Cloud computing: Revolutionizing the African Continent through open data. Using Kenya as a case study.

Research · May 2015

DOI: 10.13140/RG.2.1.1878.4162

CITATIONS
0

READS
191

1 author:

Raphael Amponsah
Ghana Institute of Management and Public Administration
2 PUBLICATIONS **0** CITATIONS

SEE PROFILE

Cloud computing: Revolutionizing the African Continent through open data. Using Kenya as a case study.

Raphael Amponsah

Abstract

In this paper it is argued that Africa, which is seen as the most corrupted continent in the world would (Lawal, 2007) have its corruption rate halved two decades from now through the introduction of cloud computing in Africa. This assertion is qualified through the use of the institutional theory through which cloud computing which is the focal Information Technology in this paper is seen as a formidable force that could cause this change. Kenya one of the most corrupted countries in Eastern Africa that has introduced the Open Data Initiative (a cloud based technology) since 2011 (Kwamboka, 2013) is used as the case study in this paper to articulates the institutional nature of cloud computing technology.

1.0. Introduction

We find ourselves in a digital age where technology has become a force to reckon with, which affects both organisational structure and work to a very large extent. Technology according to Chrisanthi Avgerou (2007), is an institution in itself. It is in this vein that the paper makes the claim using the institutional theory that in the next two decades Africa's increasing corruption rate will be halved based on the rate of adoption of cloud computing technology on the continent. Over the past decades Africa as a continent have been striving in most areas to catch up with technological advancement and usage. Which in most African countries, it can be seen by how much technology has got itself integrated into the life patterns of Africans both in the health sectors and even in education sector ("Emerging Africa, A hopeful continent," 2014) .

This paper thus takes a deep look into how IT in Africa is helping to reduce the rate of corruption in most corruption endemic countries through cloud computing. As cloud computing technology gains more grounds in countries such as Kenya, South Africa, Ghana the rate of corruption is seen to be affected by the technology introduction, which is the main objective of this paper. There has been several papers that have been written about African corruption, and strategies by which corruption could be reduced. Also some literature focused

on the increase in IT in Africa, however little has been done to connect these three issues for which as asserted above is dwells in the focus of this paper.

2.0. Literature Review

This paper posits the assertion that the rate at which Africa is accepting this technology, in the next two decades the rate of corruption will be halved. Thus this paper reviews how cloud computing introduction in Africa would be able to achieve a drastic reduction in the rate of corruption in most corrupt endemic countries which is as a result of the increase in IT growth and the characteristics of cloud computing.

The claim made in this paper could be viewed from two perspectives; from an institutional theory standpoint according to Scott (2004) institutional theory focuses on the resilient parts of an organisation, taking into consideration the norms that becomes established as authoritative guidelines for social behaviour. Thus it looks at IT (cloud computing in this case) and how in introducing it in an organisation (an African government) can cause a societal behavioural change due to the force it carries as an institution in itself (Avgerou, 2007), the second perspective which views this issue through the technology acceptance model builds itself on the factors that affect how users come to accept technology and how the user (in this case African government) perceives the usefulness of cloud computing technology, its ease of use and the benefits they stand to gain, the degree of accepting such a technology will be very high (Davis, 1989).

However in comparing these two theories, considering the African IT maturity and the inevitable human resistance to change the technology acceptance model will not be able to fully explain how the drastic reduction of corruption will occur with the advent of such a powerful technology. Therefore it suffices to say that the institutional theory through which one can see IT as a force or a transformational tool, will be the appropriate way to understand this phenomenon.

2.1. Cloud Computing

According to the National Institute of Standards and Technology (NIST) cloud computing is a model for enabling ubiquitous, on-demand network access to a shared pool of computing resources that can be effortlessly provided and released with minimal effort (Mell & Grance, 2012). It is also the virtualization of quantified resources (Thorpe, Grandison, Ray, & Barbir,

2010). However the working definition of cloud computing for this paper will be; having a group of servers which are all connected and yet having a centralised system to store all the data in which the data can accessed anywhere at any time. Over the past years this technology has gained a lot of attention due to the advantages that it brings with it. Cloud computing offer three main types of services, Platform as a services (PaaS), Infrastructure as a Service (IaaS), Software as a Service (SaaS), Network as a Service (NaaS) all these services rendered by cloud computing can serve as business models in themselves (Mell & Grance, 2012).With the advent of these services, organisations are able to render quality customer relation services such as online payments, sharing data, web conferences only to mention a few all enabling innovative bus.

With the cloud computing comes openness. The centralised data storage aspect of cloud computing is what makes accessibility, openness and transparency possible. This is possible because as organisations' resources are hosted on a cloud network it becomes very easy to access information with little hindrance, data can easily be tapped into from any network connected device a classic example being; a mobile device retrieving information from an organisation's database over the internet. With this feature many dynamic applications have been developed that can interact with such informational resources online in a more fast and reliable way.

Furthermore the interconnectivity of the mobile devices also enhance the openness of the market. This capability of the cloud has led to the concept of the Open Data –more of data as a service (Amaral et al., 2013)- which many governments in Africa are now trying to inculcate into the fibre of governance in their countries. Notable among such countries are Kenya, Ghana, South Africa and Rwanda (Laverty, 2011). The openness that cloud computing offers which has led to the open data is the lens through which this paper would view how corruption in Africa would drastically be reduced in most corruption endemic countries.

Furthermore among other benefits that yields from cloud computing is the cost-benefit factor it brings to bear (Sarga, 2012); this is because users of the cloud computing do not need the actual IT infrastructure, rather users can easily outsource the IT infrastructure and host their applications on them, and they will be only billed for the resources users take up, as the key words in the NIST definition states that it is *on-demand service*, thus users only pay for what they use at a particular time. This is cheap compared to the in-housing the IT resources whereby most of the resources might not even be needed or used (Mell & Grance, 2012).

2.2. Corruption in Africa

Corruption as defined by the Transparency International is the abuse of power for private gain (Carter, 2014). It is also defined by other scholars as the acts in which public office power is used for personal gain in a way that contravenes the rules of the game (Jain, 2001). However this paper would look at corruption as the lack of conducting any transaction that is not transparent, lacking openness and where rules are abused for personal gain. Africa for a long time have been labelled as the most corrupt continent (Lawal, 2007), and reasons for this labelling have been attributed to the slow developmental process yet abundant resources, the never ceasing wars in certain African countries such as Somalia, among others.

Again it is also due to the lack of transparency in governance which leads to a shady-kind of governance (Carter, 2014), and this has resulted in a poor sharing of the national cake, and all these trickles down to visual effects such as poor educational facilities, lack of good health insurance policies and implementation, poor distribution of road network. This does not end only in the ambits of the government, institutions in most African countries are not efficient enough (Munyua, 2012); discrepancies of data is very high, several bodies operate without adequate supervision from the government and all these increase the level of corruption in these countries. All these makes it difficult to pull down the curtain of corruption to the minimum.

According to the United Nations Economic Commission for Africa and the African Union Advisory Board on Corruption, 50% of tax revenue, 25% of the continent's GDP and US $ 30 billion in aid had been dwindled by corruption (Nations & Advisory, 2011), and some of the aforementioned reasons had been the contributing factor of such a statistic. These statistics infers that corruption has a debilitating and corrosive effect on the continent (Mapuva, 2014). There has been numerous conferences and strategies that have been put in place to solve this menace. However until recently the World Bank informed that Information and communication technologies could help reduce corruption by bringing in transparency and accountability (Munyua, 2012). Following this statement several countries begun adopting ICT strategies to curtail the ascendancy of corruption on the continent. The most significant among these IT strategies is the introduction of open data initiative which builds itself on cloud computing. Several corruption endemic countries such as Kenya, Ghana, South Africa, and Tunisia have started implementing this technology in governance.

3.0. Analysis

In taking into cognizance the statistical definition of corruption and the power of Cloud computing through the lens of institutional theory, it is appropriate to note that the main keywords that resound in defining corruption is basically lack of transparency and openness in governance, and this is because corruption is shadowy and secretive in nature (Transparency International, 2013).

However information technology (cloud computing) can reduce corruption in the public sector by increasing transparency and accountability (Munyua, 2012) as espoused by the Kenyan President Mwai Kibaki that data is the foundation of improving accountability and governance (Kwamboka, 2013). The inception of cloud computing has brought into focus *linked* open data; which is, an interconnected or networked data consisting of different datasets that can be freely used and redistributed or reused (Mirashe & Kalyankar, 2010), governments in Africa have resorted to this paradigm of technology thereby making governmental and institution operational data publicly accessible, as a way to encourage transparency and openness in governance (Carter, 2014). Which in effect leads to the reduction of corruption in the system as there will be less room for secrecy and shadowy operations which are the main constructs through corruption in Africa has had its growth.

According to the institutional theory the emergent of IT into a system throws in a high degree of determinism of behaviour (Avgerou, 2007). As IT is not based on subjective thinking it becomes important to note how the social aspect of any organisation can be transformed by such an institution since the radical human agency's will-power declines. Through cloud computing as the IT, the paradigm of open data is able to perform this transformation to the widest possible point although not without some degree of challenges. This capability in relation to the intuitional theory emphasizes the fact that IT is not merely a group of material products that follow a set of technical rules embedded in it physical components rather it forms part of social networks that are embedded in today social systems (Avgerou, 2007). Therefore due to this closeness of IT to the social system, the propensity of transforming entities is high.

The self-perpetuating nature of IT in organisations over the years have been studied to revolutionize organisational structures and forms of work. In this perspective it might seem comfortable to assert that the introduction of IT in an organisation inadvertently circumvent the system in such a way that the actors of the system turn to conform to the norms as established though the usage of such technologies.

The following sub-sections of this paper takes a look at the Kenyan case, in their introduction of the open data initiative in governance how it affected their corruption status, the challenges such technology posed and the future implications.

3.1. Case study: Kenyan Open Data Initiative (KODI)

In 2011 Kenya one of the Sub-Saharan African countries esteemed to be the most corrupted country in Eastern African introduced into their governance the Open Data Initiative (Munyua, 2012) a cloud based technology that allows easy and free accessibility to the national data leading to transparency in governance. KODI according to Munyua (2012) brought by the government was a way to also make the government effective in governance. The main driving force behind such initiative was to help reduce corruption in the country, as the Transparency International (TI) had ranked Kenyan in 2011, 154th out of 182 countries. The Afro Barometer also confirmed that majority of the population of Kenyans believe that all public officials including the president are corrupt (Afro Barometer, 2008). Which was due to most importantly the lack of transparency in governance which is largely overshadowed by the political will of the country (Goundar, 2007), since its inception since 2011 there has been a variety of developmental changes in the country among which are; increase in software developers which is serving a new wave of employment for the youth in the country, there is also the new data journalism which now journalist can interrogate government data from any mobile or computer device with internet connection (Otieno, 2013) which has led to the reduction of time spent to acquire information from the government and its bureaucratic associations.

Significant among the changes pertaining to the introduction of the KODI is the decline in corruption since 2011, the 2013 TI gave a statistic that ranked Kenya the most corrupted country in Eastern Africa as at 2011 (Munyua, 2012) 136th out of 177 countries with a score of 27 which is 5% improvement over 2011 for which Transparency International reported a score of 22 and ranked Kenya 154 out of 182 countries. All of the aforementioned statistics and developments became visible only after the inception of cloud computing open data initiative. Although there might be other factors that may have contributed to this slight fall in corruption, it would not be a blunder to believe that open data introduction in Kenya owns the applause for this change.

This change of 5% improvement in the corruption rate of Kenya indicates a lot, both about what open data can do, what it is doing and the challenges that it faces. Open data as a

technology having propelling force transforms a culture of shadow-back yard operations to a culture of openness and transparency; which is one the major ways of decreasing corruption in a country and this is evident in how the political will has resisted the initiative (Munyua, 2012).

This is what open data as an institution drives to achieve. Thus it can be seen that there is an invisible force that is transforming the Kenya society even though it is a slower pace. The slow pace of such change is due to the fact even though such a technology possess such a force the social aspect of the organisation (in this case, Kenya) also poses some resistance to the technology. Among such issues raised which slowed the pace of the corruption decline is the lack of effective policies to back the full operation of Open Data (Davies, 2014).

Again awareness creation about the initiative was low, thus even though the project was in operation only a small populace were aware about it. And to add more was the lack of internet connectivity among certain rural areas (Notes, 2009). These among others can be attributed to as the reasons for the slow pace notwithstanding, per the statistics and one can observe that even in this steady growth in two years recounting the claim made earlier on in two decades when most of these challenges would have been culled the propensity of the corruption rate in Kenya for that matter Africa in general would have really been halved. This has been elaborately been confirmed by the institutional theory which throws more light on the fact that IT carries with itself a force that can cause change.

3.2. Limitations

This deductive study although presents several evidences of how cloud computing though open data can affect the corruption trends of Africa in general using Kenya Open Data Initiative as the case study, there are certain limitations that need to be addressed.

Most important among the limitations is the fact that since this research is a more of deductive study it would have held more water if an on-field research was done to provide with current on-ground trends and statistics to back the claim. Also a more of statistical projection with some mathematical models would have been very appropriate to aid in some predictive analysis.

Apart from these cloud computing is a new feat on the continent and as such it would take some time for it to take a stronger root. There is also the need for a good political will which will help propagate government open data initiatives (Mutuku and Mahihu, 2014).

4.0. Conclusion

In summation cloud computing as a technology has the capacity to transform the corruption index of African countries especially through the inception of Open Data initiatives leading to open governments. Again in increasing the pace of development on the continent cloud computing would help enable such a possibility, whereby issues of unemployment would reduce, the socio-economic state would rise.

However despite the advantages that cloud computing brings to the table of governance it's very important that any African country who so desires to go into open data initiative ask the question of how ready the country is for cloud computing Open data initiative. The technological maturity of each country must be considered likewise the political culture and tensions in every African must be considered before such technology is initiated.

4.1. Recommendations

To gain a true reflection of this study a more on-ground research could be done to enhance this study. Furthermore awareness must be created to sensitize Africans about the importance and usage of open data cloud computing. And more strong willed policies must be made to ensure the full operation of this technology.

5.0. References

Amaral, R., Badia, R., Blanquer, I., Candela, L., Castelli, D., Giovanni, R. De, … Torres, E. (2013). EU-Brazil Open Data and Cloud Computing e-Infrastructure for Biodiversity, 3–10.

Applications, O. D. (2014). Open Data in Developing Countries.

Avgerou, C. (2007). IT as an institutional actor in developing countries Book section.

Carter, B. (2014). Transparency and accountability.

Davies, T. (2014). Open Data Policies and Practice : An International Comparison.

Davis, D. F. (1989). Perceived Usefulness , Perceived Ease Of Use , And User Accep. *MIS Quarterly*, (Sep 1989), 319.

Emerging Africa, A hopeful continent. (2014). *The Economist*, 1–6.

Goundar, S. (2007). Cloud computing : Opportunities and issues for developing countries, 1–15.

Jain, A. K. (2001). Corruption: A Review. *Journal of Economic Surveys*, *15*(1), 71–121. doi:10.1111/1467-6419.00133

Kwamboka, L. (2013). Open Data – How Kenya Did It @ KenyaOpenData By Former Project Coordinator : Kenya Open Data Initiative Kenya Open Government Partnership Blogger at datascience . co . ke. *Kenyan Open Data*, 14.

Laverty, A. (2011). The Cloud and Africa – Indicators for Growth of Cloud Computing | The African File on WordPress.com. Retrieved December 15, 2014, from http://theafricanfile.com/ict/the-cloud-and-africa-indicators-for-growth-of-cloud-computing/

Lawal, G. (2007). Corruption and Development in Africa : Challenges for Political and Economic Change, *2*(1), 1–7.

Mapuva, J. (2014). THE DEBILITATING IMPACT OF CORRUPTION ON DEMOCRACY AND GOOD GOVERNANCE : A CRITICAL, *2*(September), 164–174. doi:10.14662/IJPSD2014.039

Mell, P., & Grance, T. (2012). The NIST Definition of Cloud Computing: Recommendations of the National Institute of Standards and Technology (2011). *URL Http://csrc. Nist.*

gov/publications/nistpubs/800-145/ …. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+NIST+Definition+of+Cloud+Computing+Recommendations+of+the+National+Institute+of+Standards+and+Technology#0

Mirashe, S. P., & Kalyankar, N. V. (2010). Cloud Computing. *Communications of the ACM*, *51*(7), 9. doi:10.1145/358438.349303

Munyua, A. (2012). Kenya. *Kenya ITC Action Network (KICKTANet)*, (2011), 157–160.

Nations, U., & Advisory, A. U. (2011). Combating Corruption , Improving Governance in Africa.

Notes, C. (2009). Access to information technology : Africa in the world rankings.

Otieno, D. (2013). Data Journalism in Kenya: Introducing Data Dredger. *Internet*. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:No+Title#0

Sarga, L. (2012). Cloud Computing : An Overview, 3–14.

SUMMARY OF RESULTS ROUND 4 AFROBAROMETER SURVEY IN KENYA , 2008 Compiled by : Institute for Development Studies (IDS), University of Nairobi and Michigan State University. (2008). *Afro Barometer*.

Thorpe, S., Grandison, T., Ray, I., & Barbir, A. (2010). Towards Enabling Behavioral Trust among Participating Cloud Forensic Data Center Agencies, 4–9.

Transparency International Report. (2013). CORRUPTION PERCEPTIONS INDEX 2013. *Transparency International Report*.