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A Quantitative Evaluation of Website Transparency

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Abstract : Websites are increasingly becoming the defactor media of transmission of information and or provisioning of government services to the citizens. Accordingly, there has been an equally corresponding demand for standardization in terms of quality, productivity and efficiency. These standards are translated into several constructs or indices. Indices such as Openness, Usability, Accessibility, Transparency, Functionality, Citizen Participation etc are used to measure and standardize these websites. A key index that is continuously demanded by citizens is Transparency. Consequently, this paper proposes an approach towards the quantitative evaluation of the quality of Transparency of eGovernment websites. The approach involved the systematic appraisal of available literature to identify the key constructs that define Transparency and corresponding dimensions. Information, Reachability, Accountability and Reliability were the identified constructs of Transparency. A metric scale of measure of each construct was created. An adapted WebQEM methodology was utilized for the aggregation. A variant of Simple Multi-Attribute Rating Technique was developed and used to determine the different weights of the multi-attributes of each construct. A direct ranking technique was proposed for ranking of multiple websites. The methodology was used to calculate the Transparency of 23 Nigerian Government Ministries Websites. From the evaluation, the Federal Ministry Health was adjudged to be the most Transparent, followed by the Federal Ministry of Information and Culture and subsequently by the Ministry of Foreign Affairs. The Federal Ministry of the Capital Territory is the least Transparent.

Keywords: *Website Transparency, Metric Development, eGovernment, Website Evaluation*

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I. Introduction

Governments around the world are continuously adopting ICTs to offer cost effective, efficient and effective services to their citizens. The opportunities offered by these ICTs in government public services include, larger reach, multi-level penetration etc. These factors, and a sundry others combined, formed the basis for the transformation of government services,

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interactions as well as engagements is more commonly referred to as the "eGovernment Revolution". The 'eGovernment Revolution" entails encouraging participation in form of civil engagements as well as political participation, entrenching transparency, deepening and boosting democracy, engendering a culture of accountability in both the citizens and government.

ICTs role in providing an efficient and effective avenue for the flow of government information and services has made ICTs the major drivers for this 'eGovernment Revolution" [44]. However, every agency and different governments have adopted as well as customized the different ways, channels as well as processes of providing these services to their citizens. Interestingly, regardless of the methods, processes and even the content of these information and services, the website is increasingly being adopted as the main interface in information and service delivery by governments.

Governments overtime have been driven to innovate and transform their offerings due to increasing demand to democratize their offerings. These innovations can be traced to technologies such as Gov 2.0 which provides a collaborative open source computing platform to enhance transparency of government information and services as well as encourage citizen participation. This is possible with the provisioning of domain focused apps, websites, widgets etc. Gov 2.0 also involves infrastructure for open data, cloud services, web services etc. [45]

Amidst these infrastructures as well as technological innovations are both opportunities and challenges. These challenges are equally embedded in the same concepts that provide the opportunities. For example the demands for transparency and collaborative participation as well as accountability present both challenges as well as opportunities for government innovation. As citizens continuously demand to be part of the decision making process of government, they need government information to be transparent so that they can participate in decision making. [2,3] Define transparency from government perspective to be a technological process or a movement that directs actions and demands of both government and citizens in the provisioning of government services as well as information. Furthermore some researchers such as [4] opined that, transparency is a normative guide for both government and citizens and it entails concepts of openness, collaborative participation as well as accountability. However, other researchers such as [5] posited that, the affectivity of transparency is measured by citizen empowerment through democratic processes. This in turn sets the dimensions of the transformational expectations of government transparency. Accordingly,transparency is achieved by the use of tools as provided by the ICTs that act as enablers for the governed to take part in decision making using e.g the website or other collaborative platforms .

The concept of open government transparency is rooted within the Freedom of Information Act [46]. Within the domain of open government, othe concepts are open government collaboration, open data, open government participation and open government accountability. Other researchers have also argued that, open government transparency is inspired by the principle of the right to know [13]. Therefore, many researchers have defined transparency across different government information and services domains [47]. With a sundry others going further to developed methodologies of evaluating transparency [48,49,50]. These efforts have yielded several constructs such as, reusability of data, collaboration, standardization of information and data etc. In this paper, the concept of open government transparency is being viewed from both the technological perspective as well as the government as an information and service providing institution. As such, the government is expected to provide and maintain the necessary confidentiality while providing information about its functions, accessibility, limitations, obligations or rendering service to the citizen. This view ensures public

participation and all stakeholders' cooperative collaboration[14].

At the moment, there is a dearth in open government transparency evaluation methodologies as well as other open government constructs like open government accountability, open government participation etc [6,7,8,9,10]. Even though, with respect to open data portals, there has been significant researches that were targeted towards the evaluation of usability of the open data portals and other parameters [11,12]. Furthermore, available evaluation methodologies are predominantly qualitative, hence our quantitative approach.

As highlighted earlier, there is an obvious gap in frameworks for the evaluation of open government transparency [15,16,17]. Additionally, there is equally an obvious delineation of functions which is limiting its use [19]. Researchers such as [20] have identified some of the limitations as lack of stewardship and usefulness of the information or provided data. Others such as [51] have made a case for the need to develop transparency evaluation criteria, measurement methodologies, expansion and portability. Consequently, the main goal of this paper is;

a. To develop a model that can be used to quantitatively evaluate the level of open government transparency of a government website.

b. Use the developed methodology to rank a group of government websites.

Therefore, the research questions are;

a. What are the constructs that can be used to quantitatively evaluate the transparency of a government website?

b. Are there any correlations between identified key constructs or their corresponding attributes?

The basis of this paper is hinged on the WebQEM methodology or the Website Quality Evaluation Methodology as developed by Luis Olsina Rossi [18]. Our proposed approach involves the development of a metric system based on the Software Product Quality standard or ISO 9126. The model for the metric system was developed using the Unified Modeling Language UML as was proposed by [18]. Ultimately, this methodology was used to evaluate and rank 23 websites of the Nigerian Federal Government.

The rest of this paper is structured as thus; section 2, is a review of available literature in open government transparency and section 3, shows the methodology of the approach. Section 4 shows the results obtained from the implementation of the developed method to evaluate the 23 Nigerian Federal Ministries websites, while section 5 is the discussion of the results obtained. Section 6 is the conclusion and section 7 is the limitation and recommendation of the research.

II. Related review

As stated earlier, government openness is viewed as a process that measures government's willingness and abilities to respond to citizen's demands. These demands which are often in form of information and services stimulate government's response in form of government reinvention parameters such as innovative interactivity, providing accessibility, accountability [21]. These parameters ultimately increase the governments trust by the citizens.

The interaction between these three parameters entails the government providing accessible information and services and through interactivity both the government and citizen are eventually accountable to each other. This relationship is engendered using the World Wide Web and web technologies platform, which structure this interaction both internally and externally.

Historically, transparency became an international issue post world war 1[52], which resulted in negotiations that saw about 11 countries establishingFreedom of Information laws in the 1980s. By the year 2004, about 59 countries have developed and enacted Freedom of Information laws [53,54]. The Freedom of Information Laws establish the rights of

citizens to access government information and these are regarded the cornerstone of participative democracies around the world. Furthermore, transparency has been established to prevent corruption, set modalities and responsibilities of governments to provide accurate information, enable decision making etc.[55,56,57,58]. In order to measure the rate of response to citizen requests, in 2006, [59] undertook a study of 14 nations with established transparency laws. The study concluded that, existence of a vibrant transparency law is positively related to the response to citizen request for information by the governments. With regards to openness, the webs level of transparency is adjudged by the information about the basic structure of an organization that will enable a user to easily understand and navigate through the social system of the organization. This social system of the organization can either be at a small scale or large scale. The transparency dimension reveals more about the processes and procedures or activities of the organization[10]. This also provides a measure of the depth of access the information on the website provides to the consumer. The following sub elements give an insight into the dimension of the transparency component of a website with regards to openness.

i. The depth of knowledge on the procedures and processes of the organization it reveals

ii. The depth or timeliness of response to consumer's requests

iii. The level of access into the organizational structure it provides.

Transparency and eGovernment

Transparency is domiciled within the domain of eGovernmentand it has been established to be positively related with accountability and an inverse relationship with corruption. As [22] posited that, within the domain of open government, transparency measures the willingness of governments to communicate with the citizen and at the same time measure the citizens' response. [23] Enumerated other types of transparency such as fiscal, judicial transparency etc. Furthermore, there is significant evidence in the reduction of budget deficits as well as public debts with increased fiscal transparency[24]

Open government like eGovernment has maturity levels, with participation, transparency, collaboration and ubiquitous engagements as its maturity level dimensions [25,26]. These maturity levels are related in such a way that, publishing of timely, relevant information on government websites consolidates trust on leaders [27] and accessibility to services allows the citizens to participate and collaborate with the governments. This ultimately leads to a ubiquitous relationship based on engagement of both the government and the governed, which leads to good governance [28]

III. Proposed Approach

The methodology was broken down into the following parts

a. Identification of constructs/indicators and corresponding measurable attributes

b. Classification of attributes into meaningful indicators

c. Development of measurable and quantifiable Metrics for the attributes and indicators

d. Weight determination of attributes

e. Aggregation of Values

Identification of Constructs/Attribute and Classification of Attributes into Meaningful Indicators

The methodology is aimed at building an appropriate transparency measuring instrument for eGovernment websites. This measuring instrument is developed by identifying the constructs that comprehensively describe open government transparency. On the other hand, these constructs boundaries are set by specific attributes. Therefore, to identify these constructs and their descriptive attributes, a comprehensive and rigorous literature review was conducted. Different sources which

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include different sources such as blogs, journals, open government topical books and other publications. These constructs and their attributes were reduced from 6constructs, 72 attributes to 4 constructs42dimensional attributes by checking for functional overlap and discrepancies. The checking for functional overlap and homogenization of the constructs and their describing attributes was conducted by three experts which includes the authors. Fig. 1, below shows the diagrammatic distribution of the core constructs and describing attributes.

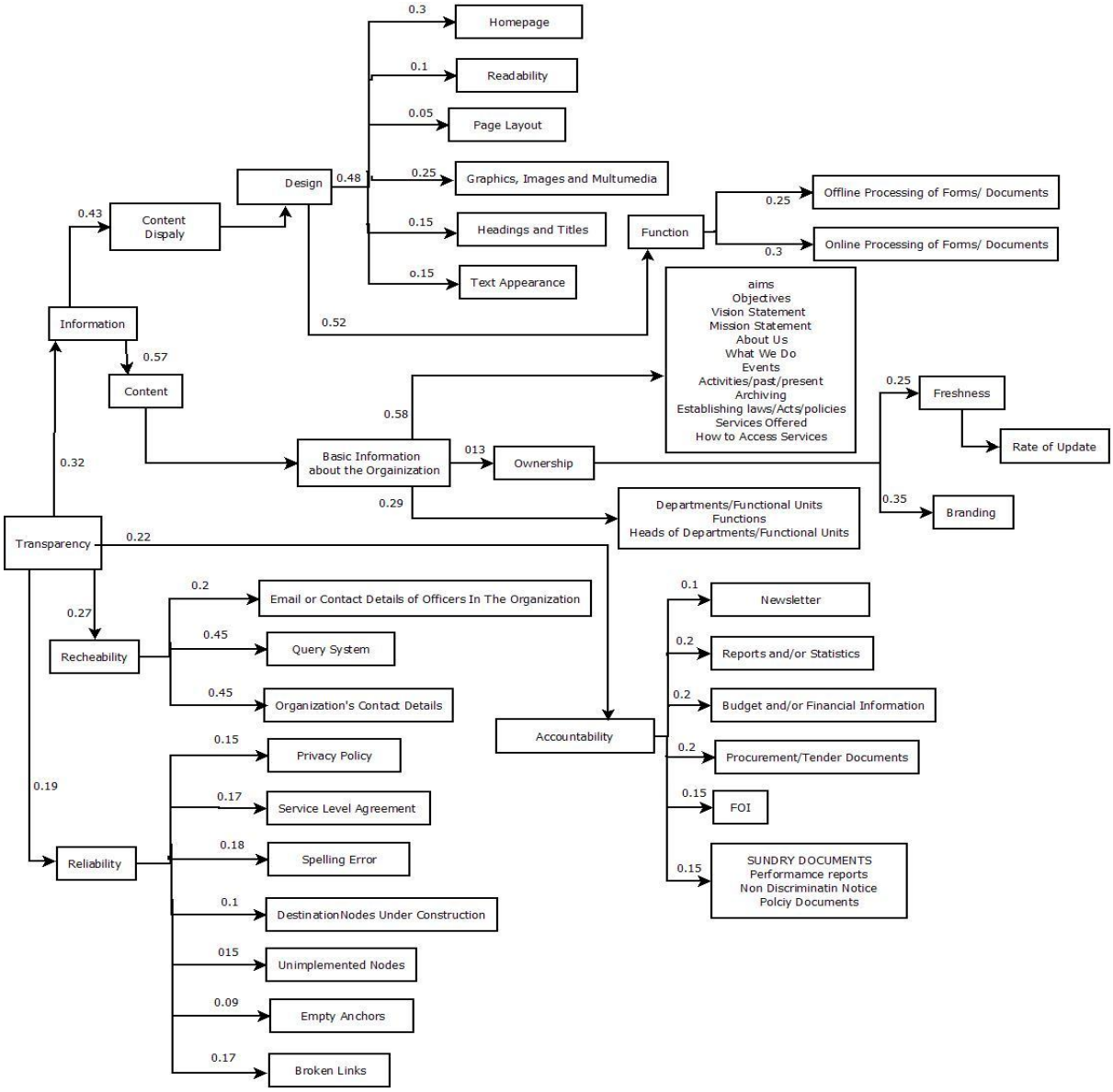

Fig. 1. Identified Constructs and their variables

Development of Metrics

As highlighted earlier, the method of developing quantifiable scales for constructs and attributes as described by Luis olsinarossi [18] was used to develop the transparency quality metrics. The process was used to design the enumerated open government transparency constructs and corresponding attributes mentioned in Fig. 1. The generic developed scale of the design attribute metric system is presented in Fig. 2.

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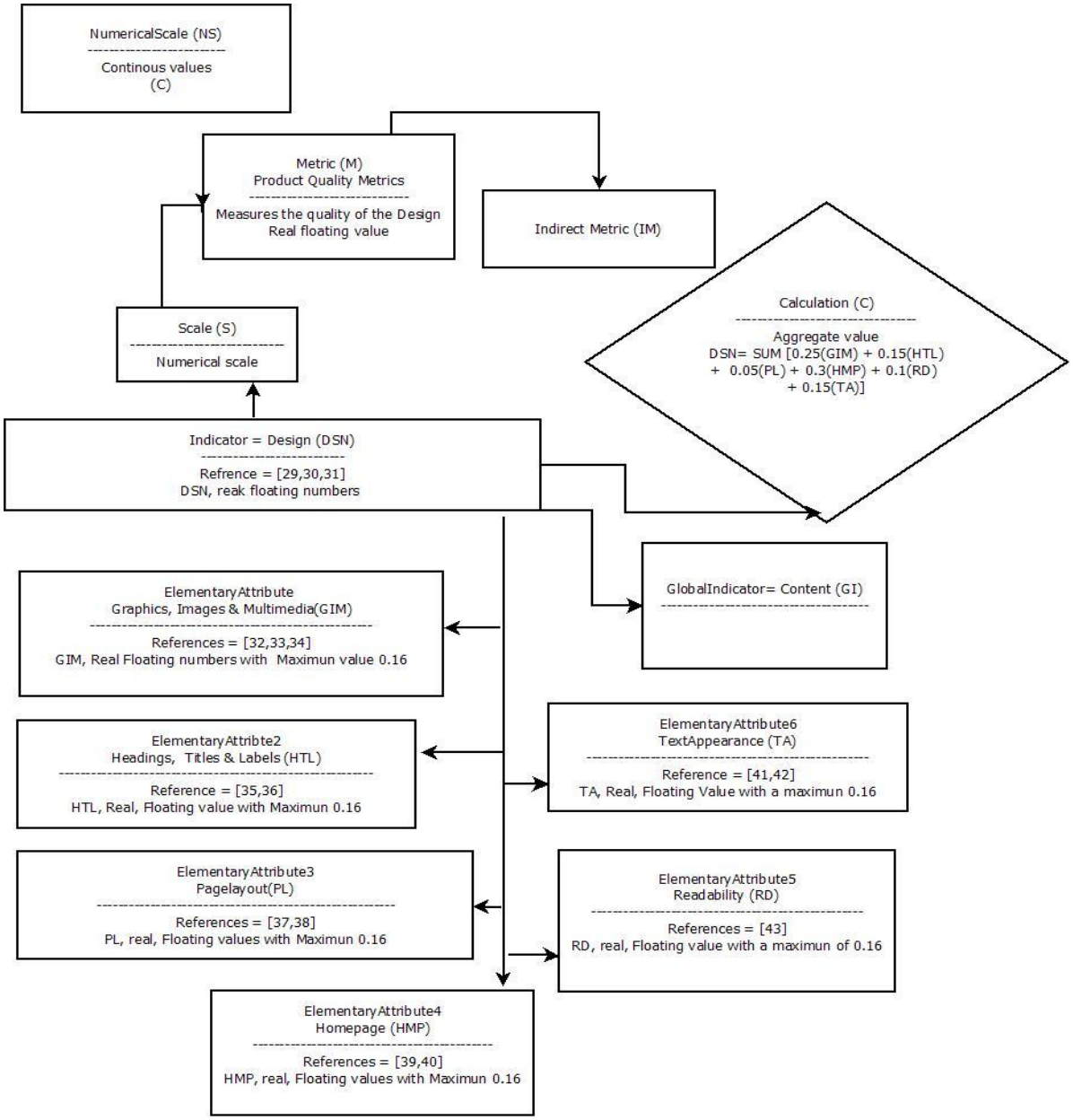

Fig. 2. Design (DSN) Metric Aggregation Procedure

Weight Determination

Since each of the identified construct as well as its corresponding attributes have different weights in different website domains, our approach involves enumerating the weight of each construct as well as their corresponding attributes in the eGovernment websites domains. Again, our approach is geared towards reducing the dependence on expert opinion which is prevalent with other approaches. We used the following three criteria for the weighting of the constructs as well as their corresponding attributes.

a. Relative importance from research using the HHS as guide as well as other research indicators

b. Strength of evidence as scored using the HHS as an inference point as well as research indicators.

c. Using two independent evaluators that are experts in eGovernmnet evaluation to score the attributes an indicators using a Likert scale of 1 – 5 with 1 being low and 5 being excellent.

d. Each of the evaluators will score each

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attribute or indicator independently.

e. The methodology for the weight evaluation is as below.

Criteria for Evaluation.

Let us assume $C_1, C_2 \ldots C_n$ are the criteria for scoring each variables $(V_1, V_2 \ldots V_n)$ for a group of attributes that constitute an Indicator E.

Then the summation of the values of each of the criteria for each scoring variable is represented by equation ….(1) below;

Let $P_1 = \sum_{C=1}^{n} C_1 \ldots C_n$……(1)

Where P_1 = the sum of all the criteria $C_1 \ldots C_n$ for attribute V_1

Let

The sum of all P is;

$P_{Total} = \sum_{P=1}^{n} P_1 \ldots P_n$. . . . ..…… (2)

Then

To scale the weight to factor of 1

$W_1C_1 + W_2C_2 \ldots W_nC_n = 1$ . . ……...(3)

Where W = the weight of each attribute.

Then,

$W_1 = (1 \div P_{Total}) \times C_1$ ……..…… (4)

Then equation (4) can be used to calculate the weight for each i^{th} attribute V_i as below

$W_i = (1 \div P_{Total}) \times C_i$…….. ..(5)

Global Evaluation

This phase aggregates all the values generated from the attributes metrics through the sub-indicators all the way to global indicators while multiplying with individual weights.

IV. Results

This section presents the results obtained from the implementation of the developed approach to 23 Nigerian federal ministries websites.

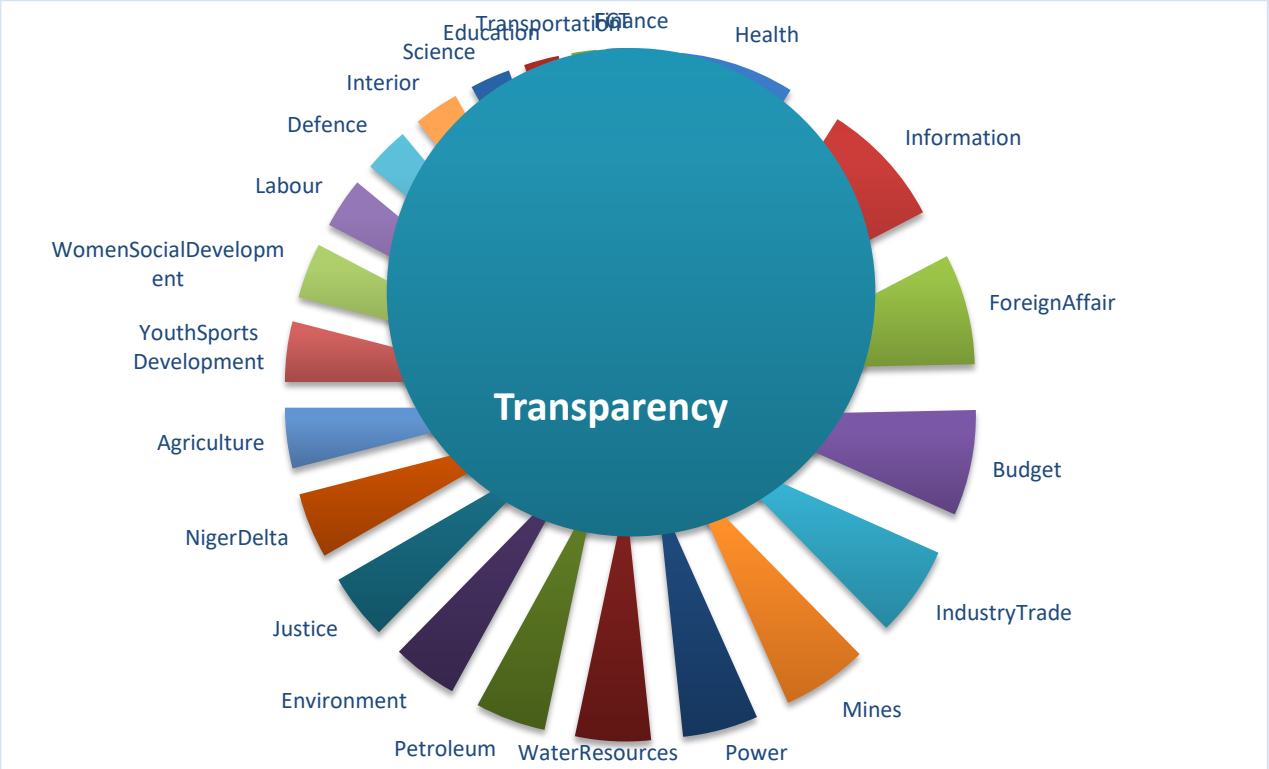

Fig. 3. Distribution of Open Government Transparency in the 23 Ministries.

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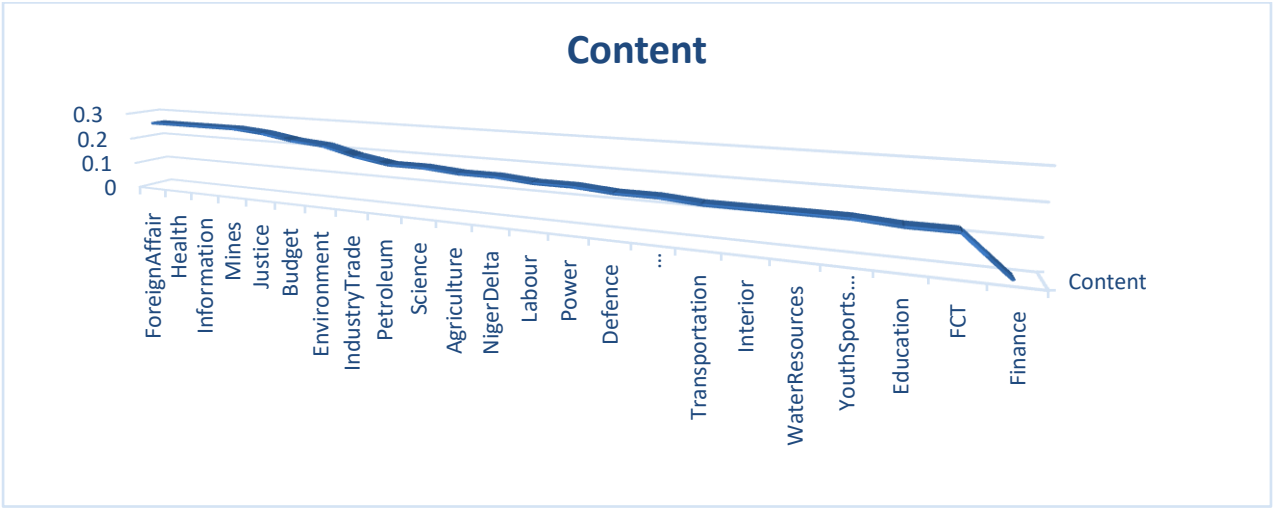

Fig. 4. Distribution of Content Sub-Construct in the 23 Ministries

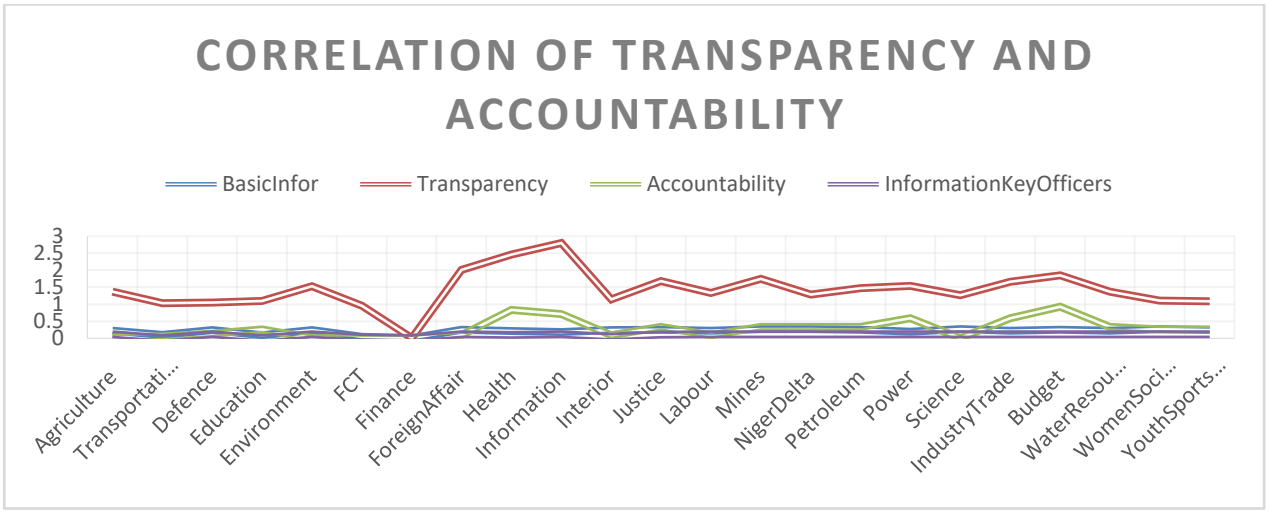

Fig. 5. Correlation of Transparency with Accountability

V. Discussion of Results

Based on transparency, Ministry of Health is the most transparent, with a transparency score of 0.27, this is closely followed by Ministry Information and Ministry of Foreign Affairs with Transparency rating of 0.25 and 0.22 respectively. The pie chart in Fig. 3 gives a clearer picture of the distributions of transparency across the Federal Ministries, with 10 Ministries out of the 23 Ministries under review spread within the 3rd and 4th percentile representing about 36% of the total area of the pie chart.

A line plot of the content indicator in Fig. 4, shows a relatively smooth distribution with 4 Ministries namely, Foreign Affairs, Health, Information and Mines and steel all having a content score of 0.26. This is closely followed by Ministry of Justice and Budget and Planning with 0.25 and 0.23 respectively. About 44% of the Ministries have a score above the average, with the lowest score being 0.12 for the Ministry of Federal Capital Territory. This is a clear indication that, most of the Ministries have relatively good contents as can be seen in the variation in Fig. 4. However, the function sub-indicator of content which has a high weight of 0.52 appears to be the least developed.

Granular analysis of the results obtained for the function sub-indicator showed that, very few Ministries have a dedicated service oriented portal. Also, notably only Ministries of

environment, Foreign Affairs, Health, Mine and Steel and Budget and Planning provide services through their websites. The Ministry of Environment provides a platform for the registration and submission of Initial Environmental Examination IEE for Environmental Impact Assessment EIA contractors. It also provides services through CITES for Forest Administration and Timber Trade Experts in Nigeria. Accordingly, the Ministry of Foreign Affairs also provides services through the Nigeria Economic Diplomacy Initiative NEDI platform. The Ministry of health provides the Health Management Information System. However, Better Health for All (bh4a), Malaria Control Program MCP, and National Aids Control Program as provided by the external links www.bh4a.com.ng, www.mcp.gov.ng, and www.nascp.gov.ng where dead links. In a similar manner, the National Tuberculosis Control link is inactive. The Ministry of Justice provides and Freedom of Information FOI portal. The Ministry of Mine and Steel provides an Integrated Automation Solid Minerals Portal (IASMP. The Ministry of Budget and Planning, has provided links for sundry of services that mainly involves submission of forms online. However, services such as Budget Helpdesk, M&E Information as provide by named links are inactive. Expectedly, the website offers an e-procurement online information page. Other pages such as macroeconomic analysis page only provide on stakeholders information and the procedure as well as functions as opposed to the actual macroeconomic analysis.

A significant part of the content that appears on the website is embedded in basic information about the organizations (BasicInforOrg), Accountability documents (AcctDocs) and information about key officers (InforAbKeyOff). Therefore, a quick view of the correlation of these items is represented in scatter line plot Fig. 5. It can be observed that, there is significant correlation with the shape of the lines graphs between government website transparency and Accountability documents (AcctDocs), a somewhat initial correlation between transparency and basic information about organization (BasicInforOrg) as well as information about key officers (InforAbKeyOff). Running a correlation analysis on each of the itemized indicators against transparency shows that, there is significant positive correlation between the identified indicators with transparencyi.e 0.464560803, 0.668659419 and 0.541911935 BasicInforOrg, AcctDocs and InforAbKeyOff respectively. Undertaking a regression analysis yields the following P-values (with a 95% confidence value) O.617754558, 0.00288852 and 0.445624668 for BasicInforOrg, AcctDocs and InforAbKeyOff respectively. The results obtained from the statistical analysis further consolidate the graph in Fig. 5, by showing Accountability Documents having the significant P-value less than 0.05 i.e 0.00288852. Therefore, confirming the direct correlation between the Accountability Documents (AcctDocs) and Open government transparency. It can be concluded that, to enhance transparency, the Federal Ministries websites of Nigeria should be encouraged to make available, up-to-date Accountability documents on their respective websites.

VI. Conclusion

In this paper, we identified a gap in the development of evaluation frameworks for transparency on open government transparency in a government website. A total of four major constructs namely information, reachability, reliability, accountability were identified to adequately describe open government transparency, within the context of our approach. Measureable attributes for each of the constructs were identified and a metric scale of measurement was developed using the ISO 9126 product quality concept. A weighting method that is less subjective was developed to weight the contribution of each attribute amongst a group of attributes. The developed model was utilized to measure the open government transparency of 23 Nigerian federal ministries websites and rank them accordingly.

VII. Limitations of the Proposed Approach

It should be noted that, the evaluation is positively inclined as it measures the presence of identified features and simultaneously tries to ascertain the quality of this feature against an assessment criterion. Consequently, the method does not factor in the consequence or the negative impacts of the existence of some negative features or even badly implemented features. It is imperative to note that, the unavailability of certain features or services which would have been otherwise proclaimed to be available have a remarkable consequence on other measurable quantitiese.g the impact of a dead or unimplemented link on the reliability measure.

References

[1] Harper, Logan (27 March 2013). "Gov 2.0 Rises to the Next Level: Open Data in Action". Open Source. Retrieved 24 July 2013.

[2] Yu, H. & Robinson, D. G. (2012). "The New Ambiguity of 'Open Government'". In: UCLA Law Review Discourse, 59, 178-230. Available at SSRN: https://ssrn.com/abstract=2012489.

[3] Peixoto, T. (2013). "The Uncertain Relationship between Open Data and Accountability: A Response to Yu and Robinson's 'The New Ambiguity of Open Government'". In: 60 UCLA Law Review Disc. 200. Available at SSRN: https://ssrn.com/abstract=2264369.

[4] Mulgan, R. (2014). Making open government work, London, Palgrave-Macmillan.

[5] Joel S. S., Guillermo M. C., "Introducing the Open Government Metric: A quantitative instrument to measure improvement in Mexico,": 2017. Available at: https://www.opengovpartnership.org/stories/introducing-open-government-metric-quantitative-instrument-measure-improvement-mexico

[6] Darbishire, H. (2010). *Proactive Transparency: The future of the right to information?*. World Bank.

[7] Bertot, J. C., McDermott, P., & Smith, T. (2012, January). Measurement of open government: Metrics and process. In *2012 45th Hawaii International Conference on System Sciences* (pp. 2491-2499). IEEE.

[8] Huijboom, N., &Broek, T. V. d. (2011). Open data: an international comparison of strategies. European Journal of ePractice.

[9] Harrison, T. M., Guerrero, S., Burke, G. B., Cook, M., Cresswell, A., Helbig, N., ...& Pardo, T. (2012). Open government and e-government: Democratic challenges from a public value perspective. *Information Polity*, *17*(2), 83-97.

[10] Fox, J. (2007). The uncertain relationship between transparency and accountability. *Development in practice*, *17*(4-5), 663-671.

[11] Sandoval, R. (2011). The two door perspective: An assessment framework for open government. *JeDEM-eJournal of eDemocracy and Open Government*, *3*(2), 166-181.

[12] Sandoval-Almazan, R., &Steibel, F. (2013, October). Benchmarking Mexico & Brazil open government websites: model and metrics. In *Proceedings of the 7th International Conference on Theory and Practice of Electronic Governance* (pp. 372-373). ACM.

[13] Richardson, E. L. (1973). Freedom of Information. *Loy. L. Rev.*, *20*, 45.

[14] Lathrop, D., &Ruma, L. (2010). *Open government: Collaboration, transparency, and participation in practice*. " O'Reilly Media, Inc.".

[15] Fishenden, J., & Thompson, M. (2012). Digital government, open architecture, and innovation: why public sector IT will never be the same again. *Journal of public administration research and theory*, *23*(4), 977-1004.

[16] Scholl, H. J. (2012). Five trends that matter: Challenges to 21st century electronic government. *Information Polity*, *17*(3, 4), 317-327.

[17] Prieto, L. M., Rodríguez, A. C., & Pimiento, J. (2012, October). Implementation framework for open data in Colombia. In *Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance* (pp. 14-17). ACM.

[18] Olsina, L., & Rossi, G. (2002). A quantitative method for quality evaluation of web sites and applications. IEEE multimedia, 9(4), 20-29.

[19] Dawes, S. S. (2010). Stewardship and usefulness: Policy principles for information-based transparency. *Government Information Quarterly*, *27*(4), 377-383.

[20] Sandoval-Almazan, R., & Gil-Garcia, J. R. (2014, September). Towards an evaluation model for open government: A preliminary proposal. In *International Conference on Electronic Government* (pp. 47-58). Springer, Berlin, Heidelberg.

[21] McGee, R. & Edwards, D. (2016). "Introduction: Opening Governance - Change, Continuity and Conceptual Ambiguity". In: Opening governance, 47 (1), 1-22.

[22] Cerrillo-i-Martínez, A: The regulation of diffusion of public sector information via electronic means: Lessons from the Spanish regulation. Government Information Quarterly, Vol. 28 (2011), pp. 188–199.

[23] Cuillier, D. &Piotrowski, S: Internet information-seeking and its relation to support for access to government records. Government Information Quarterly, Vol. 26 (2009), pp. 441–449.

[24] Alt, J. &Lassen, D: Fiscal transparency, political parties, and debt in OECD countries. European Economic Review, Vol. 50 (2006), pp. 1403–1439.

[25] Lee, G. &Kwak, Y: An Open Government Maturity Model for social media-based public engagement. Government Information Quarterly, Vol. 29 (2012), pp. 492–503.

[26] Ganapati, S. & Reddick, C: Open e-government in U.S. state governments: Survey evidence from Chief Information Officers. Government Information Quarterly, Vol. 29 (2012), pp. 115–122.

[27] Armstrong, C: Providing a clearer view: An examination of transparency on local government websites. Government Information Quarterly, Vol. 28(2011), pp. 11–16.

[28] Jaeger, P. T., &Bertot, J. C. (2010). Transparency and technological change: Ensuring equal and sustained public access to government information. *Government Information Quarterly*, *27*(4), 371-376.

[29] Zimmerman, Donald E., Carol A. Akerelrea, David B. Buller, Barbara Hau, and Michelle Leblanc. "Integrating usability testing into the development of a 5 a day nutrition website for at-risk populations in the American Southwest." *Journal of health psychology* 8, no. 1 (2003): 119-134.

[30] Macbeth, S. A., Moroney, W. F., & Biers, D. W. (2000). Development and Evaluation of Symbols and Icons: a Comparison of the Production and Focus Group Methods, Proceedings of the IEA 2000/HFES 2000 Congress (Vol. 1, pp. 327-329(323)): Human Factors and Ergonomics Society.

[31] Thurlow, M. L., McGrew, K. S., Tindal, G., Thompson, S. J., Ysseldyke, J., & Elliott, J. L. (2000). Assessment accommodations research: Considerations for design and analysis (Technical Report 26). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

[32] Vaughan, M. W. (1998). Testing the boundaries of two user-centered design principles: metaphors and memory load. *International Journal of Human-Computer Interaction*, *10*(3), 265-282.

[33] Farkas, D. K., &Farkas, J. B. (2000). Guidelines for designing web navigation. *Technical communication*, *47*(3), 341-358.

[34] Faraday, P., & Sutcliffe, A. (1997, March). Designing effective multimedia presentations. In *Proceedings of the ACM SIGCHI Conference on Human factors in computing systems* (pp. 272-278). ACM.

[35] Spyridakis, J. H. (2000). Guidelines for authoring comprehensible web pages and evaluating their success. *TECHNICAL COMMUNICATION-WASHINGTON-*, *47*(3), 359-359.

[36] Bartell, A. L., Schultz, L. D., &Spyridakis, J. H. (2006). The effect of heading frequency on comprehension of print versus onlineinformation.*Technical communication*, *53*(4), 416-426.

[37] Rosenholtz, R., Li, Y., Mansfield, J., &Jin, Z. (2005, April). Feature congestion: a measure of display clutter. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 761-770). ACM.

[38] Halverson, C. A., & Ackerman, M. S. (2003, January). Yeah, the Rush ain't here yet-Take a break: Creation and use of an artifact as organizational memory. In *36th Annual Hawaii International Conference on System Sciences, 2003. Proceedings of the* (pp. 10-pp). IEEE.

[39] Koyani, S. J., Bailey, R. W., and Nall, J. R.

2003b. Research-Based Web Design & Usability Guidelines. National Institutes of Health.
[40] Nielsen, J. (2003). Usability 101: Introduction to usability.
[41] Adkisson, H.P. (2002) "Identifying de-facto standards for e-commerce websites", Proceedings of IEEE International Professional Communication Conference, pp. 22–45.
[42] Melody Y. Ivory , Marti A. Hearst, Improving Web Site Design, IEEE Internet Computing, v.6 n.2, p.56-63, March 2002
[43] Norvig web data science award. (2013). http://norvigaward.github.io/index.html,
[44] Chadwick, A., & May, C. (2003). Interaction between States and Citizens in the Age of the Internet:"e-Government" in the United States, Britain, and the European Union. *Governance*, *16*(2), 271-300.
[45] Khan, Z., Kiani, S. L., &Soomro, K. (2014). A framework for cloud-based context-aware information services for citizens in smart cities. *Journal of Cloud Computing*, *3*(1), 14.
[46] Worthy, B. (2010). More open but not more trusted? The effect of the FreedomofInformationAct2000ontheUnited Kingdomcentralgovernment.*Governance*,*23*(4), 561-582.
[47] Grönlund, Å. (2010, August). Ten years of e-government: The 'end of history'and new beginning. In *International Conference on ElectronicGovernment* (pp. 13-24). Springer, Berlin, Heidelberg.
[48] Kim, S., & Lee, J. (2012). E-participation, transparency, and trust in local government. *Public Administration Review*, *72*(6), 819-828.
[49] Stern, R. A. (1997). The GSC sensitive high resolution ion microprobe (SHRIMP): analytical techniques of zircon U–Th–Pb age determinations and performance evaluation. *Geological Survey of Canada, Current Research.*
[50] Fisher, E. (2010). Transparency and administrative law: a critical evaluation. *Current Legal Problems*, *63*(1), 272-314.
[51] Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, *27*(3), 264-271.
[52] BARMAN, S. 2000. Writing Information Systems Security Policies, Indianapolis, New Riders Publishing.
[53] Relly, J. E., &Sabharwal, M. (2009). Perceptions of transparency of government policymaking: A cross-national study. *Government Information Quarterly*, *26*(1), 148-157.
[54] Roberts, A. (2006). *Blacked out: Government secrecy in the information age*. Cambridge University Press.
[55] Cuillier, D., &Piotrowski, S. J. (2009). Internet information-seeking and its relation to support for access to government records. *Government Information Quarterly*, *26*(3), 441-449.
[56] Mulgan, R. (2007). Truth in government and the politicization of public service advice. *Public administration*, *85*(3), 569-586.
[57] Relyea, H. C. (2009). Federal freedom of information policy: Highlights of recent developments. *Government Information Quarterly*, *26*(2), 314-320.
[58] Quinn, A. C. (2003). Keeping the citizenry informed: Early congressional printing and 21st century information policy. *Government Information Quarterly*, *20*(3), 281-293.
[59] Open Society Institute. (2006). *Transparency & silence: A survey of access to information laws and practices in fourteen countries*. Open Society Inst.