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To cite this article: Shadrack Katuu (2018) Using Web Analytics to Assess Traffic to the Mandela Portal: The Case of African Countries, New Review of Information Networking, 23:1-2, 1-18, DOI: [10.1080/13614576.2018.1523741](https://doi.org/10.1080/13614576.2018.1523741)

To link to this article: <https://doi.org/10.1080/13614576.2018.1523741>



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Published online: 11 Apr 2019.



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Using Web Analytics to Assess Traffic to the Mandela Portal: The Case of African Countries

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ABSTRACT

This article is a longitudinal assessment of the visitors to the Mandela Portal between 2009 and 2016. It is based on web analytics methodology that consists of a four-step process with the first and second steps using data collected by Google Analytics tool. The article outlines trends of global figures as well as specific trends within the top ten African countries. It further explored statistics from the top five African countries: South Africa, Kenya, Nigeria, Tanzania, and Ghana. There are two main findings: those related to web traffic trends and those exploring the trustworthiness of Google Analytics data.

KEYWORDS

Big data; data trustworthiness; Google analytics; Mandela archive; Nelson Mandela

Introduction

Web analytics is defined as “the measurement, collection, analysis, and reporting of Internet data for the purposes of understanding and optimising web usage” (Digital Analytics Association 3). Web analytics constitutes four steps: collection of data, processing, developing performance indicators, and formulating an online strategy to meet institutional goals (Jansen). The four steps are illustrated in Figure 1 (Wikipedia).

Web analytics has mostly been used by commercial entities to enhance online marketing strategies. In a few cases, libraries and cultural institutions in the nonprofit sector have used web analytics methodology to help understand their visitors (Marek; Woody). This article uses the first two steps of the web analytics process to assess the global visitors to a portal developed by the Nelson Mandela Foundation (NMF) in order to identify longitudinal trends and discuss their implications.

The NMF was established in 1999 as the post-presidential office for Mr. Nelson Mandela upon his retirement as South Africa’s first democratically elected president. Mr. Mandela had promised to serve only one five-year term and upon retirement felt that he needed to continue working to promote social justice (Harris). At the core of the mandate of the NMF is to document and facilitate access to the Mandela Archive and promote memory-based dialogue

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/rinn.

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Basic Steps of Web Analytics Process

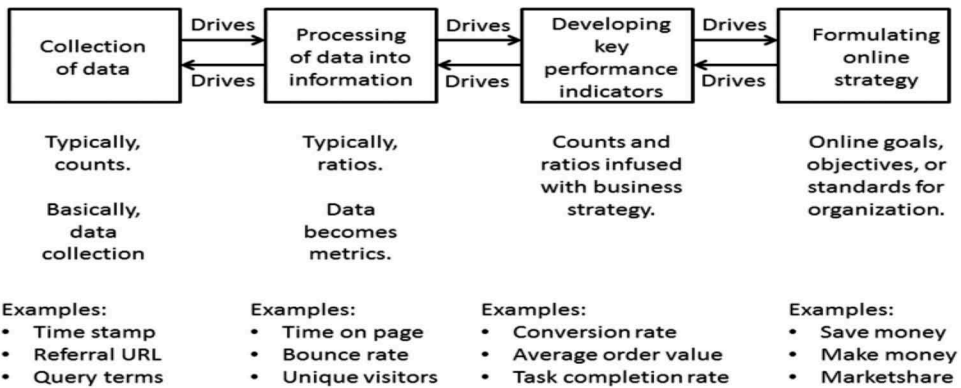


Figure 1. Basic steps of the web analytics process.

interventions. This Mandela Archive is infinite, fragmented, and scattered both geographically and institutionally (Josias). Since the NMF did not envisage bringing the archive into a physical location, the objective was to use the Mandela Portal as the key avenue to provide access the Archive. The Portal leverages the convenience of providing multiple and remote connections via the web (Katu, “Are We Information Providers” 361–62).

This article looks at the period between January 2009 and December 2016, which witnessed many events, including the long-term hospitalization and eventual passing away of Mr. Mandela. In this eight-year period, the Portal has endeavored to establish itself as the most trusted resource on the life and times of Mr. Mandela. This article outlines some background to the Portal, the data collection and findings, as well as a discussion on trends and issues arising from the assessment activities.

Conceptualizing the Mandela Portal

The NMF conceptualized a multilayered virtual archive or portal that would be accessible through its website. The website was initially developed in the early 2000s and had already undergone several phases of development by the late 2000s (Katu et al.). The drafting of the Mandela Portal began in 2008 with an architecture that had four design elements:

- Databases providing a dense description of resource materials
- Linkages to actual materials, to other websites, and to different layers within the website
- Digitized materials including paper, sound, and moving images

- A surface layer of stories and information ([Nelson Mandela Foundation](#), “Annual Report 2008–09” 22–23).

These elements were later integrated with social media platforms that relate to each of these elements and launched in April 2011 as an integrated Mandela Portal ([Nelson Mandela Foundation](#), “Annual Report 2011–12” 14). By 2014, the Portal had “established itself as the most trusted and widely used Internet resource for research on the life and times of Nelson Mandela” ([Nelson Mandela Foundation](#), “Annual Report 2013–2014” 11). In this regard, the Mandela Portal that was initially developed to provide a web presence for the NMF had grown to becoming its premier communication platform. Over the years, the Portal has offered a rich resource of content, including databases on Mr. Mandela’s speeches, archival material on the Rivonia Trial, speeches, and a bibliography of books. In addition, it has a tributes database that is an inventory of thousands of civic honours and awards given to Mr. Mandela from educational, arts, and cultural, as well as sports institutions ([Nelson Mandela Foundation](#), “Data Resources”). The Portal also hosts the O’Malley “Heart of Hope” mini-site that consists of an extensive collection of interviews conducted by Padraig O’Malley conducted between 1985 and 2005 with many key personalities, who influenced South Africa’s political history ([Nelson Mandela Foundation](#), “The Heart of Hope”).

The NMF publishes a statistical analysis outlining the impact of the Portal through its annual reports that provide an overview of year-to-year visitor patterns ([Nelson Mandela Foundation](#), “Annual Reports and Financials”). The statistics have been collected through the use of Google Analytics, the most influential and freely used tool in the world, which the NMF implemented from November 2007. The first year of the tool’s use was spent integrating it to the website platform, as well as understanding the reporting mechanisms. In addition, between 2009 and 2011 there were early efforts to support the further developments of the Mandela Portal, incorporating new design elements ([Katuu et al.](#); [Katuu and Hatang](#)).

A number of articles and presentations on the Portal have been published over the years ([Katuu](#), “The Mandela Portal”; [Katuu](#), “Visitors to the Mandela Portal”; [Katuu et al.](#); [Katuu and Hatang](#)). These publications provide valuable insight regarding the development of the Portal since its early years. However, only one such article provided a longitudinal assessment of the visitors to the Mandela Portal using web analytics ([Katuu](#), “The Mandela Portal - an Assessment”). Nonetheless, the article only looked at the period between 2009 and 2015 and did not explore details about trends in African countries. During the 1980s and 1990s, commentators noted that while the information revolution swept the rest of the world, African countries not only lagged behind ([Adeya](#); [Katuu](#), “User Studies and User Educational Programmes and Their Implications for Archival Institutions in Africa”),

but seemed to act as passive pawns, even within the Global South (Katu, “Refugees in Africa and the Information Age: An Investigation” 10–11). Therefore, this article offers the longitudinal assessment concentrating specifically on web traffic to the Portal from the African continent.

Findings

There is considerable debate about the reliability of data captured by web analytics tools (Clifton 26–29; Thomas 17). For instance, the means to identify a unique visitor are still undergoing refinement (Alarifi and Fernández 1–6; Menken 20). Also, debatable is whether a page view consists of one hit to the page or different parts of the page. Therefore, for the purposes of this study, the base statistics are drawn from what Google Analytics terms as sessions, defining each as “a group of interactions that take place on the website within a given time frame” (Google “How a Session is Defined in Analytics”). A session combines screen views, events, social interactions, and transactions and, therefore, the statistical figure will be much less than the number of page or screen views, but represents a more organic engagement with a website.

This section describes the findings of the longitudinal study covering the period between January 1, 2009 and December 31, 2016 that had a total of 15,140,519 sessions by visitors to the Mandela Portal. The findings begin with general trends of global figures and explore more specific trends using an analysis of the top ten African countries, and ends with statistics from cities and regions of the top five African countries.

Cumulative global statistics between 2009 and 2016

The eight-year period shows a growth, with the total number of visitor doubling from 2009 to 2010, dipping in 2011 and increasing again in 2012. Understandably, in 2013, due to the dramatic events of the long illness and eventual passing on of Mr. Mandela, the statistics are more than two times all of the previous years combined. Year 2014 shows a reduction of visitors by almost 60%, and 2015 another 60% reduction, with a plateauing in 2016. Nonetheless, even the 2016 figures are quite high compared to the pre-2013 figures. Figure 2 illustrates the trend of visitors over the eight-year period.

Cumulative statistics of the top ten countries globally between 2009 and 2016

The Cumulative Global Statistics between 2009 and 2016 section provides a global view of the statistics, while this section provides insight to the top ten countries out of a total 242 ranked countries in the world. Figure 3 shows the cumulative number of visitors based on country rankings globally.

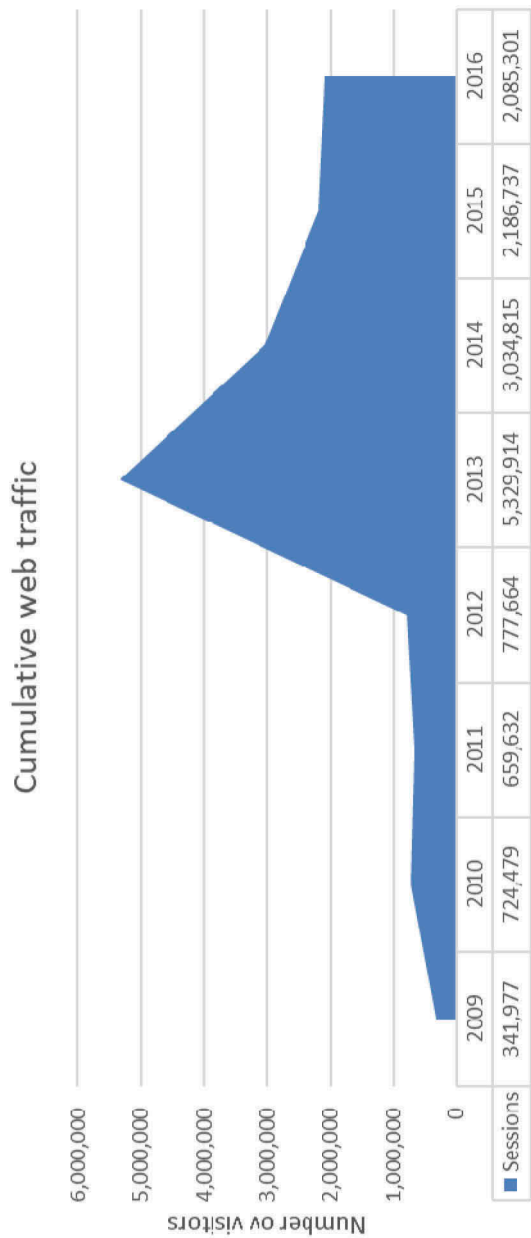


Figure 2. Cumulative global statistics between 2009 and 2016.

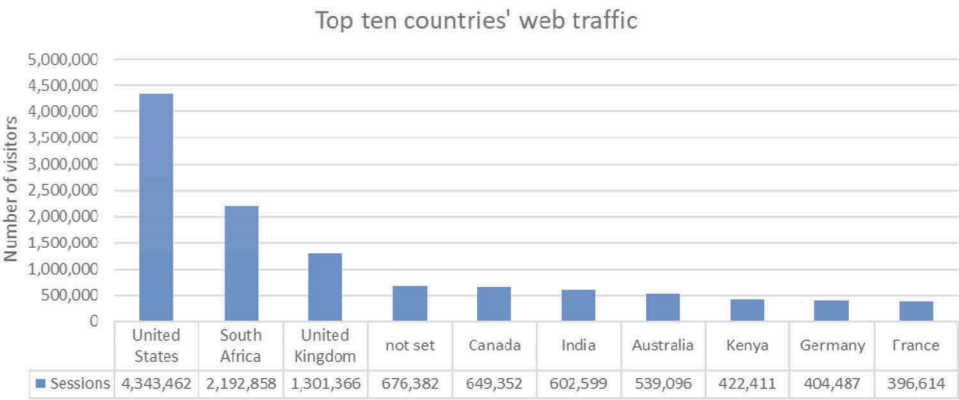


Figure 3. Cumulative statistics of the top 10 countries globally between 2009 and 2016.

Figure 3 illustrates the vast geographical spread of the visitors to the Portal as well as the clear domination of the United States over all other countries. In addition, there is the curious categorization titled “not set.” Google (“Location Says (Not Set)”) acknowledges that this is the result of using third-party vendors who may not have an accurate record of the visitor location and a more extensive discussion on the issues is presented in Discussion section of this article.

Cumulative statistics of the top ten African countries between 2009 and 2016

The Cumulative Statistics of the Top Countries Globally between 2009 and 2016 section offered a first level of specificity on global countries, and this section provides additional insight on the top ten African countries out of a 242 ranked countries. The section is broken down into three parts. Since South Africa and Kenya’s statistics are high enough to be included in the top ten countries globally, they are illustrated in Figures 4 and 5. The other top eight African countries are included in Figure 6.

South Africa’s graph demonstrates the previously observed trend of a steady increase before 2013 and the peaking of visitors in 2013. However, the graph also demonstrates a slight dip in 2014 and 2015, with an increase again in 2016.

Kenya’s graph demonstrates a different trend from either the global trend presented in Figure 2 or the South African trend presented in Figure 4. There are low numbers between 2009 and 2011 and there is a drastic increase between 2012 and 2015, ranging between 200% and 800%.

The aforementioned eight African countries demonstrate the previously observed trend of low numbers between 2009 and 2012, then peaking in 2013. After 2013, there is either a decrease or plateauing of the numbers of visitors from individual countries. Another observable fact is that several countries do not make it to the top ten in some of the years. These are Tanzania in

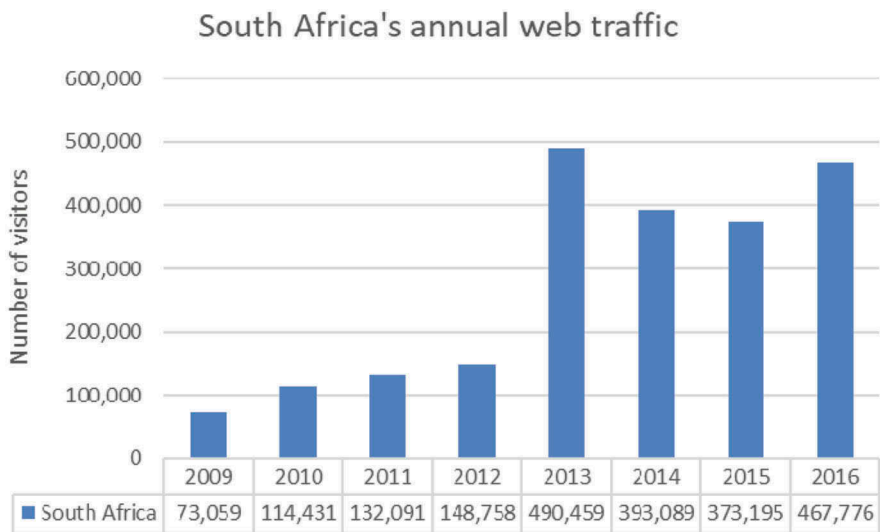


Figure 4. South Africa’s annual statistics between 2009 and 2016.

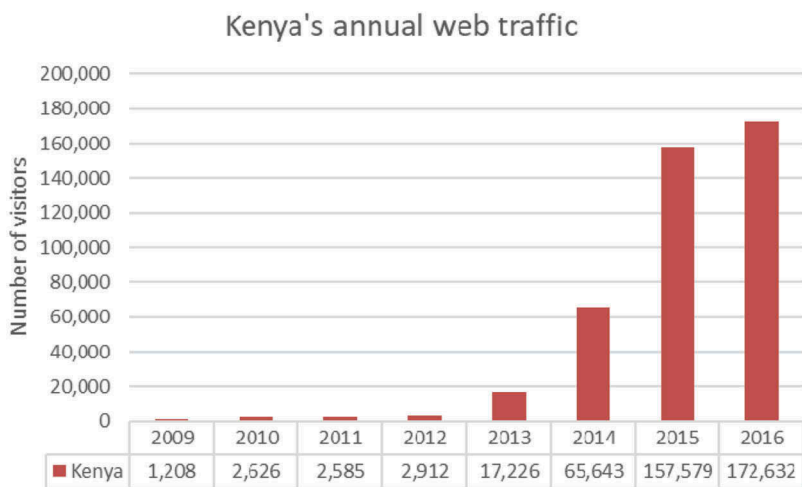


Figure 5. Kenya’s annual statistics between 2009 and 2016.

2009, Egypt in 2016, Zimbabwe in 2009 and 2012, Algeria in 2009 and 2011, and Namibia in 2013. This suggests a dynamic ranking that changes annually.

Cumulative statistics of the top five African countries between 2009 and 2016

The Cumulative Statistics of the Top Ten African African Countries between 2009 and 2016 section provides a third level of specificity regarding the top ten African countries. This section provides more details on the statistics drawn from cities and regions in the top five African countries: South Africa, Kenya, Nigeria, Tanzania, and Ghana.

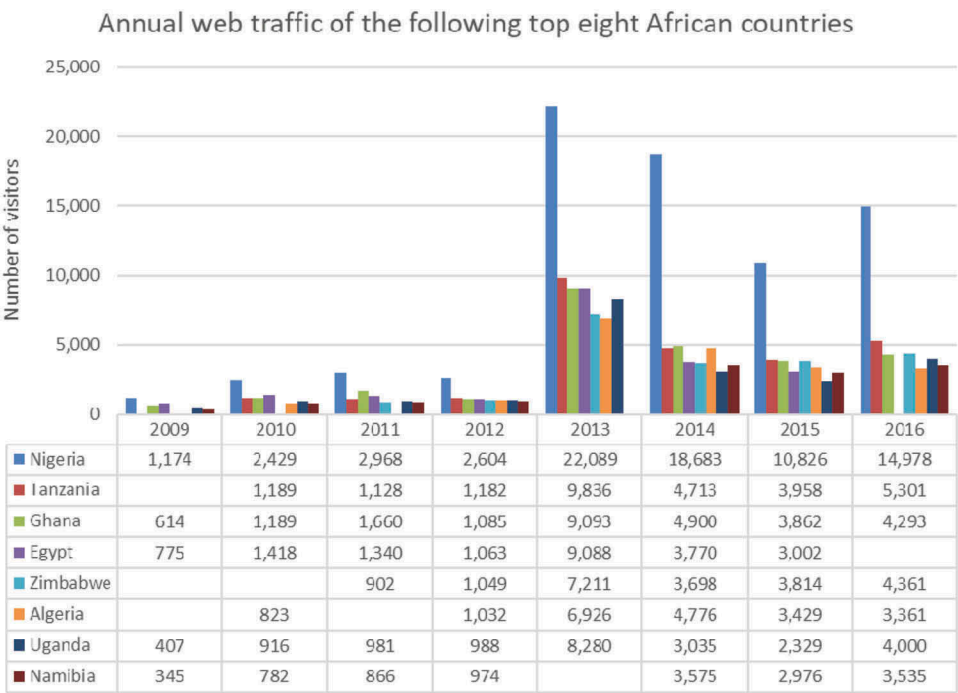


Figure 6. Annual statistics of the top eight African countries between 2009 and 2016.

Cumulative statistics on South African traffic between 2009 and 2016

Google Analytics was able to draw two sets of cumulative statistics on South Africa, traffic from different cities in Figure 7 and different provinces in Figure 8.

Figure 7 illustrates statistics from the top ten of the 296 cities Google Analytics identified in South Africa. It illustrates that the top five cities contribute the largest part of the national statistics throughout the eight-year period.

Figure 8 illustrates statistics from all nine provinces of the country, but also has the category titled “not set,” initially discussed in The Cumulative Statistics of the Top Countries Globally between 2009 and

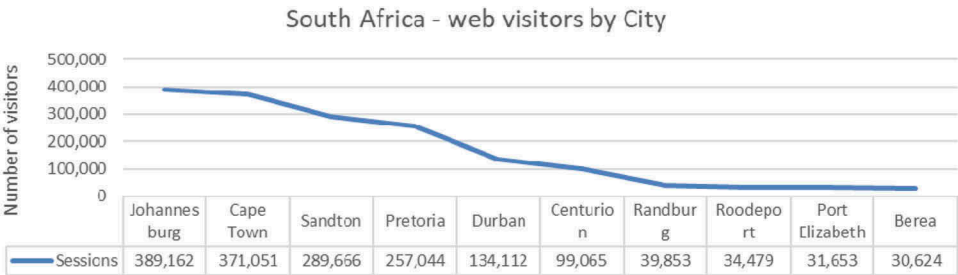


Figure 7. South African visitors from different cities between 2009 and 2016.

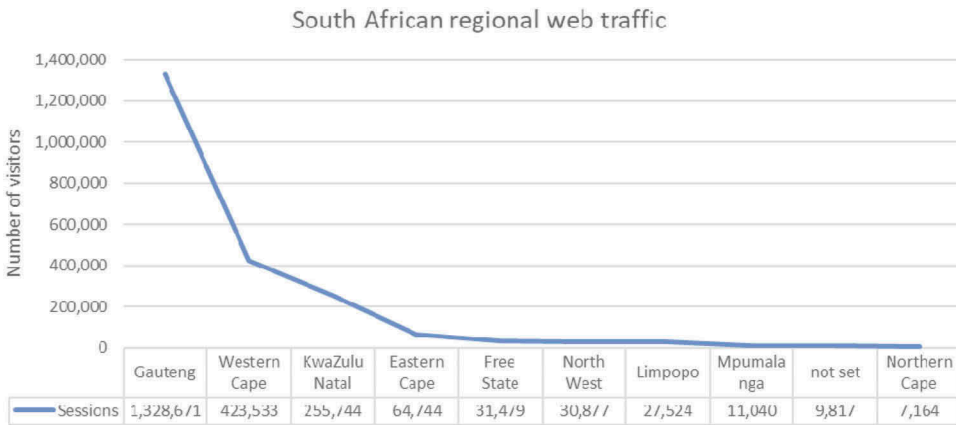


Figure 8. South African visitors from different regions between 2009 and 2016.

2016 section. The graph shows an overwhelming dominance of Gauteng Province followed by the Western Cape Province and KwaZulu Natal Province.

When one looks at both city and regional graphs, it is obvious that the connection of the top five cities is located in the top three provinces:

- Johannesburg, Sandton, and Pretoria are all in Gauteng Province
- Cape Town is in Western Cape Province
- Durban is in KwaZulu Natal Province

Cumulative statistics on Kenyan traffic between 2009 and 2016

Google Analytics was able to draw only one set of cumulative statistics on Kenya, traffic from different cities as presented in [Figure 9](#).

[Figure 9](#) shows that there are two separate “not set” categories that combine to form the largest part of the national statistics. The only other significant contribution is the country’s largest city, Nairobi, with other cities contributing a very small percentage. Curiously, the city ranked as tenth is the name of the country.

Cumulative statistics on Nigerian traffic between 2009 and 2016

Google Analytics was able to draw two sets of cumulative statistics on Nigeria, traffic from different cities in [Figure 10](#), and different provinces in [Figure 11](#).

[Figure 10](#) illustrates statistics from the top ten cities of the fifty-three cities Google Analytics identified in Nigeria. Similar to the case in Kenya, this list has two “not set” categories. In addition, the contribution of the largest city, Lagos, dominates all other contributions put together.

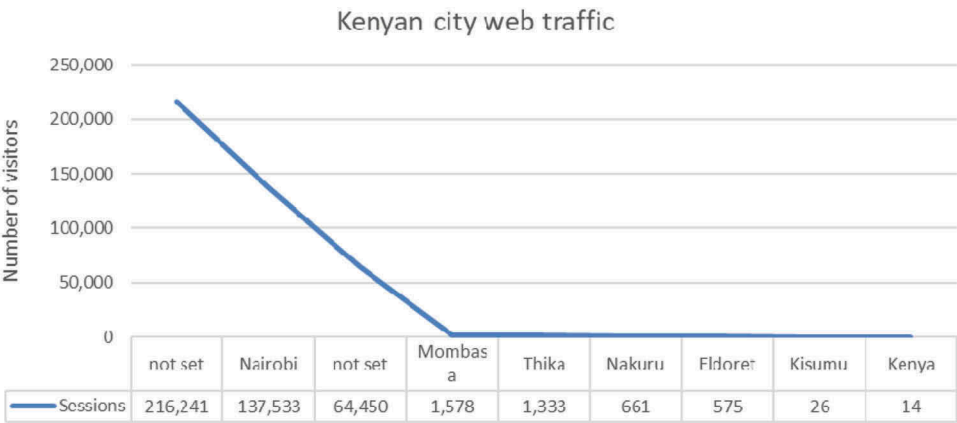


Figure 9. Kenyan visitors from different cities between 2009 and 2016.

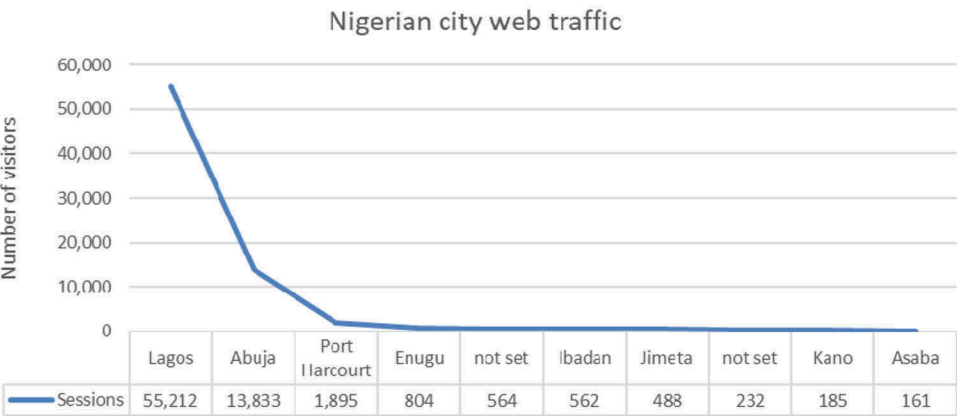


Figure 10. Nigerian visitors from different cities between 2009 and 2016.

Figure 11 illustrates statistics from the top ten regions of the thirty-six regions that Google Analytics identified in Nigeria. Again, there is one “not set” category, and the contribution of Lagos dominates those of all others combined.

When one looks at both country graphs, there is the distinct domination of Lagos city and Lagos region. In addition, the “net set” categories are prominent enough in both graphs to occupy positions in the top ten ranking.

Cumulative statistics on Tanzanian traffic between 2009 and 2016

Google Analytics was able to draw only one set of cumulative statics on Tanzania, traffic from different cities as presented in Figure 12.

Figure 12 illustrates statistics from the Top Seven cities that Google Analytics identified in Tanzania. Similar to trends in Kenya and Nigeria, the largest city dominates all other contributions and there are two “not set”

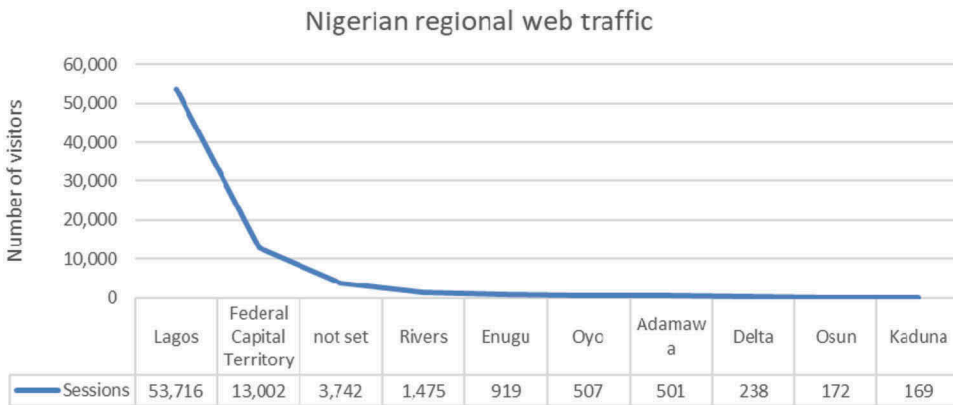


Figure 11. Nigerian visitors from different regions between 2009 and 2016.

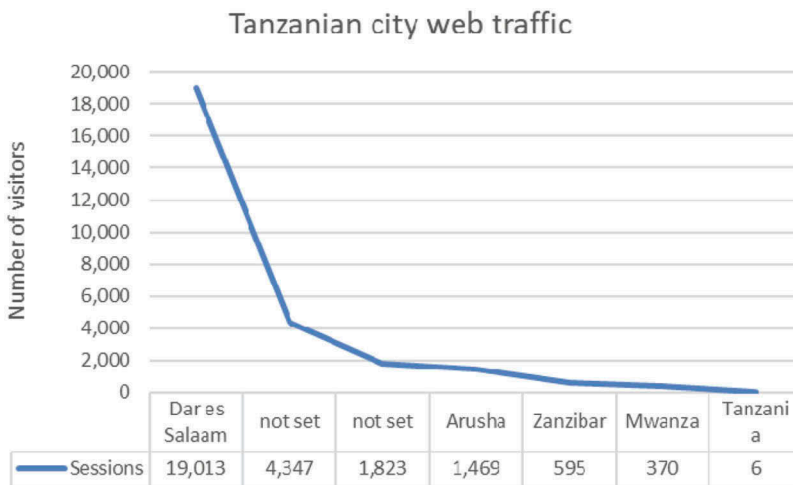


Figure 12. Tanzania visitors from different cities between 2009 and 2016.

categories. Curiously, the city ranked seventh is Tanzania, which is the name of the country and is a clear error.

Cumulative statistics on Ghanaian traffic between 2009 and 2016

Google Analytics was able to draw only one set of cumulative statics on Ghana, traffic from different cities in [Figure 13](#).

[Figure 13](#) illustrates statistics from the top nine cities that Google Analytics identified in Ghana. Similar to trends in Kenya, Nigeria, and Tanzania, the largest city dominates all other contributions. There are also two “not set” categories. In addition, three different cities are cited twice: Accra, Kumasi, and Cape Coast. Finally, the city ranked ninth is Ghana, which is the name of the country and, as in the case of Tanzania, another case of an error.

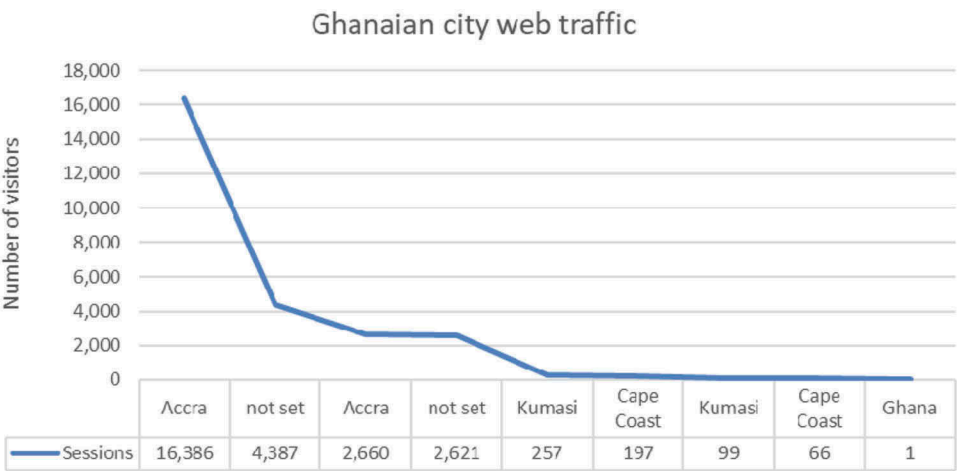


Figure 13. Ghanaian visitors from different cities between 2009 and 2016.

Discussion

The findings have revealed a number of aspects related to trends observed in the data as well as the analytics tool. This section discusses two categories of observations: those related to web traffic trends and those exploring the trustworthiness of Google Analytics data.

Web traffic trends

The web traffic trends can be viewed as covering three broad aspects. First, the statistics from the individual countries showed the clear dominance of two countries in the African continent throughout the eight-year period of the study, that is, South Africa and Kenya. It is understandable in the case of South Africa since the Mandela Portal is located in a South African institution. However, the Kenyan statistics beg additional scrutiny considering there are several other countries closer to the South African historical experience, such as Namibia and Zimbabwe, whose statistics should be much higher.

Second, the cumulative global statistics revealed that the web traffic peaked in 2013 consistent with the global attention on the long-term hospitalization and eventual passing on of Mr. Mandela. After 2013, the pattern is mixed among the African countries. While South Africa and Nigeria generally maintained the same level, most other countries gradually declined after 2013. However, Kenya's statistics show a drastic increase, highlighting the need for further explanation.

Third, as pointed out in the preceding discussion, Kenya seems to occupy a unique place within the top 10 African countries. A number of explanations could be offered for the country's dramatic ascendance of web traffic numbers after 2012.

- First, there is a generally held view that there has been an increase in access to the Internet within developing countries and particularly, in sub-Saharan Africa. While there are studies that show increasing numbers of Internet users, no studies show as dramatic an increase as Kenya, demonstrated within a period of a few years ([Gillwald et al.](#); [Hansson and Jobe](#); [West](#)). In addition, increased Internet access does not explain one African country's drastic statistics changing that are not otherwise mirrored by any of the other countries on the continent.
- Second, the notion that the Portal may have been particularly attractive to a Kenyan web audience. There has been Kenyan-related content on the Mandela Portal, but this content significantly predates 2013. For instance, in 2009, Mr. Mandela hosted President Uhuru Kenyatta in 2009, at the time when he was Deputy Prime Minister ([Nelson Mandela Foundation](#), "Nelson Mandela Meets Kenya's Deputy Prime Minister"). In the same year, the Nelson Mandela Foundation co-hosted a dialogue event on the work of Truth Commissions and hosted a number of government and civil societies from Kenya ([Goethe-Institut et al.](#)). None of these events seem to have had an effect on web traffic after 2012.
- Third, and the most likely explanation, is that Google Analytics increased the accuracy of its data on Kenya after 2012. This is supported by various sources demonstrating Kenyan efforts to leverage Google and other mapping applications in aspects such as road and urban planning ([Mahabir et al.](#); [Panek and Sobotova](#)), as well as the development of an online directory for small and medium-size businesses, beginning in 2012 and culminating in the current Kenyan Business Online portal ([Halliday](#); [Jidenma](#)). In addition, Google has supported mapping of households in health-related activities ([Centers for Disease Control and Prevention \[United States\]](#)), as well as the transit system ([Mindock](#); [Walker](#)). This third explanation offers more validity considering that between 2009 and 2013 four African countries were within the same statistical range until Kenya's dramatic changes happened after 2014, as illustrated in [Figure 14](#).

Trustworthiness of Google analytics data

Fundamental to any web analytics tool is the ability to provide trustworthy statistics. There are concerns about the accuracy of the longitudinal data based on the litany of inconsistencies demonstrated in the Findings section and, particularly, the top five African countries ([Katuu](#), "The Mandela Portal - an Assessment" 280).

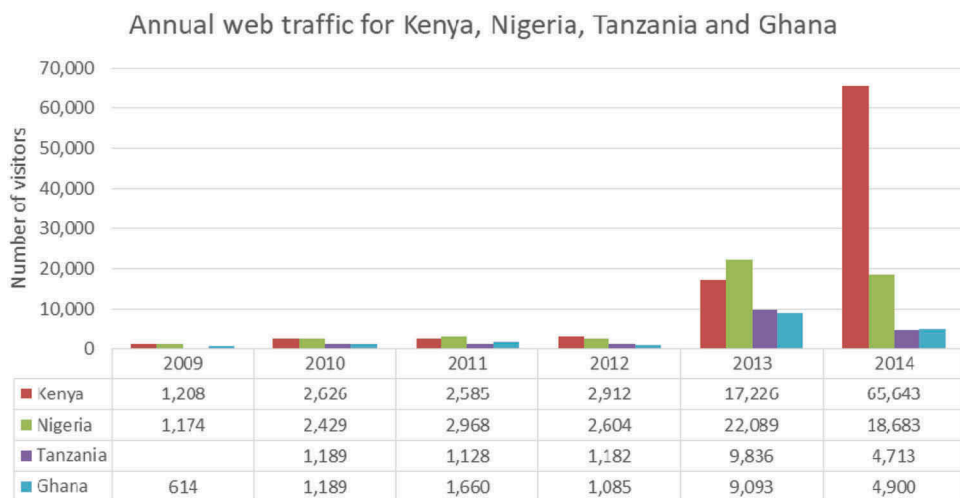


Figure 14. Annual statistics for Kenya, Nigeria, Tanzania, and Ghana between 2009 and 2014.

- First, there is inconsistency in the variety of details available for the different countries. South Africa and Nigeria have data about both city and regional locations, but Kenya, Tanzania, and Ghana only have data on their cities.
- Second, the statistics of all five countries reveal the presence of the category titled “not set.” For South Africa, it is identified as the ninth ranked region, while for Nigeria, it appears as the third ranked region and twice as fifth and eighth cities. For Kenya it is both first and third ranked cities, in Tanzania second and third ranked cities, while in Ghana second and fourth ranked cities.
- Third, there are fundamental issues about accuracy, when for Kenya, a city titled Kenya is ranked as ninth, for Tanzania, a city titled Tanzania, is ranked as seventh, while in Ghana, a city titled Ghana is ranked ninth. In addition, for Ghana, three different cities are listed twice: Accra ranked first and third, Kumasi ranked fifth and seventh, as well as Cape Coast ranked sixth and eighth.

At the core of these issues is Google Analytics’ inability to determine unique visitors and/or their geographic locations. Since geographic locations are determined using visitors’ IP addresses, complications arise with visitors that use virtual connections or access The Web via mobile devices that could be moved easily across terrains ([Barnes](#)). This may explain, among other things, why the “not set” category features prominently, as well as why cities have country names and are identified more than once. [Google](#) (“Location Says (Not Set)”) admits that it collects geographic location information from third-party vendors and relies on them for accuracy.

The data analyzed was not sophisticated at all and did not delve into details, such as number of page views, bounce rates, pages per visit, or average time per visit. Yet, even at the fundamental level of geographical location, it revealed seemingly obvious inconsistency and inaccuracy issues. This suggests the fundamental examination of trustworthiness of such information within the larger discussions on big data ([Lemieux](#)).

Conclusion

In 2004, while at a nascent stage in the development of the Mandela Portal, Mr. Mandela stated “[i]t is our hope that from these small beginnings it will grow into a vibrant public resource offering a range of services to South Africans and visitors from all parts of the world” ([Mandela](#)). Since that time, the Portal has been able to facilitate global access to the Mandela Archive.

This article provided an outline on the conceptualization of the Portal and the need to do an assessment of its visitors in line with Mr. Mandela’s desire. It explored different aspects of visitor trends on the African continent, a place where Mr. Mandela has his roots and invested most of his time.

The assessment of visitors was done using Google Analytics, a web analytics tool that revealed the period between 2009 and 2016 witnessed just over 15 million sessions of Web visitors to the Portal. The article explored geographic origins of these visitors, but also demonstrated concerns on the trustworthiness of the data. This article did not explore other statistical aspects of the Mandela Portal data such as bounce rates, pages per visit, or average time per visit, all of which would deserve in-depth analysis in order to contribute to the debates about the trustworthiness of visitor statistics. The discussion demonstrates that web analytics could offer incredible insight, but this requires sustained efforts in exploring avenues to guarantee that the data being analysed can be trusted.

Web analytics is evolving and its methodology as well as terminologies are consistently being refined ([LaCugna](#); [Sostre and LeClaire](#) 309). While web analytics has predominantly been used to formulate online strategies that are often in corporate monetary terms, this study demonstrates the value created for a nonprofit institution that used it to better understand its web audience.

Acknowledgments

The author was a staff member at the Nelson Mandela Foundation for a period of five years from 2005 and contributed to the development of the Mandela Portal. The author gratefully acknowledges the thoughtful readings of previous iterations of the article by Lee Davies, Verne Harris, and Sello Hatang. The views expressed herein are solely those of the author and should neither be attributed to his current employer, nor any of his previous employers, including the Nelson Mandela Foundation.

Disclosure statement

No potential conflict of interest was reported by the author.

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