websites are still in its presence stage (URT, 2012) and therefore at least the basic web accessibility guidelines must be followed. Furthermore, to the author's knowledge no assessment has been conducted to-date to evaluate web accessibility issues of public websites in Tanzania. Accordingly, it is better to start with level A conformance evaluation before proceeding to higher levels of conformance. As evaluation of web accessibility guidelines does not depend completely in automatic evaluation tools, human intervention is required to evaluate some other web accessibilities guidelines that cannot be automatically evaluated (Abanumy, Al-badi, & Mayhew, 2005). This study, therefore, employed all evaluation techniques, manual and automatic, to assess the web accessibility of the targeted websites' homepage.

### **Accessibility Evaluation Tool**

In evaluating web accessibility, this study employed two automatic evaluation tools: A-checker and Cynthia-Says. These tools are

open source tools and are available online. They have also been adopted by previous researchers to evaluate web accessibility in different studies (Kane et al., 2007). The author decided to use the two web accessibility evaluation tools because using only one may underestimate or overestimate the accessibility errors found in a webpage (Kane et al., 2007). For findings to be reliable, all web accessibility errors found to violate level A guidelines from each tool and the average numbers of guidelines violated from all tools were reported. The study collected the number of guidelines violated instead of collecting the number of how frequently single guidelines were violated. From the development perspective, it is difficult to deal with several violated guidelines rather than dealing with only one guideline violated in several cases.

#### **Manual Assessment**

In conducting web accessibility assessment, not all guidelines may be automatically assessed by tools (Abanumy et al., 2005). Therefore, this study manually assessed other guidelines. The manual web accessibility assessment was concentrated on, first, the availability of accessibility policy online that may enable easy understanding of accessibility issues on various services and information offered by the website. Second, the concentration was on the text version of the webpage: this checks if the ministries have also text-based webpage version to accommodate different users who are using devices that cannot render the web styles such as html tables. Lastly, the study assessed the availability of alternate language to Swahili version website, as most of Tanzanians (99%) are Swahili speakers (Masato, 2004), and the websites are developed to disseminate information to them. Therefore, the intention was to assess if a ministry's website also enables Swahili speakers to use the website.

In assessing whether a website is accessible or not, this study adopted website accessibility measurement scale presented by Lazar et al. (2003). The measurement scale requires the website to have zero rule violated to be considered as accessible, otherwise it is considered as inaccessible. The level of inaccessibility depends on the number of rules violated as presented in Table 1.

**Table 1: Accessibility level of rules Violated**

Category	Accessibility level
0	Guideline violated Accessible
1-3	Guidelines violated Marginal inaccessible
4-6	Guidelines violated Moderate inaccessible
7+	Guidelines violated Substantial inaccessible

#### **Study Findings and Discussions**

The assessment of all websites was conducted in May 2015. During that time, website domain names of 3 ministries were inaccessible. These were; the Ministry of Information, Youth, Culture and Sport; the Ministry of Energy and Mineral; and the Ministry of Natural Resource and Tourism. Consequently, these ministries were excluded from subsequent analyses, and we remained with 21 out of 24 websites that consisted of national portal website, and 20 ministries websites. The results of the assessment are presented in Table A1.

The result shows that there is no ministry homepage that is accessible. Additionally, all website homepages were inaccessible, although the levels of inaccessibility differs depending on the number of guidelines that had been violated. Seven websites (33.3%) were in the marginally inaccessible category, thirteen (61.9%) in the moderate inaccessible category, and one website (4.5%) was in the substantially inaccessible category (see Fig. 1). This provides evidence that most public websites are inaccessible and they are posing serious accessibility problems to their stakeholders.

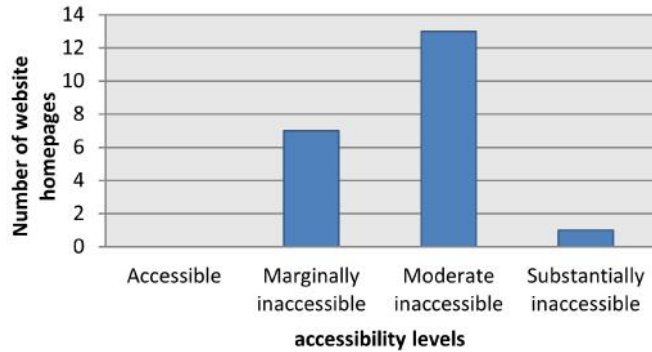


Figure 1: Accessibility Level of Different Ministries Homepage

The analysis of violation of WCAG 2.0 Level A guidelines are presented in Fig. 2. The results show that 20 (95%) out of 21 homepages violated guideline 1.3, which is about “*information and structure relationship*” in information presentation. This means that most of the information completely depends on the structure of the web page designed, which usually tends to bring more complications in rendering the web contents. Guidelines 1.1 on the “*uses of alternative text for non-text content presented in webpage*” is also the most violated guideline. Results show that 18 (86%) out of 21 homepages have several images with no alternative text. As a result, users with assistive devices or low bandwidth may not understand the information if the

image file is not loaded. Furthermore, search engine may not access and index the web page images due to missing of semantic meaning of the image.

Manual web accessibility assessment results presented in Fig. 3 show that the entire evaluated website homepage do not contains web accessibility policy. This tends to limit users on how to use the website because the availability of accessibility policy may enhance the usability of a website (Logacheva, 2016). In addition, web accessibility policy assists web users on the use of website features when encountered with difficulties due to web accessibility barriers. WIA requires all website owners to have their web accessibility policy on

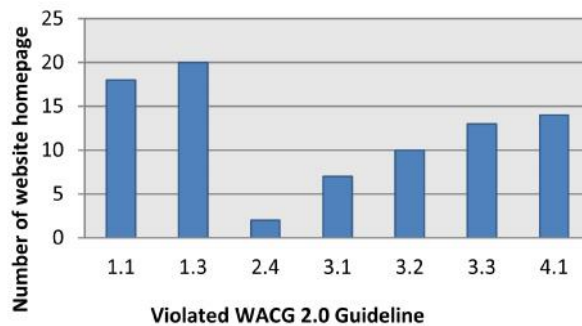
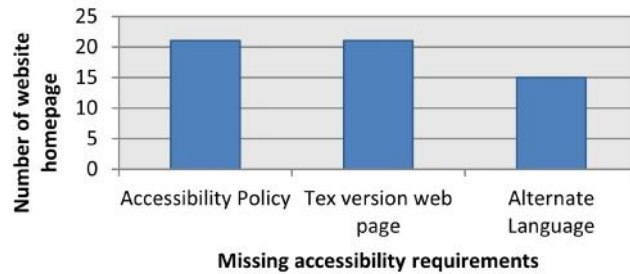


Figure 2: WCAG 2.0 violated guidelines



**Figure 3: Manual assessment of website homepage**

their websites to increase the accessibility of the web contents (W3C, 2008). Similarly, results show that there is no text-based version website in any of the evaluated website. Hence, people who use different devices that cannot render the web styles or alternative browser may not be able to access the websites' contents.

Furthermore, most of the homepages are presenting information and services in English. The evaluation shows that 15(71%) out of 21 evaluated website homepages did not provide Swahili-based version of their website as an alternative language. Since most Tanzanians are Swahili speakers, and are using Swahili for daily communication (Telli, 2014), it will be difficult for them to use these public websites. Likewise, the Ministry of Constitutional and Legal Affairs present everything in Swahili; there is no alternate link to English which is also regarded as an official language in Tanzania. As a result, the website may limit English speakers from accessing its contents.

### **Conclusion and Further Research**

This study has evaluated the web accessibility of Tanzania national portal and 20 ministries websites' homepages. Results have shown that all homepages are inaccessible according to the WCAG 2.0 Level A guidelines. Further, the results show that designers and developers of national portal and all ministries' websites have not taken into account the issues of web accessibility, consequently various stakeholders may be struggling to access the webpage. Since

the government is committed to using e-government strategy in providing public services via websites, then the following should be done to make public website accessible at least to WCAG 2.0 Level A conformance:

- (1) eGA should instruct all ministries to modify their websites to accommodate at least web accessibility Level A conformance standards. The immediate solution should be addressing the violated guidelines in all websites as discussed earlier, and making websites accessible in both Swahili and English languages.
- (2) The government should establish a web accessibility policy to make sure that all public websites are developed by following web accessibility guidelines.
- (3) All public websites should be implemented in Swahili since a large percentage of users are Swahili speakers, and English version websites should be accessible through the alternative language feature.

### **Limitation and Further Studies**

This study has evaluated only homepages of selected websites. Nevertheless, this may not provide a complete picture of web accessibility status in the Tanzania public sector as in most cases homepages are mostly found to be well designed compared to other linked WebPages. In addition, the study focused only on national

portal and ministry websites, whilst there are other public websites that are used to present information to stakeholders. Consequently, the author recommends further studies that will, first, include a large number of public websites; second, evaluate several number of WebPages in each websites instead of the homepages only to get a broader picture of the web accessibility status. Furthermore, a study that captures user experiences on barriers presented by inaccessible web is also important to get broader understanding from user perspectives.

#### References

- Abanomy, A., A. Al-badi, & P. Mayhew, (2005), "e-Government Website Accessibility: In-Depth Evaluation of Saudi Arabia and Oman," *The Electronic Journal of E-Government*, 3(3): 99–106.
- Boussarhan, I., N. Daoudi, & S. De, (2014), "The Accessibility of Moroccan Public Websites: Evaluation of Three E-Government Websites," *Electronic Journal of E-Government*, 12(1): 67–81.
- Childres, J., (2007), "Improving the Accessibility of websites for Visually Impaired Individuals," (Dissertation), University of North Caroline.
- Federal Government of Nigeria, (2012), *Standards and Guidelines for Federal Government Websites in Nigeria*.
- Flowers, C., M. Bray, & R. Algozzine, (2000), "Accessibility of Schools and Colleges of Education Home Pages for Students with Disabilities," *College Student Journal*, 34(4): 550.
- Freire, A., R. Fortes, M. Turine & D. Paiva, (2008), "An Evaluation of Web Accessibility Metrics Based on their Attributes," In *In Proceedings of the 26th annual ACM International Conference on Design of Communication*, 73–80.
- Kane, S., J. Shulman, T. Shockley & R. Ladner, (2007), "A Web Accessibility Report Card for Top International University Web Sites," In *Proceedings of the 2007 international cross-disciplinary conference on Web accessibility (W4A) - W4A '07*, (148–156), ACM.
- Kautzman, A., (1998), "Virtuous, Virtual Access: Making Web Pages Accessible to People with Disabilities," *Searcher*, 6: 42–29.
- Latif, M. & M. Masrek, (2010), "Accessibility Evaluation on Malaysian E-Government ebsites," *Journal of E-Government Studies and Best Practices*, 11: 1-11.
- Lazar, J., P. Beere, K.-D. Greenidge & Y. Nagappa, (2003), "Web accessibility in the Mid-Atlantic United States: A Study of 50 Homepages," *Universal Access in the Information Society*, 2(4): 331–341.
- Logacheva, E., (2016), "Designing for Web Usability and Accessibility: User-Interface Design Guidelines in Connection with Human-Computer Interaction." Helsinki, Metropolia University. [http://www.theseus.fi/bitstream/handle/10024/108527/Logacheva\\_Evanfiya.pdf?sequence=1](http://www.theseus.fi/bitstream/handle/10024/108527/Logacheva_Evanfiya.pdf?sequence=1)
- Masato, M., (2004), "Kiswahili Strategies to Meet Demand for Language," *Daily News. Saturday*, 30: 2.
- Mundy, D. & B. Musa, (2011), "Towards a Framework for eGovernment Development in Nigeria," *Electronic Journal of Electronic Government*, 8(2): 147–160.
- National Informatics Center, (2009), *Guidelines for Indian Government Websites*, India: Department of Information Technology, Ministry of Communications and Information Technology.
- Nurmela, K., A. Pirhonen & A. Salminen, (2013), "Accessibility of Public Web Services: A Distant Dream?" *Human-Computer Interaction - INTERACT*, 566–578.
- President's Office, (2012), *Tanzania e-Government Strategy*. Dar es Salaam: United Republic of Tanzania, President Office.
- Ramano, N., (2002), "Customer Relationship Management for the Web Access Challenged: inaccessibility of the Fortune 100 Web sites," *Proceedings of the 35<sup>th</sup> Hawaii International Conference on System Science*, 35
- Signore, O. & B. Loporini, (2004), "Web Accessibility: Principles, International Context

- and Italian Regulations. Proceedings of euroCMG 2004 - Vienna, 19-21 September 2004. <http://www.w3c.it/papers/eurocmg2004.pdf>
- Telli, G., (2014), "The language of instruction issue in Tanzania: Pertinent Determining Factors and Perceptions of Education Stakeholders," *Journal of Languages and Culture*, 5(1): 9-16.
- The National Archive., (2010), "Equality Act 2010. Retrieved May 1, 2015, from <http://www.legislation.gov.uk/ukpga/2010/15/contents>
- United Republic of Tanzania (URT), (2008), *Tanzania 2008 Disability Survey Report*, Dar es Salaam: National Bureau of Statistics.
- US Federal Government, (2000), U.S Federal Government Section 508. Retrieved May 1, 2015, from <http://www.section508.gov/>
- W3C., (2008), "Web Content Accessibility Guidelines," (WCAG) 2.0. Retrieved May 28, 2015, from <http://www.w3.org/TR/WCAG20/>
- Web Accessibility Initiative, (2012), "Developing a Web Accessibility Business Case for Your Organization," Retrieved May 1, 2015, from <http://www.w3.org/WAI/bcase/>



**Appendix****Table A1: Analysis of public websites accessibilities (May, 2015)**

---

S/N	Website Name	Automatic			Accessibility policy	Manual Text version web page	Alternate language
		CynthiaSay	Achecker	Average			
1	Tanzania Portal website	5	5	5	1	1	0
2	Regional Administration and Local Government	6	6	6	1	1	1
3	Constitution and Legal Affairs	3	1	2	1	1	1
4	Home Affairs	2	2	2	1	1	1
5	Communication, Science and Technology	5	4	5	1	1	0
6	Lands, Housing and Human Settlements Developments	5	5	5	1	1	1
7	Agriculture, Food Security and Co-operatives	1	1	1	1	1	1
8	Defence and National Service	2	0	1	1	1	1
9	Education and Vocational Training	5	4	5	1	1	1
10	Public Service Management	4	3	4	1	1	1
11	Finance	5	5	5	1	1	1
12	Foreign Affairs and International Co-operation	3	4	4	1	1	0
13	Health and Social Welfare	5	4	5	1	1	1
14	Industry and Trade	4	5	5	1	1	1
15	Works	6	3	5	1		
16	Labour and Employment	4	2	3	1		
17	Livestock and Fisheries Development	4	4	4	1		
18	Water	2	2	2	1		
19	Community Development, Gender and Children	6	6	6	1		
20	East African Co-operation	2	1	2	1		
21	Transport	6	7	7	1		

---