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ADDRESSING THE CHALLENGE OF PATH DEPENDENCY IN THE CREATION OF SUSTAINABLE INFORMATION AND COMMUNICATION TECHNOLOGIES FOR DEVELOPMENT AN ANALYSIS OF ZAMBIA'S E-GOVERNMENT SYSTEM

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ABSTRACT

The research paper seeks to discuss the challenges associated with path dependency in the creation of sustainable information and communication technologies for development. The research seeks to determine whether path dependency has presented a challenge for the development of a sustainable electronic-government system in Zambia which can reliably provide services to the public. The methodology adopted is an analysis of what path dependency is and the extent to which it affects the possible provision of a sustainable electronic government system in Zambia. The research found that path dependency has a large impact on Zambia's ability to deliver sustainable electronic government services and that if they are not addresses, the use of technology will not achieve its intended purpose. The research will suggest possible solutions to the identified challenges if any.

Key words: *Path dependency; electronic government; sustainable information and communication technologies; government policy and planning.*

1. INTRODUCTION

The development of any nation in modern times is heavily reliant on the leveraging of technology in o02rder to accelerate its economic growth and social development. Technology, like any other innovation or tool is not a "perfect panacea" to the challenges of society and like all tools, is only effective in the hands of a person competent to use the tool. This discussion will focus on the phenomenon of path dependency and how it impacts the development of the provision of e-government services to the public in Zambia.

2. METHODOLOGY

The methodology adopted by this research was to identify the basic infrastructure requirements for the development of a sustainable electronic government system and then det{/p.ermine how these systems are interlinked in order to create dependent paths and analyse h*?ow these paths affect each other. This was largely though the qualitative analysis of the statistical and technical data available.

3. RESULTS

The results found from the research are that path dependencies do exist in Zambia in relation to the development of sustainable electronic government systems for the provision of +|-}sustainable informati185on and communication technologies for development. The research has determined that there is need for a more integrated approach to the planning and delivery of electronic government services in a manner that ensures that they are delivered in the intended fashion to the public without creating disparities.

4. DISCUSSION

4.1 Path Dependency

It has been noted that a significant amount of "literature on the economic and social restructuring of the advanced capitalist societies is predicated upon the notion that such transformations are driven by the revolutionary technologies (ICTs)."[1] In terms of the leveraging of ICTs for development, the major factor that determines the extent of success of the initiatives of government in providing sustainable ICTs for development. It has been noted that the network effect of path dependency causes reverberations to different areas of ICT utilisation and implementation which are not directly connected with the initial infrastructure created. An example of this network effect is the QWERTY keyboard. The lack of any other widely used keyboard means that standards, whether *de jure* or *de facto*, that relate to the manufacture and safety of such keyboards are made based on the fact that this is the only keyboard in use. Several other devices and areas of regulation are structured along these lines. The effect then spreads to other areas such as education where curricular are developed based on the network premise due to the wide use of any given element. The crucial point to note is however, that this network dependency or effect does not mean that the approach currently in use is the best. In discussing the network effect and trust in general, Fitzpatrick has observed that:

> Economists speak of network effects or *path dependencies.* If one person takes a particular route through a field it will be easier for those that follow to take the same path, and the more that take the path, the wider it becomes for those that follow.
>
> Classic examples of path dependencies in technology are the QWERTY keyboard and the VHS player/recorder. But the path dependencies of the information age

> are compounding and self-reinforcing- digitalization is a path, the generic computer is a path upon that path, the digital network is a path upon that path upon that path….[2]

It is clear that the development of an effective e governance delivery platform is one that is able to leverage on path dependency in a manner that ensures that it does not become an obstacle to the provision of the e-government services. At the level of political will and the intention of the Zambian Government to ensure the effective utilisation of ICTs for development, it may be seen that the commitment expressed by the Government is being translated into tangible action. The Government is therefore undertaking various programmes and projects that are being undertaken by the Government. For instance, one of the goals of the Seventh National Development Plan,[3]is to respond to the Smart Zambia transformation agenda 2064 and embed in it the economic recovery necessary for the actualisation of a Smart Zambia. Specifically, development outcome 8 of the plan deals with enhanced information and communication technology. Under this outcome, the second strategy, which relates to improvement of ICT infrastructure for service delivery, aims to improve ICT infrastructure, through invest in and upgrading of telecommunications networks, data centres and access devices through the SMART Zambia Master Plan. The plan is also meant to improve the flow of information within and among government institutions, enterprises and citizens to bring about social and economic benefits.[4] Further, the third strategy under outcome 8 states that the Government will transform its mode of delivery of public services from traditional face-to-face interaction to online channels to ensure that citizens and business entities can access services anywhere and anytime. Additionally, the Government will also facilitate ICT skills up-scaling for public service workers and the private sector. To ensure sustainable development and utilisation, the Government will accelerate the mainstreaming of ICT in the Zambia education curricula.[5] The Seventh National Development Plan in a roundabout way acknowledges path dependency as a major factor in the development of sustainable ICTs.

Having given a basic description of path dependency and the role it is expected to play in a networked society, an examination of the interrelated path dependencies that have a fundamental bearing on the development of Zambia's e-government system will now be undertaken.

4.2 Technological Advancement

Technological advancement is one of the major determinants of the provision of sustainable ICTs and e-government services in any nation. This is because the rapid rate at which technology advances and the possibility of obsolescence requires sustained investment in the systems that facilitate the delivery of e-government services. In a country like Zambia which has only recently rolled out 3G technology for example and is barely beginning to implement 4G, the fact that the rest of the global community is talking about 5G[6] clearly puts pressure on the nation to ensure that it deploys appropriate technologies. This is especially important where services are meant to be accessed in a secure and efficient manner at a supra national level.

Further, the advances in technology have concomitant effects on the ability of a nation to provide e-government services to its citizens. The questions that begin to arise include the fundamental question whether a nation that has basic challenges such as the need to provide essential services to its citizens such as water and sanitation, basic health services and

education and can afford the "luxury" of delivering e-government services when there are more basic and urgent considerations to be made in relation to their population.

Although the universal rollout of technology seems to be a simple thing on paper, it has massive implications especially when rolled out as part of an integrated government wide system. The considerations to be taken into account in such a situation include the need to have in place appropriate control over the hardware and software being deployed and utilised in order to ensure that the government does not suffer "monopolistic capture" that often is a danger with the use of proprietary software or hardware that is tied to specific software or licensing requirements which are only available for a single or limited number of vendors. The need for appropriate sustainable care and replacement plans for obsolete equipment also need to be taken into account when dealing with the provision of sustainable e-government services.
Additionally, the changing nature of the technology may affect delivery channels and therefore affect the cost or manner of delivery of the services. An example this is the delivery and use of broadband technology as opposed to other technologies such as analogue technologies, especially in light of the global move towards universal digital migration.[7] The deployment of new technologies also has to take into account the physical security of the infrastructure and disposal methods of the technology once it has outlived its usefulness.

These factors are largely interrelated and rely on the principle of path dependency in order to be optimally utilisable for the benefit of the citizens in the provision of e-government services and sustainable ICTs to foster development. The main path dependencies that exist in relation to the advancement of technology therefore can be traced and modelled in various ways. An example of the applicable path dependency which will take into account the role of persons as opposed to the technology itself, may be that for a single terminal to be deployed in a rural office in the Ministry of Lands to allow for access to the lands registry for search purposes. In order for it to be fully functional, there would be need for electricity, appropriate network infrastructure, a secured area where it would be located, appropriate hardware and software that would be able to access the desired network elements and appropriate knowledge of the intended user and the appropriate technical support service provided by qualified personnel, both for the network and for the user terminal. All these dependencies are related and can be individually costed over time and integrated into an assessment model to determine the needs and reach of the technological requirements to provide universal or selected access to the technology by the end user of the e-government service.

4.3 Information and Communication Technology Capacity

Apart from technological advancement, another source and of path dependency is the ICT capacity of a given nation such as Zambia. This is because the technological capacity related to the provision of e-government services may be related and dependant on other capacities without which they cannot be fully optimised. An example of this may be seen from the Government's plan to change the way in which national registration cards are issued and also the type of national registration card issued which, going forward, will be an electronic one capable of seamlessly storing integrated public citizen information.[8] It has been stated that the new card will make Zambia the first country in eastern and southern Africa to introduce multipurpose electronic national registration cards that will be used for voting, accessing banking services and as driving licenses.[9] The change of the national registration card necessarily entails that there will be a requirement for the use of card readers related to the

provision of public services, not only in urban areas and areas that are electrified but in areas where there is a presence of government service delivery.

It must be noted that where the roll-out of technology creates disparities of access to services by citizens, the government is obliged to ensure functional equivalence[10] in order to ensure that there is no inequality among citizens occasioned by the use of technology as this would be a contravention of Articles 8 and 9 (1) of the Constitution[11], which provide as follows:

> 8. The national values and principles are-
> (a) morality and ethics;
> (b) patriotism and national unity;
> (c) democracy and constitutionalism;
> (d) human dignity, equity, social justice, equality and non-discrimination;
> (e) good governance and integrity; and
> (f) sustainable development.
>
> 9. (1) The national values and principles shall apply to the-
> (a) interpretation of this Constitution;
> (b) enactment and interpretation of the law; and
> (c) development and implementation of State policy.

From the provisions of Articles 8 and 9, it is evident that where there is a deployment of technology for the purposes of provision of services to the public, such services are also dependent on the development of paths that ensure that there is no social or physical divide created among the various citizens that use the public services. Having examined the advancement of technology and ICT capacity as two interdependent paths in the provision of sustainable e-government services, the next paths to be examined relate to the architectural and contextual elements of the delivery of services to citizens.

4.4 Zambia's ICT paths and their dependencies in creating an environment for sustainable development

The provision of e-government services in Zambia is a major commitment that the Government is determined to fulfil through deliberate actions that are intended to achieve the targeted results. The full achievement of sustainable ICTs for development and delivery of e-government services is therefore dependent on various factors which should operate together in order to provide sustainable e-government services to the citizens.

4.4.1 Electricity

One of the basic requisites for the implementation of electronic services in Zambia is the need for stable electricity supply, especially where systems that are deployed require continuous and stable supply by virtue of the fact that public electronic services need to be available almost one hundred percent of the time. This is critical where the services are provided at a supra national level and are not subject to normal time constraints or applicable to uniform time zones. An example of that of online visa applications. In relation to the availability of electricity in Zambia, it has been noted that only 33.1 percent of the households in the country are able to access electricity from the national grid and of these, 29 percent access energy for powering electrical equipment through the utility companies like ZESCO while a smaller proportion utilise alternative energy sources such as solar and

generators accounting for 17 percent and 1 percent of all households respectively. Further, of the 33.1 percent of households, 27.3 percent are in urban areas whereas only 5.7 percent are from rural areas. Additionally, 66.9 percent of all urban households are connected to the national grid while only 9.7 percent of all the rural households are connected to the national grid.[12]

The supply of electricity to the public should be as stable as possible. This may not always be the case, as was witnesses during the time of load shedding that Zambia experienced as a result of erratic rainfall that led to declining water levels in lake Kariba, the main area for the generation of the bulk of Zambia's hydro electricity supply. For example, on 18th June 2010, a system disturbance occurred within the ZESCO electricity network and resulted in significant electricity black out that affected most parts of the country.[13] A similar incident occurred in December, 2015 where eight out of the ten provinces experienced a power blackout caused by a system failure at Kafue Gorge and Kariba North Bank Power Stations.[14]

The remaining areas requiring electrification in Zambia therefore consist of large proportion of the rural population. As at 2005, it was observed that only 2% of the rural population had access to electricity.[15] In Zambia presently, the ability to provide e-services is predicated on the path of availability of electricity, in order for the applicable technologies to be appropriately used. It must be noted that backup electricity supply for government buildings is available for strategic installations but not for "front line" institutions, that deal directly with the public in the provision and delivery of electronic services. It must be noted that without the appropriate and adequate supply of electricity, the development of electronic based service provision becomes a very big challenge. Thus electricity plays a vital role as a path in the provision of ICT services to the public. The government is however addressing this challenge through various interventions. Having examined the status of electricity provision in Zambia.

4.4.2 ICT Infrastructure

Having examined the role that electricity plays as a path in the provision of sustainable ICT services especially in relation to public services, the next path worth consideration is the deployment and utilisation of ICTs. The deployment of ICT infrastructure in Zambia can also be determined by the household penetration as well as the nature of the technology used and its appropriateness in addressing the requirements for which it is applied. It has been noted that that access internet services regardless of mode of device increased stood at 12.7 percent in 2015.[16] From the information provided, it is clear that there is need to the capacities in terms of the generation of electricity and the power usage of the various technologies used to provide services to citizens are both part of interrelated and mutually dependant paths. A further factor for consideration related to the geographical location of the various items of infrastructure deployed as these have a bearing on the efficiency of the technology and the ability to provide physical security for the infrastructure. Having examined the matters relating to infrastructure and the path that it creates, the next aspect of path dependency that will be examined is the need for basic identification that facilitates effective access to, and use of public services.

4.4.3 Basic Identification and Authentication

One of the strengths of a system designed to provide public services is its ability to identify and authenticate the users or beneficiaries of a particular system in a manner that ensure public confidence and trust. The need for development of trusted systems using various authentication and security protocols, which rely on the identity of an individual or organisation puts additional pressure on the government to ensure that all the systems that it utilises are secure. This is especially important when dealing with electronic systems that provide service and store vast amount of data which is vulnerable to theft by cyber criminals who always seek to exploit weaknesses in electronic systems to gain access to information that they can use to their own selfish ends. Example of such data breaches have included the Sony data breach, Ashley Madison and yahoo.[17] What is more startling is that there are tools that are easily available on the internet that provide the ability of persons to gain unauthorised access to personal information.

In relation to Zambia's general objectives of providing e-governance services, one of the paradigm shifts that will occur going forward is that national identity documents will be biometric.[18] This by itself creates a path dependency arising from the need to collect and maintain accurate information relating to births and deaths of citizens, whether these are born or die in an urban or rural setting. This increasingly continues to be a challenge especially when viewed in light of the fact that some children are not born in health facilities where the birth can be immediately recorded and registered.[19] The same challenge occurs in relation to the death of persons in certain circumstances.

A risk that will have to be managed with the transitioning of national identity documents is one of fraud. Presently, there are instances that have been noted where non-nationals have been able to fraudulently obtain national identity documents even when they are not citizens.[20] Another matter related to the management of the risk of the changing of the national identity documents related to the sustainability of supply and general architecture that ensures the optimal, integrated and uninterrupted use of the new national identity card in the provision of services that are delivered through electronic channels, such as e-health, e-driving licenses, e-tax registration, etc.[21] Having examined the role that the national identity card would play as a path in the provision of e-government services to the public, it is must be noted that in order for the national identity to serve a practical purpose, it must be linked to the ability to locate the physical body behind the document. To this end, there is another path that is required to be traversed in the provision of sustainable ICTs for development and this relates to national numbering and addressing systems.

4.4.4 National Numbering and Addressing

The need to ensure accurate and traceable telephone and mobile numbers and residential and business addresses in order to make the provision of e-government services practical means that Zambia has to implement a sustainable mechanism for the identification of street addresses, postal addresses and corresponding telephone numbers and in some cases mobile numbers related to a particular identity and household.

The numbering and addressing system is also a path for access to information held on government databases and cross referencing of public information about citizens held by the government. Further, the addressing system assists with law enforcement such as Immigration, the Police, Drug Enforcement Commission and the Anti-Corruption Commission and general service delivery to the citizens. The use of numbers and addresses is

therefore an additional path which further emphasises the occurrence of path dependency. Having examined numbers and addresses as a path upon which the provision of e-government services is dependent, a further path is that of technological literacy.

4.4.5 Technology Literacy

The issue of technological literacy as a path relates to the fact that no matter how perfect and efficient the delivery channels are for the provision of e-government services; they are useless if they cannot be utilised by the intended users. Technological literacy in this context is the ability of a person to use an electronic service unaided in the manner the service was designed to be used. In a country like Zambia, technological literacy is a serious issue especially when examined in the context of the very low access to computer systems by most households as well as generally high illiteracy levels. According to the 2015 ICT survey report, about 47 percent of the internet users in the country owned an email address while only 7 percent used cloud services. Internet Banking and Online shopping activities accounted for only 4 percent and 6 percent of all internet users respectively.[22] The Government however has made efforts to increase technological literacy through the introduction of computer studies in the school curriculum, which was previously not available. The need to ensure universal technology literacy is one of the means of bridging the digital divide from the human side of path dependency.

Technological literacy is important in order to fully implement automated systems as it is a path that ensures significant reductions in face to face contacts in the provision of public services and consequently reducing the chances of vices such as corruption and embezzlement of public resources by front line officers. Further, automation of public services ensures that front line staff can be reduced and the freed up human, financial and other resources redeployed to other areas of need. High levels of technological literacy would also encourage remote access to public services and minimise the need to deploy public access terminals and kiosks, which in turn would reduce the risk of damage or vandalism to public infrastructure and in the long run reduce the cost of physical infrastructure required for the provision of e-government services.

Having examined the various path dependencies related to the technology deployment of technology for the provision of e-government services, what remains to be analysed is the formulation of policy as a path as well as examining the various initiatives for delivery of e-government services among the various organs of Government namely the Executive, Legislature and the Judiciary.

4.4.6 Policy Making

One other determinant of path dependency is the formulation of policy. In Zambia as is the case in many other commonwealth countries the policy process begins with a political party being voted into government and subsequently implementing its various election promises contained in its party manifesto.[23] The formulation of policy is the largest single determining factor in relation to how a country decides to take the direction of its e-government systems and delivery of electronic services to the public. Government policy also determines the rate at how fast technology can be deployed and employed as a result of the priorities and actions that the government takes in relation to making policy decisions.

As has been earlier noted, in Zambia the general policy direction is to ensure a "smart" Zambia by 2064.[24] The policy commitment can further be seen through the reforms in areas that provide paths for the sustainable development of ICTs such as the electricity, energy and educational sectors. Having examined policy as a path determinant, it becomes necessary to examine the initiatives that the Government is actually undertaking in the provision of e-government services to the citizens.

4.4.7 Executive

The provision of services by the executive takes many forms as it is conducted by government departments and various statutory bodies that exercise public functions on behalf of the government. Some of the services include the computerisation of the management of the public service, establishment of the e-registry of business licenses established under the Business Regulatory Act,[25] and the establishment of the electronic Zambia transport information system and the AscyudaWorld at the Zambia Revenue Authority. One of the major projects currently being undertaken by the Executive has been the electronic management of the public service wage bill and the project to computerise public procurement of goods and services. In relation to this, the National Coordinator Smart Zambia National has stated that the new electronic payment system for the public service, to come into effect by August 2017, will save the country in excess of US$7 million spent monthly in printing paper wage slips.[26] The electronic payslip system is a classic example of the challenges that may arise in the deployment of technology. The new system is predicated on the creation of official electronic mail addresses for public servants, despite the fact that not all of them have terminals to access the government email system, which has restricted access. Further, the email addresses are likely to periodically change depending on which ministry an officer is redeployed to and the turnaround time for the adjustment of the email address, being a centralised process, risks delays in some instances and could technically result into "unauthorised access" to information if not properly managed.

4.4.8 Legislature

The Zambian legislature has also been providing electronic accessibility of laws, parliamentary proceedings reports to the Zambian public through the Parliament website. The Parliament website also has provision for the making of submissions to committees by members of the public on subjects of interest. The platform, being an online platform, is dependent on the various paths that have been discussed.

4.4.8 Judiciary

The Judiciary of Zambia has also made concerted efforts in making the provision of electronic services possible through the development of a system for the electronic filing of court process. The judiciary has reviewed the legal framework relating to procedures and filing of documents in court in order to facilitate electronic filing of court documents in order to reduce congestion in the court registries. The utilisation of ICT by the Judiciary is also dependent on the various paths that have been discussed and also faces the challenges associated with path dependency in the delivery of services to litigants.

5. CONCLUSION

5.1 Addressing the challenge of path dependency

From the foregoing discussion, it is clear that the seemingly innocuous provision of an electronic service through a single computerised terminal has far reaching legal, policy and security considerations. Further the delivery of sustainable ICTs for development especially in the provision of e-government does face challenges related to path dependence and this should therefore be analysed and deal with in a systematic manner in order to ensure that the developmental objectives for the development and utilisation of ICTs reaches fruition.

Having examined the various instances and aspects of path dependency that occur in Zambia in relation to the implementation of sustainable ICTs for development especially in the provision of e-government services to the Citizens, there is need for increased deliberate efforts to ensure that the bottlenecks to the provision of ICTs that arise as a result of path dependency are adequately dealt with. The single most ambitious initiative by the Government in dealing with path dependency and its attendant challenges is the development of the Seventh National Development Plan[27], which was launched by His Excellency the President of the Republic of Zambia, Mr Edgar Chagwa Lungu on 21st June, 2017.

There are a number of means of addressing the challenges associated with path dependence. One of the ways is the development of Public Private Partnerships in order to minimise the expenditure outlay and reduce the timelines for the development of the various paths that pose the largest bottlenecks in the deployment of sustainable ICTs for development in Zambia. These partnerships are especially vital for the development of paths relating for instance to electrification and development of reliable network infrastructure which ensures intra-country and transnational connectivity, security and backup.

A further way means is overcoming the challenges of path dependency is through the provision of an enabling economic, legal and regulatory environment that ensures that the use of appropriate technologies is able to thrive within the nation and emphasises further research and development into sustainable technologies and development and maintenance of hard and soft infrastructure[28]. This would require appropriate business licensing systems, efficient legal determination of disputes and effective enforcement of judgements as well as the assurance of law and order and security or persons and service providers in the country. The protection and security of personal and commercial data as well as other critical data and systems with appropriate backups would have to be effectively deployed. This is especially in light of the various recent events which can at best be described as cyberterrorism in some cases, such as the disruption of the National Health Services in the United Kingdom and British Airways.

A further means of ensuring that sustainable use of ICTs for development which could also be used to deal with the challenges of path dependence is the application and effective utilisation of big data in a manner that bridges the digital divide. This should be done taking into account the need to ensure privacy of persons as required by the Constitution.[29]

ENDNOTES

[1] Brian Loader, "The governance of cyberspace: Politics, Technology and Global restructuring" The Governance of Cyberspace: Politics, technology and Global restructuring, London: Routledge, 1997, 1-19.

[2] Greg Fitzpatrick, "An Essay on Information Technology and Trust" in Cecelia Magnusson Sjöberg (ed.), Legal Management of Information Systems-Incorporating Law in E-Solutions, Studentlitteratur, Lund, 2005 p.78

[3] Ministry of National Development Planning, "Seventh National Development Plan 2017-2021" Lusaka, 2017 p. 131.

[4] Seventh National Development Plan 2017-2021 p. 76.

[5] Ibid, p. 76.

[6] ITU defines vision and roadmap for 5G mobile development Future: mobile technologies usher in new paradigms for connected society, Geneva, 19 June 2015, available at https://www.itu.int/net/pressoffice/press_releases/2015/27.aspx accessed on 12th July, 2017.

[7] See Guy Berger, "Challenges and Perspectives of Digital Migration for African Media" Dakar: Panos Institute of West Africa, 2010.

[8] Adam Vrankulj "Zambian government to issue biometric registration cards" at http://www.biometricupdate.com/201303/zambian-government-to-issue-biometric-registration-cards available on 30th June, 2017.

[9] Michael Malakata, "Zambia's adopts multipurpose ID cards" at http://news.idg.no/cw/art.cfm?id=071AF482-1A64-67EA-E4B297FCADCF3934 available on 30th June, 2017.

[10] The principle of functional equivalence is an aspect of the regulatory approach of technology-neutral policy and regulation formulation. In the case of online regulation, it is employed to enable application of general legal frameworks online just as they are applied offline. See Bert-JaapKoops, "Should ICT Regulation by Technology Neutral", Starting Points for ICT Regulation. Deconstructing Prevalent Policy One-Liners (IT & Law Series), 2006.

[11] Chapter 1 of the Laws of Zambia as amended by the Constitution of Zambia (Amendment) Act No. 2 of 2016.

[12] Zambia Information and Communications Technology Authority, "Survey on Access and Usage of Information and Communication Technology by Households and Individuals in Zambia 2015" 2015, p. 3

[13] Energy Regulation Board "State of Infrastructure Report 2010" 2010. p.19.

[14] Reuters, "Zambia state power firm says substation fault caused blackout" at https://www.yahoo.com/news/zambia-state-power-firm-says-substation-fault-caused-150207793--finance.html?ref=gs available on 30th June, 2017.

[15] CORE International, Inc., "Zambia: Regulating Rural Electrification Experiences and Lessons Learned" November 14, 2005.

[16] ZICTA, "Survey on Access and Usage of Information and Communication Technology by Households and Individuals in Zambia 2015", p. 13.

[17] See Rick Robinson, "Two Important Lessons from the Ashley Madison Breach" Security Intelligence, October 28, 2015 at https://securityintelligence.com/two-important-lessons-from-the-

ashley-madison-breach/ available on 30th June, 2017; Dana Tamir, "Who Hacked Sony? New Report Raises More Questions About Scandalous Breach" Security Intelligence, February 5, 2015 at https://securityintelligence.com/two-important-lessons-from-the-ashley-madison-breach/ available on 30th June, 2017 and Robert McMillan, Ryan Knutson and Deepa Seetharaman, "Yahoo Discloses New Breach of 1 Billion User Accounts" The Wall Street Journal, Dec. 15, 2016 at https://www.wsj.com/articles/yahoo-discloses-new-breach-of-1-billion-user-accounts-1481753131 available on 30th June. 2017.

[18] See Adam Vrankulj "Zambian government to issue biometric registration cards" at http://www.biometricupdate.com/201303/zambian-government-to-issue-biometric-registration-cards available on 30th June, 2017 and Michael Malakata, "Zambia's adopts multipurpose ID cards" at http://news.idg.no/cw/art.cfm?id=071AF482-1A64-67EA-E4B297FCADCF3934 available on 30th June, 2017.

[19] Gethsemane Mwizabi, "Birth certificate mystery: Zambia should decentralise registration" Times of Zambia, June 20, 2014.

[20] "Government warns citizens aiding foreigners to obtain NRCs" September 9, 2015 at https://www.lusakatimes.com/2015/09/09/government-warns-citizens-aiding-foreigners-to-obtain-nrcs/ available on 24th July, 2017.

[21] See Adam Vrankulj "Zambian government to issue biometric registration cards" at http://www.biometricupdate.com/201303/zambian-government-to-issue-biometric-registration-cards available on 30th June, 2017 and Michael Malakata, "Zambia's adopts multipurpose ID cards" at http://news.idg.no/cw/art.cfm?id=071AF482-1A64-67EA-E4B297FCADCF3934 available on 30th June, 2017.

[22] ZICTA, "Survey on Access and Usage of Information and Communication Technology by Households and Individuals in Zambia 2015", p. 16.

[23] Constantin Stefanou, "Drafters, Drafting and the Policy Process" in Constantin Stefanou and Helen Xanthaki (eds), Drafting Legislation: A Modern Approach (Ashgate 2008) p, 4.

[24] See Seventh National Development Plan.

[25] Act No 3 of 2014.

[26] Jeff Kapembwa, "Smart Zambia electronic system to save US$7mln incurred in printing paper wage slips for public workers, the US$440 mln-worth electronic payment system to enhance ICT, efficiency" Friday 16th June, 2017 at http://zambiainformer.blogspot.com/2017/06/smart-zambia-electronic-system-to-save.html available on 30th June, 2017.

[27] Ministry of National Development Planning, "Seventh National Development Plan 2017-2021" Lusaka, 2017

[28] By hard infrastructure is meant roads, airports, ports, etc. and by soft infrastructure, is meant a country's legal, regulatory and financial systems.

[29] See Article 17 of the Constitution of Zambia Cap. 1.

REFERENCES

[1] Berger, Guy "Challenges and Perspectives of Digital Migration for African Media" Dakar: Panos Institute of West Africa, 2010.

[2] Business Regulatory Act No 3 of 2014.

[3] Constitution of Zambia Chapter 1 of the Laws of Zambia as amended by the Constitution of Zambia (Amendment) Act No. 2 of 2016.

[4] CORE International, Inc., "Zambia: Regulating Rural Electrification Experiences and Lessons Learned" November 14, 2005.

[5] Energy Regulation Board "State of Infrastructure Report 2010" Lusaka 2010

[6] Fitzpatrick, Greg "An Essay on Information Technology and Trust" in Cecelia Magnusson Sjöberg (ed.), Legal Management of Information Systems-Incorporating Law in E-Solutions, Studentlitteratur, Lund, 2005.

[7] ITU "ITU defines vision and roadmap for 5G mobile development Future: mobile technologies usher in new paradigms for connected society", Geneva, 19 June 2015, available at https://www.itu.int/net/pressoffice/press_releases/2015/27.aspx accessed on 12th July, 2017.

[8] JaapKoops, Bert "Should ICT Regulation by Technology Neutral", Starting Points for ICT Regulation. Deconstructing Prevalent Policy One-Liners (IT & Law Series), 2006.

[9] Kapembwa, Jeff "Smart Zambia electronic system to save US$7mln incurred in printing paper wage slips for public workers, the US$440 mln-worth electronic payment system to enhance ICT, efficiency" Friday 16th June, 2017 at http://zambiainformer.blogspot.com/2017/06/smart-zambia-electronic-system-to-save.html available on 30th June, 2017.

[10] Loader, Brian "The governance of cyberspace: Politics, Technology and Global restructuring" The Governance of Cyberspace: Politics, technology and Global restructuring, London: Routledge, 1997.

[11] Malakata, Michael "Zambia's adopts multipurpose ID cards" at http://news.idg.no/cw/art.cfm?id=071AF482-1A64-67EA-E4B297FCADCF3934 available on 30th June, 2017.

[12] McMillan, Robert, Knutson, Ryan and Seetharaman, Deepa "Yahoo Discloses New Breach of 1 Billion User Accounts" The Wall Street Journal, Dec. 15, 2016 at https://www.wsj.com/articles/yahoo-discloses-new-breach-of-1-billion-user-accounts-1481753131 available on 30th June. 2017.

[13] Ministry of National Development Planning, "Seventh National Development Plan 2017-2021" Lusaka, 2017.

[14] Mwizabi, Gethsemane "Birth certificate mystery: Zambia should decentralise registration" Times of Zambia, 20th June, 2014.

[15] Reuters, "Zambia state power firm says substation fault caused blackout" at https://www.yahoo.com/news/zambia-state-power-firm-says-substation-fault-caused-150207793--finance.html?ref=gs available on 30th June, 2017.

[16] Robinson, Rick "Two Important Lessons from the Ashley Madison Breach" Security Intelligence, October 28, 2015 at https://securityintelligence.com/two-important-lessons-from-the-ashley-madison-breach/ available on 30th June, 2017.

[17] Stefanou, Constantin "Drafters, Drafting and the Policy Process" in Constantin Stefanou and Helen Xanthaki (eds), Drafting Legislation: A Modern Approach (Ashgate 2008).

[18] Tamir, Dana "Who Hacked Sony? New Report Raises More Questions About Scandalous Breach" Security Intelligence, February 5, 2015 at https://securityintelligence.com/two-important-lessons-from-the-ashley-madison-breach/ available on 30th June, 2017.

[19] Vrankulj, Adam "Zambian government to issue biometric registration cards" at http://www.biometricupdate.com/201303/zambian-government-to-issue-biometric-registration-cards available on 30th June, 2017.

[20] Zambia Information and Communications Technology Authority, "Survey on Access and Usage of Information and Communication Technology by Households and Individuals in Zambia 2015" 2015.