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Open Government Data in Africa: A preference elicitation analysis of media practitioners

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ABSTRACT

Open Government Data (OGD) continues to receive considerable traction around the world. In particular, there have been a growing number of OGD establishments in the developed world, sparking expectations of similar trends in growing democracies. To understand the readiness of OGD stakeholders in Africa especially the media, this paper (1) reviews current infrastructure at OGD web portals in Africa and (2) conducts a preference elicitation analysis among media practitioners in 5 out of the 7 OGD country centers in Africa regarding desired structure of OGD in developing countries. The analysis gives a view of the relative importance media practitioners ascribe to a selected set of OGD attributes in anticipation of a more functional OGD in their respective countries. Using conjoint analysis, the result indicates that media practitioners put premium on 'metadata' and 'data format' respectively in order of importance. Results from the review also reveal that features of current OGD web portals in Africa are not consistent with the desired preferences of users. Overall, the study provides a general insight into media expectations of OGD in Africa, and also serves as a foundational knowledge for authorities and practitioners to manage expectations of the media in connection with OGD in Africa.

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1. Introduction

Open Government Data (OGD) is gradually resonating with governments around the world (Gonzalez-Zapata & Heeks, 2015; Krishnamurthy & Awazu, 2016; US Gov., 2016). For instance, as of 2015, 52 countries and 164 regions (cities and districts) around the world have functioning OGD centers (US Gov., 2016). This development is welcoming especially given the fact that, public data had for a long time been the exclusive reserve of the state (Yiu, 2012). Besides the individual country initiatives, major global development-oriented organizations have also been advocating for a broader acceptance of OGD by its member countries. Some of such organizations are the World Bank, The Organization for Economic Co-operation and Development, International Monetary Fund, United Nations, Bank of International Settlements, European Central Bank, African Development Bank, the statistical office of the European Union (EUROSTAT) and the European Commission (OECD, 2014; AfDB, 2011; AfDB, 2014; World Bank, 2015).

Despite the growing acceptance and interest in OGD, the definition, scope, expectations and preferences among key stakeholders such as politicians, civil society groups, funding agencies, public sector officials

and the media have been varied (Gonzalez-Zapata & Heeks, 2015). However, while the definitional differences and the seeming discrepancies in the scope of OGD are not surprising, the logistics, standards and methodologies are expected to be synchronized. In particular, standardizing the technical requirements is key to guiding OGD adaptations around the world. In addition to achieving consistency in technical requirements, understanding preferences and expectations of key actors is also viewed as a positive step to successfully localizing the OGD concept in various regions around the world (Martin, Kaltenböck, Nagy, & Auer, 2011). According to Stoneman (2015), one key actor conspicuously missing in most OGD discourses is the media - professional practicing journalists including those in the print and electronic media (radio and TV), as well as online journalists such as bloggers. For instance, while the media's role in Freedom of Information (FOI), otherwise known as Right to Information (RTI) is well recognized (Burgess, 2015; Giannone & De Frutos, 2016; Stoneman, 2015), its role in OGD has not been well-defined or discussed. Stoneman (2015) posits that the media is both a beneficiary and an agent of OGD. As beneficiaries, the media stands to gain in a functional OGD, by having ready access to data for its work. In addition, media practitioners also stand to benefit by using OGD to hone their skill sets in data journalism or precision journalism (Lewis & Usher, 2013; Stoneman, 2015). As an agent of information channel and dissemination, the media has the capacity to create and shape public opinion on the usefulness of OGD (Sambrook, 2013; Martin et al., 2011;

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Network, 2013; Stoneman, 2015). In view of this and to facilitate the role of the media in OGD, it is imperative to understand their preferences and expectations.

This paper therefore conducts a preference elicitation analysis of media practitioners in 5 out of the 7 OGD country centers in Africa to determine preferences of media practitioners regarding features of an ideal OGD web portal. The preference model employed also allows for the determination of the relative importance of the preferred features by the media practitioners. Since the conception and the formal launch of OGD, several studies ranging from definitional challenges among different stakeholders (Gonzalez-Zapata & Heeks, 2015; Vetrò et al., 2016), perceived benefits, myths and challenges (Martin, 2014; Janssen, Charalabidis, & Zuiderwijk, 2012; Robinson, Yu, Zeller, & Felten, 2009), standards and frameworks (Bennett & Harvey, 2009; Herzog, 2014), to policy issues (Martin, 2014; Yiu, 2012; Zuiderwijk & Janssen, 2014) have been authored. Though some works have focused on reporting on initiatives made over the years in some countries (Attard, Orlandi, Scerri, & Auer, 2015; Krishnamurthy & Awazu, 2016; Ubaldi, 2013; Huijboom & Van den Broek, 2011; Rahemtulla, Kaplan, Gigler, Cluster, Kiess & Brigham, 2011; Ohemeng & Ofosu-Adarkwa, 2015), none so far has conducted a technical infrastructural audit of OGD web portals in accordance with established standards and requirements. Furthermore, none of the previous works on OGD, has attempted to understand preferences and expectations of stakeholders in specific regions around the world, with a view to understanding the adequacy of current standards and methodologies. The study therefore fills theory and research gaps in two folds: First, an audit is conducted of the current infrastructure used at OGD centers in Africa. The audit, reviews the current web services infrastructure offered on each country's OGD web portal, grouped mainly into web portal *functionalities* and *contents*. The second contribution of the paper focused on understanding media practitioners' preferences of ideal OGD features or characteristics. The traditional conjoint analysis method was deemed appropriate for building the preference and elicitation model. Further, relative importance assigned by media practitioners are segmented based on their socio-demographic characteristics.

The rest of the paper is structured as follows. First, a brief description of current state of the art at OGD centers in Africa is provided. This is followed by the methodology, where the mathematical theory, the design and implementation of conjoint analysis are presented. The results, discussion, recommendations and conclusion are further presented.

2. State of the art of Open Government Data centers in Africa

The growth of OGD centers in Africa has generally slowed in spite of the high expectations since its launch in 2011 (Kassen, 2014; Cretu & Manolea, 2013). According to Open Government Partnership, the pioneering organization responsible for the global OGD launch, there are 11 countries in Africa out of 69 in the world that have signed the OGD declaration as of 2016 (OGP, 2016). However, only 7 out of the 11 countries comprising of Ghana, Sierra Leone, Tunisia, Morocco, South Africa, Kenya and Tanzania have functioning OGD web portals (US Gov., 2016).

To understand the level of progress made in Africa, this section reviewed the OGD setup, tools and standards currently implemented on the various OGD web portals for the seven African countries. In particular, the examination focused on the technical capacity (web content and functionalities), revealing features (standards) currently available and those missing across the various OGD country web portals.

2.1. OGD portal audit strategy

The World Wide Web Consortium's (W3C) benchmarks for publishing OGD data (Bennett & Harvey, 2009) and the World Bank's Technical option guide (Herzog, 2014), spell out technical requirements necessary for establishing efficient and modern OGD data centers. Together, the

two standards among other things, emphasize on (1) that public datasets are as much as possible published in their raw state rather than in an analyzed form, (2) that each dataset is accompanied by a well-documented metadata and (3) that data is stored in a range of formats – both human and machine-readable. Based on these technical requirements, as well as observing OGD web features on well-established OGD centers such as the US, UK and Australia, a range of OGD web characteristics were selected for the audit study. Table 1 explains the selected OGD features and the audit strategy used to establish the availability or unavailability of an OGD feature. The characteristics for the audit were conveniently divided into two broad categories of 'OGD portal content' and 'OGD portal functionalities' as shown in Table 1. Lower level categories under OGD portal content included *total datasets* (as at the time of this research), *number of data categories*, *links to external data sites*, *data currentness* (monthly), *metadata* and *data format*. Similarly, lower level categories under the 'OGD portal functionalities' classification, were *data search*, *data visualization*, *social media plugins* and *social media availability*.

Consistent with the guidelines, the study sought to determine how each country measures up on these metrics. A web content analysis (feature analysis) approach was used in the inventory audit by scanning through the web pages to identify relevant features. Most of the features such as *data search*, *links to external sites*, *social media plugins*, *data visualization*, *data currentness* and *number of data categories*, could easily be identified on each OGD website. However, the other features required thorough search through all the web pages. Table 2 presents the results of the OGD portal content and functionality audit findings. Apart from some measurable properties such as total datasets and number of data categories (subject areas), the rest of the metrics sought binary answers regarding the availability or otherwise of OGD features. If a feature is available, it is assigned the symbol (✓) and when not available, the symbol (x) is used. If the feature happens to be present on the webpage but not functioning, it is assigned the symbol (✓x).

2.2. Audit findings

This section summarizes the findings of the OGD web content and functionality audit (Table 2) giving an insight into the progress and deficiencies at OGD centers in Africa. In all, Kenya had the most datasets (about 8 times more than what the second highest country provided on its portal). Sierra Leone had the least number of datasets (as of the time of this research). On categories of data, Tunisia provides as many as 17 different categories of datasets though the country only provides three formats for its datasets – PDF, CSV and XLS(X). Some of the commonest data categories observed across all data portals were *education*, *agriculture*, *health*, *environment*, *governance*, *construction*, *energy* and *finance*. Some data categories were on subjects such as *state property*, *social affairs*, *real property*, *commerce* and *vocational training* which could have been classified under some higher categories.

Sierra Leone, Tanzania and Morocco do not provide links to external datasets stored on other publicly accessible servers. However, with the exception of Sierra Leone, all other countries were found to be providing up-to-date datasets. It is quite interesting that metadata which is one of the key features emphasized in the W3C benchmarks and the World Bank OGD technical guide have received no attention. Only Kenya provides data in a metadata form. Even that, Kenya provides only descriptive metadata without structural and administrative formats. There are mixed results on data formats. Tanzania provides data in only one format – comma separated value (CSV) while South Africa and Tunisia provide only two data formats. Kenya however, provides as many as 8 different data formats to ease data access, while Sierra Leone provides five different data formats. Technical guidelines dictate that OGD centers do not become just data repositories, but offer data in machine readable formats such as JSON, XML, API, RSS, RDF etc. In this regard, Kenya stands out among the 7 countries.

Table 1
OGD Web content and functionality audit strategy.

Feature	Audit strategy	
Total no. of datasets	The inclusion of this feature was to find out the total number of datasets stored on respective country's OGD servers since 2011(the year all the 7 countries joined OGD). Here datasets from the various subject categories were aggregated to arrive at the final value. Column 2 of Table 2, shows the total count of datasets recorded on each OGD web portal as of the time.	
Links to external sites	This OGD characteristic is a requirement captured in the World Bank Technology option guide for publishing OGD. Here, the audit strategy sought to identify instances where an OGD portal provided external links to datasets that are stored on different publicly accessible servers. For instance, due to copy right issues, where a dataset is not owned by an OGD portal, it is expected to provide a direct link to where the data can be located.	
OGD web portal content	No. of data categories	This characteristic measured the variety of data categories stored on each country's OGD portal. Open government partnership recommends that OGD portals store as many datasets covering variety of subjects as possible.
	Data currentness (30 days)	This feature measured the 'up-to-dateness' of datasets stored on each OGD portal. The audit strategy was to check the date on which the most current dataset was published. If the date is more than 30days, then the feature is considered 'not available'.
	Metadata	This characteristic checks whether datasets come with requisite information that adequately describes the data. This is a key requirement by OGD advocates. The audit strategy manually checked whether datasets were provided with metadata.
	Data formats	Another key requirement of OGD portals is the provision of data in both human and machine-readable non-proprietary formats such as CSV, XML, PDF, RDF JSON etc. to facilitate easy access by the public. The audit strategy sought to find whether an OGD portal had as many data formats covering various data types as possible. For instance, it is expected that data in the form of documents are stored in either PDF, doc(x) or Excel etc. and geographical data are stored in Keyhole Markup Language (KML) or their equivalent alternatives. The array of data formats as seen in Table 2 were selected from the World Wide Web Consortium (W3C) and the World Bank Technology guide for publishing OGD. The search for the data formats was easier on some OGD portals as they could easily be identified on the websites. However, for others, another search through their html codes was necessary to locate the data formats.
OGD portal functionalities	Data search	This characteristic focused on looking for a 'search box' feature on OGD webpages that allows users to easily locate specific information through a search term. This is a requirement by the World Wide Web Consortium (W3C) for publishing OGD.
	Social media plugins	Embedding social media plugins in the OGD portal design is a requirement in the World Bank Technology guide for publishing OGD. The essence of this feature is to engage data users to share their experiences and suggest new datasets through comments. The audit strategy focused on identifying at least one social media site integrated in the web design. Particularly, we looked for the presence of Facebook, Twitter or Google+.
	Social media availability	This feature is a follow up to the 'social media plugin' characteristic. Here, the strategy was to ascertain whether the social media plugins actually direct users to a functioning social media portal. Keys to Table 2 further explains it.
	Data visualization	This feature is also a requirement by OGD advocates who emphasize that OGD portals provide a functionality to help users visualize the data. Visualization features come in various forms including tables, graphs, maps etc. The audit strategy checked whether the OGD portals provided this feature in the design or not.

On the measures of *data visualization* and *data search* under OGD portal functionalities, all the countries with the exception of Tunisia possessed these features on their web portals. Finally, the Technology option in the World Bank guide for publishing OGD recommends that OGD centers also build strong social media presence to engage the public on data access and use. Here the study did not only check whether OGD portals integrated social media site plugins in the web design, but also further clicked on those links to ascertain whether their social media portals were functioning and were current (at least a month old activity). The audit findings revealed that whiles South Africa and Sierra Leone like the rest of the countries had social media plugins on their

web pages, it was not operational. Kenya and Tunisia were by far the only countries with an active and current OGD social media presence. Social media platforms considered in the study were Facebook, Twitter and Google +.

Overall, Kenya favourably sits at the top in terms of the technical richness of its OGD web portal. In fact, OGD portal Kenya, possesses a state of the art data repository with advanced features that are almost similar to data portals of OGD pioneering countries such as the UK (<https://data.gov.uk/>) and the US. (<http://www.data.gov/open-gov/>). This demonstrates Kenya's strong commitment to making public data free and easily accessible.

Table 3
Relevant attributes in Open Government Data preference modelling.

Attribute	Definition	Literature support
C ₁ : data quality	This attribute examines key characteristics that make data reliable and useful for its intended application and subsequent decision making. There are several characteristics used in measuring quality of data. This study focused on <i>currentness</i> , <i>relevance</i> and <i>accuracy</i>	Vetrò et al. (2016); Lathrop and Ruma (2010); Wang and Strong (1996); Batini, Cappiello, Francalanci, and Maurino (2009); Batini and Scannapieca (2006); Wang, Storey, and Firth (1995); Haug, Zachariassen, and Van Liempd (2011)
C ₂ : data format (cost to access)	The concept of OGD largely hinges on provision of easy access, re-use and distribution of data. For users (especially a basic user) to make the most out of the data and documents they access, the format of the data is a key consideration. This is because, the format determines whether the data can be accessed at a cost, opened later or redistributed. The levels under this attribute inquire whether media practitioners prefer <i>non-proprietary</i> (e.g. CSV, XML, etc.) or <i>proprietary</i> (e.g. EXCEL) data formats in a trade-off setting.	Maali, Cyganiak, and Peristeras (2010); Robinson et al. (2009); Huijboom and Van den Broek (2011); Bauer and Kaltenböck (2011); Zuiderwijk et al. (2012)
C ₃ : metadata	Public data that is not accompanied by a well-documented metadata is to a greater extent, useless to many especially those with no domain knowledge of the area. In particular, our focus group (media practitioners) are traditionally not statisticians, data scientists or information systems analysts. The utility of a metadata is measured using the 3 main types namely <i>descriptive</i> , <i>structural</i> and <i>administrative metadata</i> .	Reiche and Hofig (2013); Maali et al. (2010); Attard et al. (2015); Mark and Roussopoulos (1987); Hönle, Käppler, Nicklas, Schwarz, and Grossmann (2005); Greenberg (2005); National Information Standards Organization (US) (2004)
C ₄ : data availability	This attribute addresses the issue of whether users accessing OGD datasets from the web portals, have instant access from every location at any time. Data availability is a key metric in several information systems standards including information assurance (IA) and storage service providers (SSPs).	Berners-Lee (2006); Kleijen (1999); Bretz (1998); Gupta and Schonberg (1993).
C ₅ : data integrity	The integrity of data, particularly to our focus group (media practitioners) cannot be overemphasized. To measure the weight practitioners place on data integrity the levels used are high, medium and low.	Robinson et al. (2009); Vetrò et al. (2016); Batini and Scannapieca (2006); Wang and Strong (1996)

where β_{ij} expresses the part-worth utility estimate on a j -th level of an i -th factor ($i = 1, 2, \dots, n$ and $j = 1, 2, \dots, m$), and G_{ij} indicates the presence of the j -th level of the i -th attribute or criteria.

One of the aims of conjoint analysis is the determination of the relative importance of attribute-levels. The relative importance is computed as weights in percentages using Eq. (3).

$$\tilde{W}_j = \frac{\text{Max}(\beta_{ij}) - \text{Min}(\beta_{ij})}{\sum_{j=1}^t [\text{Max}(\beta_{ij}) - \text{Min}(\beta_{ij})]} \times 100 \quad (3)$$

In Eq. (3), W_j is the relative importance of attribute (A_j); $\text{Max}(\beta_{ij})$ represents the maximum utility of the attribute which signifies the most preferred attribute level (A_j) among respondents and $\text{Min}(\beta_{ij})$ represents the minimum utility which means the least preferred level in attribute A_j (Green & Srinivasan, 1978).

3.2. Stimuli construction

According to Rao (2014), a number of steps are typically followed in conjoint analysis stimuli design. These are (1) attribute-levels selection

(2) generating scenario combination (profile set) to be ranked or rated (3) questionnaire design and (4) the preference modelling. The following section explains the steps especially as used in this study.

3.2.1. Selection of attributes and levels

The audit findings of the OGD infrastructure, relevant information systems evaluation requirements (literature) and expert knowledge aided the selection of five attributes for the preference and elicitation modelling. It must be noted that not all the findings in the audit were relevant for the preference modelling. For instance, features such as 'total datasets', 'no. of data categories' were not deemed relevant attributes or sub-attributes in the preference modelling. Further, the study was also guided by the need to create limited but relevant set of profiles suitable for preference modelling of OGD web features. This was to ensure that respondents were not unnecessarily saddled with many attributes and levels that would result in long unrealistic questionnaires (Orme, 2010).

Data format and metadata were directly taken from the audit findings. Similarly, there was the need to create data quality as an attribute for the OGD features of data currentness and data visualization. Data availability and integrity were added as information systems security

Table 4
Scenario combinations of attributes and their levels in an ideal Open Government Data portal.

Observation	Data Quality	Data format	Metadata	Availability	Integrity	Respondent 1	Respondent 198
Profile1	Currency	Proprietary	Administrative	Occasionally available	High	7	8
Profile2	Accuracy	Nonproprietary	Structural	Occasionally available	Medium	3	1
Profile3	Currency	Nonproprietary	Structural	Occasionally available	High	4	4
Profile4	Currency	Proprietary	Structural	Always be available	Low	12	12
Profile5	Accuracy	Nonproprietary	Administrative	Always be available	Low	11	11
Profile6	Currency	Nonproprietary	Descriptive	Always be available	Medium	2	2
Profile7	Accuracy	Proprietary	Structural	Always be available	High	6	6
Profile8	Accuracy	Proprietary	Descriptive	Occasionally available	Low	10	10
Profile9	Relevance	Proprietary	Structural	Always be available	Medium	9	9
Profile10	Relevance	Nonproprietary	Structural	Occasionally available	Low	5	5
Profile11	Relevance	Proprietary	Administrative	Occasionally available	Medium	8	7
Profile12	Relevance	Nonproprietary	Descriptive	Always be available	High	1	3

Table 5
Demographic profile of respondents.

Profile of respondents	Frequency	Percentage (%)
Gender		
Male	87	43.90
Female	111	56.1
Age (yrs.)		
18–24	45	22.7
25–34	102	51.6
35–44	34	17.2
45 +	17	8.59
Country of practice		
Ghana	66	33.3
Kenya	48	24.3
Sierra Leone	32	16.2
South Africa	36	18.2
Tanzania	16	8.09
Highest educational level		
High school	2	1.01
Professional certificate	22	11.1
Bachelor's degree	112	56.5
Master's degree	62	31.3
Doctoral degree	0	0
Which of the following media do you most contribute to?		
Print media	56	28.31
Television	23	11.61
Radio	32	16.17
Internet (e.g. blogger)	68	34.31
Other	19	9.6
Had you heard of Open Government Data before this questionnaire?		
Yes	77	38.89
No	121	61.11
Have you ever visited your country's open data website before?		
Yes	58	29.29
No	140	70.71
Have you accessed data from the website for your peruse before?		
Yes	46	23.23
No	152	76.77

attributes (Palmius, 2007; Borglund, 2005). This was because, as an information system, data on OGD portals are expected to be available, reliable and consistent (not altered) when media practitioners access it. Since the preference modelling primarily sought to find out from media practitioners what features could help make data useful and easily accessible for them on OGD web portals, the social media plugin

and social media availability features which are not directly related to data access were excluded. Table 3 presents the relevant attributes used in the preference modelling along with their definition and literature support.

3.2.2. Generating scenario combination (profile set)

In conjoint analysis, a survey is designed comprising sets of limited scenarios for respondents to rank or rate their preferences. To select the number of scenarios in the experimental design (profiles), the fractional factorial design was used instead of a full profile design. It must be noted that fractional factorial provides optimal results not different from a full factorial design. However, because a full factorial design burdens respondents and often results in unreliable results, the fractional factorial design is preferred. For example, in this study, the 5 attributes and their levels would have resulted in a combined total of $(3 \times 2 \times 3 \times 2 \times 3) = 108$ possible sets of scenarios. To lessen the burden on respondents, a smaller but optimized set of 12 profiles satisfying orthogonality among attribute levels, was used as shown in Table 4. Given these profiles, each respondent was asked to rank the profiles in the order of importance based on their preference on a likert scale of 1 (least preferred) to 12 (most preferred). For example, Respondent 1 and Respondent 198 respectively ranked Profile1 as 7th most preferred and 8th most preferred.

3.3. Survey data

Media practitioners in 5 out of the 7 functioning OGD centers in Africa formed the study sample. The criterion for the selection of respondents was primarily to choose those in Sub-Saharan Africa who tend to have similar structures in governance, economic growth and development as well as political and social configurations (Ahlerup, Baskaran, & Bigsten, 2016). In addition, since the questionnaire was solely designed in English, only countries who use English as either their official language or their second language were considered. These two criteria automatically eliminated Morocco and Tunisia who are both non-English speaking countries and are outside the sub Saharan region.

3.3.1. Sampling and questionnaire design

The study employed convenience non-probability sampling method. This was because of the peculiarity of the population (media practitioners) and in particular the focus on only practitioners in 5 out of the 7 OGD centers in Africa. Table 5 presents the socio-demographic profiles of the respondents.

An online questionnaire was distributed to various media houses in each country mainly through emails, social media (where some national

Table 6
Part-worth utilities and relative importance of attributes and levels.

Attribute (criteria)	Levels	Part-worth utilities	Standard Error	Relative importance weight (%)
A ₁ : data quality	A ₁₁ : currentness	0.0813	0.0964	20.34
	A ₁₂ : relevance	0.1518	0.1164	
	A ₁₃ : accuracy (understandability)	-0.2331	0.1172	
A ₂ : data format (cost to access)	A ₂₁ : nonproprietary (e.g. CSV, XML, JSON)	0.9558	0.1119	23.43
	A ₂₂ : proprietary (e.g. EXCEL, PDF)	-0.5316	0.1174	
A ₃ : metadata	A ₃₁ : descriptive	1.2279	0.1121	28.82
	A ₃₂ : administrative	-1.8860	0.1183	
	A ₃₃ : structural	0.6581	0.0883	
A ₄ : data availability	A ₄₁ : must always be available	-0.9773	0.0723	15.96
	A ₄₂ : occasionally available	0.9773	0.0723	
A ₅ : data integrity	A ₅₁ : high	-0.0170	0.0755	11.45
	A ₅₂ : medium	0.0170	0.0755	
	A ₅₃ : low	-0.4242	0.0943	

R² = 0.986.

Table 7

Average relative importance of open government attributes based on demographic profiles of media practitioners (%).

Profile of respondents	Data quality	Data format	Metadata	Data availability	Data integrity
Gender					
Male	21.4	24.3	29.3	14.8	10.2
Female	19.6	23.6	32.7	12.5	11.6
Age (yrs.)					
18–24	19.4	23.9	27.5	16.9	12.3
25–34	21.7	23.5	25.7	15.5	13.6
35–44	23.2	22.3	28.9	14.9	10.7
45 +	24.6	21.1	29.9	14.2	10.2
Country of practice					
Ghana	20.2	25.2	28.4	14.6	11.6
Kenya	23.8	19.4	30.6	14.5	11.7
Sierra Leone	21.7	28.4	22.1	17.4	10.4
South Africa	20.2	22.4	29.9	15.6	11.9
Tanzania	20.8	27.0	22.6	16.6	13.0
Highest educational level					
High school	21.4	29.1	23.5	13.8	12.2
Professional certificate	19.8	23.6	32.9	12.1	11.6
Bachelor's degree	21.9	28.4	23.4	14.9	11.4
Master's degree	23.2	22.3	28.9	14.9	10.7
Doctoral degree	24.6	21.1	29.8	14.2	10.2
Which of the following media do you most contribute to?					
Print media	24.1	21.4	29.3	10.8	14.4
Television	19.0	24.2	30.7	14.5	11.6
Radio	21.4	21.4	21.4	21.4	21.4
Internet (e.g. blogger)	22.4	26.3	25.1	15.2	11.0
Other	21.6	22.1	29.9	16.2	10.2
Had you heard of Open Government Data before this questionnaire?					
Yes	22.3	24.2	27.9	15.3	10.3
No	24.6	23.1	26.1	14.6	11.6
Have you ever visited your country's open data website before?					
Yes	21.2	22.3	30.9	12.9	12.7
No	18.6	25.1	29.9	16.2	10.2
Have you accessed data from the website for your peruse before?					
Yes	19.2	26.5	28.7	14.9	10.7
No	24.6	21.4	29.6	11.9	12.5

media houses were contacted) and through individual referrals. For example, through individual contacts with practicing journalists in each country, the questionnaire was referred to colleague media practitioners to complete. Contacts were also made with secretariats of national media associations in each country through e-mails and on social media to help distribute the questionnaire to members. Each respondent was first giving an undeclared pre-test (not informing respondents that they were answering a pre-test). The error rate after the undeclared pre-test was about 26%. Most of the errors were detected in the scenario combinations (profile set) meant to be ranked by respondents. Following the first pre-test, test difficulties were addressed and the actual test was administered. The error rate of the subsequent test reduced significantly to 8.3% most of which were uncompleted responses.

3.3.2. Data collection

At the end of a 3-month administration of the questionnaire (between January–March 2016), 216 had responded, out of which 198 were complete responses. A quick preview of respondents' demographic profile in Table 5 indicated that more women (56.1%) responded to the questionnaire than men (43.90%). Majority of the journalists (respondents) were nationals from Ghana (33.3%) and Kenya (24.3%). It can also be seen that as many as 56.5% of the respondents were first degree holders while 34.31% indicated that they were working as online journalists (e.g. bloggers, content writers for their various media outlets, etc.). On the type of media respondents mostly contribute to, 9.6% chose the option 'other' and assigned reasons for their choice. Majority of these indicated working as freelance journalists and photojournalists (with no attachment to a particular media house). Quite tellingly, 61.11% of the respondents had not heard of OGD before the

questionnaire was administered. The figure increased to 70.71% and 76.77% respectively as respondents who have never visited their country OGD websites before and never accessed data from the country web portals.

4. Results

The central theme in conjoint analysis as explained in Section 3, is its ability to uniquely model user preferences into utility scores. These utility scores (part-worth utility) are aggregated to represent the relative importance (weight) assigned to attributes and their respective levels. The estimation method used was the Monotonic Analysis of Variance (MONANOVA) which generates relatively better part-worth utility scores than other estimation methods (Orme, 2010). The XLSTAT software (Addinsoft, 2014) was used in generating and analyzing the results. In Table 6, the most preferred levels under each attribute are those with large part-worth utility values (*bolded in column 3 of Table 6). The utility score and the relative importance of the attributes express respondents' value system regarding their preferred ideal characteristics (in a trade-off setting) on an OGD portal. The result indicates that, media practitioners in the 5 OGD countries in Africa view *metadata* (28.82%) favourably as the most important factor in a functioning OGD. This is followed closely by *data format* (23.43%), and *data quality* (20.34%). The relative importance of the rest of the attributes are *data availability* (15.96%), and *data integrity* (11.45%).

The results in Table 6 is further broken down to reveal media practitioners' most preferred levels in each of the attributes. A high positive part-worth utility value of an attribute level, is an indication of the level of preference by respondents (bolded in column 3 of Table 6) while a negative part-worth utility explains less preference level. For

example, under Data Quality, respondents prefer *relevance* to *currentness*. They also prefer *currentness* to *accuracy*. That is to say, data could be accurate but it will be useless if it is not relevant and also less useful if not current. Likewise, respondents highly preferred *nonproprietary* (0.9558) to *proprietary* (−0.5316) data format. Note that, just because *proprietary* received a negative utility value (−0.5316) does not mean that this level was unattractive. *Proprietary* may have been acceptable to some respondents. However, compared to *nonproprietary* (with a utility of 0.958), it fared worse. The standard error values explain the reliability of the sample mean (the relative importance) as reflecting on the actual mean of the population. The various preferred attribute levels (bolded in column 3 of Table 6) can be combined to give a picture of the ideal characteristic profile preferred by the respondents. It can be inferred in view of this that, media practitioners' ideal characteristic profile of an OGD portal is one with the following characteristics: dataset deposited on web portal should be of '*relevance*' (A_{12}) to the matter at hand or the subject area, the data format should be '*nonproprietary*' (A_{21}), the metadata should at least be '*descriptive*' (A_{31}), the data should at least be '*occasionally available*' (A_{42}) and the data integrity, at least at a '*medium*' (A_{52}). It must be noted that this profile set is arrived at after respondents have traded-off several attribute-level characteristics to settle on this 'ideal' profile. There was a high internal consistency in respondents' preferences as indicative of an R-squared value of 0.986.

The study further segmented the utility scores to reveal how respondents' demographic background influenced the scores or otherwise. In Table 7, it is instructive to note that though the most important attribute was adjudged to be the metadata, attributes such as data format and data quality were highly preferred by some demographics.

For example, at the country level, Tanzania and Sierra Leone considered '*data format*' as an important attribute than *metadata* (the most important attribute) in their ideal OGD portal. Similarly, in terms of highest education attained, respondents with a bachelor's degree preferred data format over metadata in terms of the average importance of the attributes to the study. Internet journalists were almost divided over the choice of metadata and data format. Though they preferred *data format*, they also preferred *metadata* as much. In all the demographic groups, respondents generally assigned least importance to *data integrity* and *data availability* though between the two, the preference also differed among some demographic groups.

5. Discussions

5.1. Discussion on OGD audit and preference elicitation

The OGD web content and functionality audit revealed several deficiencies as well as progress made at most of the OGD web portals in Africa. The preference and elicitation analysis also further gave an insight into what media practitioners actually want in OGD features at their various country portals. In the following section, a link is established between the OGD audit findings and results from the preference elicitation modelling. Attributes in the preference modelling and the OGD features are discussed further across the various countries.

5.1.1. Data quality

Two of the OGD features that directly come under the '*data quality*' attribute were *data currentness* and *data visualization*. It was observed in Table 2 that all 5 countries used in the preference modelling provided data visualization tools. Similarly, the rest of the countries with the exception of Sierra Leone had up-to-date datasets. Though almost all the countries were providing these two features as seen in the OGD audit, data quality was only the third most preferred feature by media practitioners in the preference modelling. At the country level, Kenya weighted data quality as its second most important attribute whereas Sierra Leone, Ghana, South Africa and Tanzania weighted it their third most important feature.

5.1.2. Data format

The gap between the audit findings on data format as a web portal content, and data format as a preference attribute is obvious. This is because, though data format was considered a very important feature by media practitioners, current OGD portals in Africa with the exception of Kenya are not committed to providing the range of required data formats. As shown in Table 2, most countries currently have data in only CSV or XLS(X) format. It is possible that data providers in these countries find CSV and XLS(X) easier to manage or do not have the skill sets or the capacity to provide more data formats. It is therefore not surprising for example, that Tanzania which provided the least range of data formats as seen in Table 2, weighted data formats as its most preferred OGD attribute (see Table 7). This clearly could mean that media practitioners in Tanzania are calling for support in the provision of adequate range of data formats beyond CSV and XLS(X). In view of this, it is imperative that authorities employ personnel with the requisite skills to revamp OGD portals in Africa to meet international and contemporary standards of publishing OGD datasets.

5.1.3. Metadata

Metadata, the aggregate most preferred OGD attribute was found to be conspicuously missing on all except the Kenyan OGD portal. Overall, media practitioners in three countries namely Ghana, Kenya and South Africa weighted metadata as the most important attribute. However, media practitioners in Sierra Leone and Tanzania chose data formats over metadata as their most preferred OGD attribute.

5.1.4. Data availability

This attribute was the second least preferred among media practitioners in the trade-off setting. This however does not mean the attribute is not important to media practitioners. With a relative importance weight of 15.96%, this means *data availability* is also an important feature overall. However, in the event of limited resource, it will be a lesser priority compared to *metadata* and *data format*.

5.1.5. Data integrity

The audit findings indicated a genuine attempt by all the countries to use social media to address data users' concerns particularly those that bother on the integrity of datasets. On Kenya's social media platform (Facebook and Twitter), we observed how social media was being used to respond to user comments as well as providing relevant information on some datasets. This helps to quickly dismiss any doubts about the integrity of datasets. Though data integrity was the least preferred attribute among media practitioners, data providers are making the effort to use social media to achieve some intimacy between themselves and users.

Overall, the preference modelling results mirror core constructs in the Technology Acceptance Model (TAM) describing how media practitioners in OGD countries in Africa are warming up to the concept of OGD. In TAM (Davis, Bagozzi, & Warshaw, 1989), two perceived factors that have an influence on whether users would accept or reject a new technology are *perceived usefulness* (PU) and *perceived ease-of-use* (PEOU). Consistent with the study results, media practitioners (majority) who had not heard of the concept of OGD, never visited their country's data portal nor had accessed data on the OGD web portal before, placed premium (importance) on attributes of OGD that would help enhance their work with little effort. In view of this, the choice of *metadata* as the most important attribute could be explained to mean an affirmation of PU by the media practitioners. This is because, for media practitioners who are yet to embrace the concept of OGD, a well-documented descriptive metadata would enhance their understanding of what to make out of datasets sourced from the OGD web portals. Similarly, the attribute, *data format*, coincidentally happens to be media practitioners' second most important OGD attribute. The choice of *data format* and in particular, a *non-proprietary* version also

seems to be consistent with the *perceived ease-of-use* (PEOU) dimension in TAM.

5.2. Recommendations

The web portal audit carried out in this paper can be used to inform the OGD community about the state of OGD in Africa. This will help ensure that countries that are lagging behind or are deficient in some principal OGD features are supported or directed on how to meet basic requirements. The overall success of OGD especially in Africa would not only benefit Africans, but international development partners who often struggle obtaining relevant data on Africa (Sanga, 2011; Kiregyera, 2015). In this regard, the provision of adequate data formats and metadata would ensure that data on Africa are accessed effortlessly by citizens and country development partners. It is assuring that most of the countries in Africa are already providing CSV (which is non-proprietary) as default data format for table structured datasets. However, other non-proprietary data formats such as XML, JSON and RDF should be encouraged to make it easier for data interchange and migration. Similarly, OGD countries in Africa must also be encouraged to provide in addition to descriptive metadata format, metadata in structural and administrative formats. In addition, since OGD portals do not currently use live interactive web features to communicate with users, the social media plugins should be encouraged to continue reaching out to the public as a medium to answering concerns of data users.

Both the OGD audit and the preference elicitation analysis should provide adequate information for the next OGD action plan in Africa and help track progress of OGD member countries. In particular, the findings of this study can be used to serve as a guide to the open government partnership group to be aware of specific OGD standards to emphasize when new African countries declare their intention to join the OGD community.

6. Limitations

In this research, an attempt was made to link the OGD features observed in the audit to the attributes used in the preference elicitation modelling. However, to effectively elicit preferences in a trade-off setting, the use of limited sets of attribute profiles meant not all the features could be used. In addition, attributes such as data format and metadata could be treated as sub-attributes of data quality. However, the research sought to maintain the order of OGD attributes as prescribed by authoritative bodies such as the World Wide Web Consortium (W3C) and the World Bank's Technical option. The decision to also stick to standardized OGD attributes was because data quality for example, tends to have many different definitions and criteria for evaluation (Cai & Zhu, 2015).

Appendix A

Open Government Data

This questionnaire is designed to carry out a research on Media expectations of Open Government Data. All information provided will be used solely and exclusively for academic purposes and would be treated with the necessary confidentiality it deserves. Information provided would be used to make sound empirical analysis in order to come out with suitable recommendations that would help Improve Open Government Data in Africa.

Background: what is Open Government Data (OGD)?

Is the concept of "Making public sector information freely available in open formats and ways that enable public access and facilitate exploitation" (Kalampokis, Tambouris, & Tarabanis, 2011). In simple terms, open means anyone is free to access, use, reuse and redistribute government data. Currently 6 African countries have officially signed to the Open Government Data though not fully operational in most cases. These countries are Ghana, Sierra Leone, Kenya, South Africa, Tunisia and Morocco.

7. Conclusion

This paper audited the OGD web portals, and also investigated the preferred and desirable qualities an OGD portal should possess from the perspective of media practitioners in five African countries. The OGD web portal audit showed a number of disparities among the five countries in terms of progress towards an open data society. Overall, though in Africa, unlike in the developed world, OGD advocacy has largely been at the bidding of the state, with very little civil society involvement (Ohemeng & Ofosu-Adarkwa, 2015), the countries observed in this study are seen to be making measurable progress.

The elicitation of media practitioners' preferences should help bring to the attention of OGD stakeholders; politicians, civil servants, public officials, donor agencies, academics and international organizations, that the media should be seen and welcomed as a key ally to the course of data liberation. Preferences of the media particularly in a developing continent like Africa, should be a good starting point for authorities to review existing OGD structures to reflect the views of various data users. This also means OGD implementation in Africa should not only be at the behest of central governments. Civil society groups and the media should take keen interest to ensure that government and its agencies do not pick and choose which datasets would be deposited on OGD platforms.

It is the expectation that the state of OGD as presented in this study, and the preference elicitation results would ignite more discussions on enriching OGD web portals in Africa with internationally accepted standards for publishing open data. The focus as demonstrated in this paper, is for countries to not be obsessed with liberating data, but also ensure that the free publicly available data comes in formats that will aid distribution and easy access. This would hasten progress on the broader open data ecosystem including fiscal transparency, judicial openness, enterprise openness, citizen engagement among others on the African continent.

Future work would explore preferences among other OGD key stakeholders and compare their utility scores with media practitioners.

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Expectations (preferences)

Admittedly, OGD is not fully functional in most of the six countries above. As media practitioners, this questionnaire is to sample your opinion and preferences of what you wish to see on an ideal Open Government Data website. To do this, you are to rank the profiles composing of features you prefer on an ideal open government data.

Socio-demographic profile

1. Gender *

 Male Female Other

2. Age *

 Under 18 18-24 25-34 35-44 Above 45

3. Country of practice *

 Ghana Kenya Sierra Leone South Africa Tanzania

4. Highest educational level *

 High school Professional certificate First degree (bachelor's) Master's degree Doctoral degree

5. Which of the following media do you most contribute to? *

 Print media Television Radio Internet (e.g. blogger) Other

Prior knowledge

6. Is Freedom of Information (FOI) law passed in your country? *

 Yes No

7. Had you heard of OGD before this questionnaire? *

 Yes No

8. Have you ever visited your country's open data website before? *

 Yes No

9. Have you accessed data from the website for your use before? *

 Yes No

Your preferences of an ideal OGD features

The following information is to help you adequately answer question 10.

Note: *metadata* refers to information that accompanies the data you download and describes the data (e.g. how the data was acquired, unit of measurement, author, title etc.). There are basically three types as explained below.

Administrative metadata: Provides information on when a file was created, the type, who can access it etc.

Descriptive metadata: This helps for discovery and identification. Examples are title, abstract, author, and keywords.

Structural metadata: Information about the internal structure of data resources including table of contents, page, indexes, “Currency” under data quality refers to how ‘up-to-date’ the data should be.

10. On a scale of 1 to 12, with 1 indicating high preference and 12 indicating low preference, rank your preferences of the following profiles of Open Government Data features you wish to see on your government's open data website. For example, if you rank Profile6 as 1 (the most preferred), you are essentially saying that you prefer your government open data centre to have up-to-date data (currency), a non-proprietary file (e.g. CSV, XML), prefer a descriptive meta data, the data must always be available (to be accessed) and must have at least a medium level of integrity.

Observation	Data quality	Data format	Metadata	Availability	Integrity	Rank
Profile1	Currency	Indifferent (e.g. EXCEL is OK)	Administrative	Occasionally available	High	
Profile2	Accuracy	Nonproprietary format (e.g. CSV, XML)	Structural	Occasionally available	Medium	
Profile3	Currency	Nonproprietary format (e.g. CSV, XML)	Structural	Occasionally available	High	
Profile4	Currency	Indifferent (e.g. EXCEL is ok)	Structural	Must always be available	Low	
Profile5	Accuracy	Nonproprietary format (e.g. CSV, XML)	Administrative	Must always be available	Low	
Profile6	Currency	Nonproprietary format (e.g. CSV, XML)	Descriptive	Must always be available	Medium	
Profile7	Accuracy	Indifferent (e.g. EXCEL is OK)	Structural	Must always be available	High	
Profile8	Accuracy	Indifferent (e.g. EXCEL is OK)	Descriptive	Occasionally available	Low	
Profile9	Relevance	Indifferent (e.g. EXCEL is OK)	Structural	Must always be available	Medium	
Profile10	Relevance	Nonproprietary format (e.g. CSV, XML)	Structural	Occasionally available	Low	
Profile11	Relevance	Indifferent (e.g. EXCEL is OK)	Administrative	Occasionally available	Medium	
Profile12	Relevance	Nonproprietary format (e.g. CSV, XML)	Descriptive	Must always be available	High	

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