Technological Distribution in Uganda: Information and Communications Technology and the State in an Eastern African Nation

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Abstract

Information and communications technologies (ICTs) include old technologies—such as the radio and the television—as well as newer technologies—such as the Internet and wireless telephony. This study considers the process that the government of Uganda has used to adopt and implement ICT policy. This study also considers the techniques which the government of Uganda has used to distribute ICTS in public locations such as government offices, schools, and hospitals. In particular, this study attempts to consider the political motivations for distribution. The Ugandan government's attempt to distribute this technology reflects strengths in the area of distribution of artefacts, particularly to rural areas. Information and communications technologies are an important part of the Ugandan economy. In addition, ICTs strengthen the ability of citizens to communicate with each other across regional and language borders through shared access points. Methodologically, this paper uses the case study method. Semi-structured interviews were conducted with politicians, policy makers, civil society activists, citizens, academics, medical personnel, regional government officials, and business people. This paper argues that politicians use ICTs as a component of a basket of goods and services that they can distribute to witnessing publics. This paper argues that ICT should be viewed as a type of infrastructure, and that as a public good, it can be used as a "club" good or "pork." Although several authors discuss the potential of ICTs as democratizing, this paper documents that the Ugandan government has employed ICTs in oppressive ways, including for the surveillance of opposition leaders, and for social control.

KEY WORDS: Uganda, ICTs, technology, telecommunications, public goods, infrastructure, telephony, Internet

本研究考量了乌干达政府用于采纳和实施ICT政策、配置并分配信息通信技术（ICT）的过程。特别地，本研究试图考量这种分配背后的政治动机。乌干达政府就分配该技术所做的尝试反映了人工技术分配领域的优势，尤其是在农村地区。ICTs是乌干达经济中的重要组成部分。此外，ICTs通过共享接入点强化了公民在跨地区跨语言界限的情况下进行通信的能力。从方法论上讲，本文使用了案例研究法。对政客、决策者、公民社会活动人士、公民、学术人士、医疗人士、地区政府官员、商业人士进行了半结构化面谈。本文主张，政客将ICTs技术作为一篮子商品和服务的组成部分，通过分配这种技术来监视大众。本文认为，ICT应被视为一种基础设施类型，并且其作为一种公共物品，也可以被当做"俱乐部"物品或"猪肉"进行使用。此外，尽管不少文献探讨了ICTs在民主化方面的潜能，本文显示，乌干达政府用压迫性的方式使用ICTs，包括监视反对党领导人和进行社会控制

关键词: 发展中国家, 信息通信技术（ICTs）, 互联网, 国家治理, 媒体, 经济发展

Este estudio considera el proceso que el gobierno de Uganda usó para adoptar e implementar la política de TIC y configurar y distribuir la tecnología de la información y las comunicaciones (TIC). En particular, este estudio intenta considerar las motivaciones políticas para la distribución. El intento del gobierno de Uganda de distribuir esta tecnología refleja las fortalezas en el área de distribución de artefactos, particularmente en las áreas rurales. Las tecnologías de la información y las comunicaciones son una parte importante de la economía de Uganda. Además, las TIC fortalecen la capacidad de los ciudadanos para comunicarse entre sí a través de las fronteras regionales y lingüísticas a través de puntos de acceso compartidos. Metodológicamente, este documento utiliza el método de estudio de caso. Se realizaron entrevistas semiestructuradas con políticos, formuladores de políticas, activistas de la sociedad civil, ciudadanos, académicos, personal médico, funcionarios del gobierno regional y empresarios. Este documento argumenta que los políticos usan las TIC como un componente de una canasta de bienes y servicios que pueden distribuir a los testigos públicos. Este documento argumenta que las

TIC deben ser vistas como un tipo de infraestructura, y que como un bien público, pueden usarse como un "club" bueno o "cerdo". Además, aunque mucha literatura discute el potencial de las TIC como democratizadoras, Este documento documenta que el gobierno de Uganda ha empleado las TIC de manera opresiva, incluso para la vigilancia de los líderes de la oposición y para el control social.

PALABRAS CLAVE: Países en desarrollo, TIC, Internet, gobernanza nacional, medios de comunicación, desarrollo económico

Introduction

The distribution of information and communications technology in Uganda represents an infrastructure challenge, a planning challenge, and a political challenge. This paper investigates the following research question: What are the political factors that affect the distribution of ICT in Uganda? This paper focuses on the politics of the rollout, uptake, and distribution of ICTs in Uganda. Specifically, the paper considers political factors as potential explanations regarding the manner in which this infrastructure has been distributed, while recognizing that other factors may be at play also.

Information and communications technologies (ICTs) comprise a bundle of old and new technologies ranging from the radio to the Internet (Etzo & Collender, 2010; Leye, 2009). At the advent of the twenty-first century, significant research by practitioners, nongovernmental organizations, and multilateral organizations established that developing nations were lagging behind developed nations in terms of most technological infrastructure indicators, and in terms of ICT in particular (Shapiro, 1999). As the new century opened, many developing countries, including African countries, lacked both the infrastructure and the human resources to support widespread access to computers, the Internet, and other communications technologies. As of 2001, African countries had the lowest telephone densities and the lowest level of Internet connectivity in the world (Okpaku, 2003).

The most extreme gap in technological access still exists between ICT access in African nations and the industrialized nations of the Global North. Yet, the gap is closing rapidly. African nations have witnessed an explosion in the availability of ICTs since the end of the 1990s (Williams, Mayer, & Minges, 2011). Indeed, "ICTs have been a remarkable success in Africa" (Williams et al., 2011). By 2009, rural coverage reached nearly half of the population of Africa's nations. Referring to the mobile phone revolution—which is a component of ICTs—authors Etzo and Collender (2010) noted that "[t]he ubiquity of mobiles [in African countries] is matched only by the ingenuity of their users."

In spite of a vibrant private telecommunications sector, and more than a decade of Ugandan government initiatives for enhancing the utilization of ICT, pockets of the Ugandan population are left behind with regard to access to ICTs. Molony (2006) observes that even in developing countries with high net ICT uptake, ICT is still out of reach for many groups due to cost, education, and literacy gaps. This is certainly the case in Uganda. In Uganda, 65% of residents owns a smartphone or a cell phone, a far lower ownership rate than in South Africa, Nigeria, or Kenya (Pew Research Center, 2015). According to the World Bank's Open Data system of World Development Indicators, only 5.8% of Uganda's households owned a computer and only 17.7% of individuals used the Internet. This suggests that Uganda's level of ICT distribution is currently far below the world average of 44.2% of households owning a computer and 40.7% of individuals

using Internet, and the Sub-Saharan Africa average of 9.4% of households owning a computer and 19.2% of individuals using Internet (World Bank, 2017).

The ICT story in East African nations—as well as in Uganda—then is a story of unevenness. ICTs in East Africa have grown explosively, yet coverage and access are not uniform. For example, mobile usage has increased exponentially in African nations over the past decade, yet Internet penetration lags behind. Despite the rapid, and indeed, remarkable, diffusion of ICTs in African nations over the past 20 years, infrastructure is not evenly distributed inside Uganda, nor is it evenly distributed across national boundaries. ICT penetration levels also vary within countries so that within the same nation there may be pockets of high and low access levels, particularly along rural–urban divides (Rao, 2005).

Diffusing ICTs to rural areas—and more specifically to rural areas in Uganda—has not been accomplished by the price mechanism of "the market."[1] Left to market forces alone, some areas or societal groups which the private sector considers unprofitable may never get access to ICTs (Molony, 2006). Accordingly, diffusing ICTs to rural areas in Eastern Africa requires the simultaneous consideration of social, political, legal, and technological factors, and the national government's role in increasing ICT diffusion warrants examination. For East Africans in rural areas to use computers, ICTs must be both accessible and affordable. Further, ICTs must be configured in a manner that allows them to withstand the rigors of a harsh climate and sporadic maintenance. Computers—and even cellular phones—are generally luxuries for individuals in Uganda (Fourati, 2009). Providing access to ICTs in rural areas requires finding innovative ways to reduce costs for both infrastructure and equipment. To enable access to ICTs, laws must be passed, infrastructure must be built, equipment must be placed, organizations must be connected, and individuals must be educated (Table 1).

This paper first presents a theoretical framework, and then proceeds to discuss methods. The methods section is followed by the political history of Uganda and then

Table 1. Network Readiness in East African Region Compared to GDP

Country	Networked Readiness Index Rank (2015)[a] (A Lower Score Indicates Superior Network Readiness)	Networked Readiness Index Score (2015) (A Higher Score Indicates Higher Readiness)	GDP Per Capita (Constant 2010 USD (2017)[b] (World Bank)
Singapore (highest in world)	1	6.0	$55,235
Portugal	28	4.9	$23,197
Turkey	48	4.4	$10,546
South Africa	75	4.0	$6,151
Rwanda	83	3.9	$748.00
Kenya	86	3.8	$1,169.2
Egypt	94	3.6	$2,785.00
Ghana	102	3.5	$2,046.1
Uganda	116	3.2	$666.00
Tanzania	123	3.0	$894.00
Malawi	133	2.8	$486.00
Chad (lowest in world)	143	2.3	$823.4

[a]As of the time of publication, this is the most recent data available. Data can be viewed at http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/

[b]As of the time of publication, this is the most recent data available. Data can be viewed at https://data.worldbank.org/indicator/NY.GDP.PCAP.KD

Sources: Network Readiness Index (World Economic Forum) (2015); World Bank GDP data (2017).

provides an analysis of the political influences on ICTs. This paper provides evidence gathered in fieldwork through both interviews and site visits about ICTs in health, education, and government facilities. The paper concludes by reflecting on the successes and challenges of distributing ICTs in Uganda, and considers surveillance and censorship utilizing ICTs by the government of Uganda.

Contribution to the Literature

The distribution of ICT in Uganda warrants study for a variety of reasons. Rogers (1995) notes the difficulty of getting a new idea adopted. He urges scholars to consider diffusion as the process by which an innovation is communicated through certain channels over time throughout a social system. Cline-Cole and Powell (2010) argue that the increasing use of ICTs for the political economy of Africa deserves more critical attention. Thompson (2004, 2008) reminds us that there is a growing need for informed policy-level critiques regarding the way in which ICTs are planned and implemented within "developing" country environments. Further, UNESCO has called for an in-depth understanding of the national communication environment in various countries (Mansell, 2011). Further, this paper attempts to consider the development of ICTs in Uganda in the context of the politics of the nation of Uganda, building on a recent effort to look at the politics of infrastructure in African nations (Gore, Brass, Baldwin, & MacLean, 2018; MacLean, Brass, Carley, El-Arini, & Breen, 2015).

The ICT policy area provides an opportunity to study a distinct and emerging policy field (Hosseus and Pal, 1997). Braman (2011) observes that the subject of "information policy" emerged as a distinct field relatively recently, during the last decades of the twentieth century.[2] The study of information and communications technology policy emerged as a distinct field in the last 50 years. This technology moved onto the African continent even more recently, in the last 30 years. Therefore, it is intriguing to study activities in this policy area on the "frontier." Focusing on a distinct policy area allows observers to examine how the Ugandan state goes about implementing policy and specifically, how it builds out infrastructure. Accordingly, the findings may be of use to scholars of both politics and policy. The findings may also have value to donors and in country stakeholders, as well as the governments of countries facing similar issues with ICT diffusion, such as Brazil and India.

This paper contributes to the literature in political science by demonstrating how politicians attempt to use infrastructure development for political purposes. Further, this study contributes to the literature in African studies, communication studies, and policy studies, by exploring how the state has chosen to distribute the physical artefacts of an important type of modern infrastructure. The Ugandan case illustrates the dramatic strides that can be made by an independent, technocratic government commission (the Ugandan Communications Commission) with support from donors as well as the President of Uganda. However, the case also illustrates how Ugandan agencies, notably the Ministry of Health and the Ministry of Agriculture, do not always cooperate with infrastructure distribution initiatives, leading to patchwork policy implementation, uneven technological penetration, and sustainability challenges. In addition, in contravention of the conventional wisdom that ICTs are democratizing, there are indications that the Ugandan government is threatened by certain uses

of information communications technology which threaten its political hegemony. Increasingly, the Ugandan government has turned to repressive uses of ICT such as surveillance and censorship.

Theoretical Framework

The theoretical framework presented here draws on work by scholars of science technology and society, scholars of information technology for development, and scholars from political science.

Information and communications technologies include the trusted: the radio, the telegraph, and the telephone. Information and communications technologies also include the novel: cell phones, the Internet, and computing. In essence, ICT is any technology that helps facilitate communication, and promotes the electronic capture, processing, and transmission of information (Molony, 2006). Yet, although ICTs include many different means of communication, they have distinct qualities. Much like roads, electricity, and water, ICTs should be viewed as a type of infrastructure (Horwitz, 2001). Indeed, "communication[s] … technologies constitute the infrastructure of an increasingly information-based, trade-oriented economy and society" (Horwitz, 2001).

From an economic perspective, ICTs can be viewed as a "thing of value" with qualities of a public good (Deacon, 2009). Like water, electricity, or roads, once ICT infrastructure is in place, it is hard to limit its use. Like electricity (MacLean, Gore, Brass, & Baldwin, 2016), ICTs represent a key public good that can facilitate economic and social development. Compared to other types of infrastructure, such as roads and dams, ICTs are relatively affordable, and can be distributed broadly. In addition, information and communication technologies increase the ability of a government to communicate with its people. Conversely, citizen access to the media may amplify citizen voices both inside and outside the country.

This study situates the placement of ICTs by the Ugandan government as an example of infrastructure development. This study makes three points about the political nature of ICTs. First, ICTs must be viewed as a sociotechnical imaginary which politicians are trying to implement (Bowman, 2015; Jasanoff, 2015). The different visions that politicians hold (or do not hold) regarding what ICTs can mean for their country may influence how they configure the technology. Second, the uneven placement of ICTs in Uganda may be explained in part by three political variables, which include (a) efforts to attract a "witnessing public" for the scientific achievements of the state (Ezrahi, 1990)[3]; (b) efforts to show its commitment to modernity (Mercer, 2006); and (c) efforts by politicians to distribute a form of rents, club goods, or "pork" to citizens (Green, 2011). These efforts intertwine and interlock. Third, ICTs have fulfilled some of their promise as socially transformative, but they have not fulfilled all visions. Importantly, there can be a political dark side to ICTS, because they can be used by politicians as a tool for surveillance. An examination of ICTs in Uganda reveals that ICTs are a technology with many political uses. For example, ICTs can be used to improve health care delivery, but they can also be used to censor opposition politicians.

What do we know about the nature and distribution of ICTs in the developing world context? Technological change is a social process (Mansell, 2012). Further, technology is not deterministic (Marx & Smith, 1994). Rather, humans make important political and social choices about the configuration and types of technology utilized and that those choices affect the impacts that technology has on society (Bijker, Hughes, & Pinch, 1989; Jasanoff, 2004a, 2004b, 2015; Williams & Edge, 1996). Winner (1980) specifically reminds us that we need to be sensitive to the contextual settings of technological change. Technologies and techniques often inscribe social preferences that have been shaped in the environment in which they have been developed (Avgerou, 2008; Fountain, 2001). Finally, when considering science and technology in developing country contexts, Shrum and Shenav (1995) urge us to consider how context-specific forms of practice interact with a set of globally distributed social interests.

Science and technology can be used by the state to demonstrate its commitment to a "witnessing" public (Ezrahi, 1990). One way to show that commitment is to build facilities that can be "witnessed" by citizens in different parts of the country. For example, Stalin used brutal efforts to build the Soviet Union into an industrial superpower in the 1920s and 1930 (Fitzpatrick, 1994). Presidents Franklin D. Roosevelt and Lyndon B. Johnson brought the technologies of their day, electricity and telephony, to rural America in the 1930s using the political vehicle of the New Deal (Caro, 1990). President John F. Kennedy and the Soviets competed over the atomic bomb and space exploration during the Cold War in an effort to prove political might. Large installations like the Tennessee Valley Authority produced immense amounts of electricity, but also served as monuments to this modernization and to regional development efforts, much copied throughout the developing world (Ekbladh, 2002). More recently, contested debates have taken place regarding the placement and function of large dams in the developing world (Khagram, 2004). There is a long history globally of politicians harnessing, displaying, and utilizing technology to build reputations, prove their worth to constituents, or pursue policy goals.

As policy makers and civil society advocated the spread of ICT to less developed communities, in both the Global North and the Global South, they generally envisioned ICT together with its social and political uses, not just its technological attributes (Mercer, 2004). Scholars Mansell (2011) and Avgerou (2008) provide valuable discussions of the discourses surrounding ICT for development. Initially, policy makers, scholars, and activists often discussed and trumpeted the potential of information technology as a catalyst for economic and social development (Thompson, 2008). Thompson (2004) provides a thoughtful review of the intertwined relationship between ICT and the discourse of "developmental intervention."

At least three relevant visions of ICT informed and influenced efforts to create policies that can regulate, control, encourage, and promote ICTs in Uganda. The three relevant visions include the ideas that (a) ICT will make governance more efficient (Cordella & Iannaci, 2010; Fountain, 2001; (b) ICTs will improve productivity and lead to economic growth (Qiang, Pitt, & Ayers, 2004); and (c) ICTs can improve social and development outcomes leading to socio-political transformation (Stauffacher, Drake, Currion, & Steinberger, 2005). A darker vision which governments rarely discuss comprises social control (Morozov, 2012; Scott, 1999).

Upon reflection, some of the "development dreams" have been fulfilled by ICTs, and then again, some have not. Notably, the role of ICTs in development remains

contested (Dobra, 2012; Fourati, 2009; Thompson, 2004). Many donors, particularly the World Bank and the UN, regard ICT as an integral tool for development, yet many scholars have expressed concerns regarding the dangers of development imposed from above (Avgerou, 2008; Banerjee & Duflo, 2011; Easterly, 2006; Escobar, 1994). Investments in ICT may divert investments to other "developmental initiatives" (Adesina, 2004). Further, researchers and practitioners often "struggle to prove specific impacts" of ICT as a development tool (Kleine, 2010).

Such concerns about ICT as a development approach may extend to the fact that external development preferences may shape the distribution of technology. The ways in which nation states place and use technology are from accidental. Rather, these choices almost always reflect stakeholder interests and politically expedient ends (Ezrahi, 1990; Jasanoff, 2004b). Policy choices by national governments regarding types of infrastructure, the extent of regional deployment of that infrastructure, the organizational structures that build and maintain that infrastructure, and the funding mechanisms that pay for infrastructure determine key aspects of what types of technology are put in place at a national level (Bijker & Law, 1992). The Ugandan case strengthens Al Jaghoub and Westroup's (2003) observation, when studying Jordan, that the nation's computerization had symbolic and political significance for the country's development.

This leads to the important, yet somewhat philosophical inquiry: Why should ICT be a national development priority in a country like Uganda that is one of the poorer countries in East Africa? First, the Ugandan government implanted its ICT policy in no small part as a response to significant pressure exerted by external donors. ICTs were introduced into Africa in the late 1990s, as the technology diffused from the Global North to the Global South, with significant assistance from multilateral organizations. Policies, including ICT policy, diffuse across borders, including across states and countries. Arguably, ICTs and information policy arrived on the Ugandan national state through both "imitation" as well as "incentives" (Shipan & Volden, 2012). Multilateral organizations, such as the International Monetary Fund, can facilitate policy diffusion in a way that may combine both incentives and coercion (Shipan & Volden, 2008, 2012). Further, the World Bank specifically focused on a top-down, long-term, and capital intensive project of introducing ICTs to lower income countries (Thompson, 2004). Numerous multilateral organizations such as ITU, UNESCO, the World Bank, the United Nations Development Program, and UNCTAD allocated resources to ICT interventions in African nations in the 1990s and 2000s in the name of "development" (Mansell, 2011). African nations, such as Uganda, did not really have significant agency in terms of accepting ICT as a component of their development approach. As the discussion below will investigate, however, Uganda did have some agency in the way it actually implemented its ICT policy.

Along those lines, African countries who have passed ICT policies are arguably implementing an external sociotechnical imaginary (Jasanoff, 2015; Mansell, 2012), which they have accepted, and to some extent, transformed. Sociotechnical imaginaries are "collectively held and performed visions of desired futures" related to advances in science and technology. Indeed, Adesina (2006) observes that although ICT has significant potential, it has also "become a signifier of the developmental mindset, and the alleged solution to Africa's development problems." Similarly, Dobra (2012) notes that the discourse around ICT in developing countries is often overly optimistic,

and "grants ICT a normative and telic essence, throwing the analysis into a myth of technology."

In Uganda, the sociotechnical imaginary of ICT as a development tool is held at the executive level and is relatively centralized, and relatively top-down, although it has a more technocratic spin than in neighboring Rwanda. By contrast, in more democratic Kenya and Tanzania, civil society and the private sector are more powerful. Stakeholders hold different, and sometimes conflicting, sociotechnical imaginaries with regard to ICT. As a result, those countries display very decentralized, very uneven distribution of ICTs, but have more sustainable systems.

Third, this study argues that Ugandan officials prioritized ICT as a national development priority in part because those leaders held an explicitly modernist vision of the future. Museveni embraced the developmental and modernization paradigms of his university education, which took place in the late 1960s and early 1970s (Kassimir, 1999). There are many possible factors that affect the extent that countries in East Africa distribute infrastructure. These include the competitiveness of the private sector, the role of donors, and the size and strength of civil society. One incentive may be found in ICTs' evocation of "the modern" (Jasanoff, 2004b). Indeed, Mercer (2006) reminds us that many African stakeholders view ICTs as a symbol of modernity. Adesina (2006) calls ICTs as a development tool a manifestation of the "neo-modernisation" thesis, which may make them particularly attractive to Museveni, who was intrigued by modernization theory.

Further, ICTs are a desirable form of "pork." Politics, including citizen demand, may be a key factor in the distribution of public goods (Kramon & Posner, 2013; MacLean et al., 2016). Brass (2016) finds that receiving services can improve citizen perceptions of state legitimacy and also notes that politicians claim credit for service provision in an effort to reap political benefits. Where politicians face serious political competition—as is the case in contemporary Uganda—they have incentives to use public resources to win elections or win support. Their spending, notes Green (2011), often takes the form of public goods that are both observable and measurable. This study argues that ICTs are a type of infrastructure and are a nonreversible public good. "Pork" goods are highly prized: they are highly visible, and can be viewed as evidence of patrons fulfilling their promises to clients (Green, 2011). Viewing ICT as a club good, or "pork," helps explain the way in which the Ugandan government has utilized ICTs in schools and hospitals. One particularly attractive quality of ICTs, however, is that they can be used to support government aid in health, education, and economic growth. In summary, ICTs have value partly because of their "modern" foreign quality, partly because they "enable" other desirable social goals including the developmental objectives of national politicians, and partly because they are so visible, and can be used as evidence that patrons are fulfilling their promises to clients.

Finally, the incumbent government in Uganda faces a challenge: it must demonstrate its legitimacy to constituents who have lived through extreme sectarian violence, as well as state collapse within the past generation. Regional conflicts abound in Eastern and Central Africa, including ongoing civil wars in South Sudan and Congo, and low-level conflict in Uganda's north. Accordingly, although military control represents "the stick" in Museveni's governance strategy, I argue that his efforts to distribute a desirable type of modern infrastructure—ICT—may represent part of "the carrot."

The preceding sections of this paper attempted to situate the diffusion of ICTs in Uganda into the theoretical literature. The following sections of the paper attempt to explore possible explanations for the political uses, both positive and negative, of ICT. Further, the following sections attempt to contextualize the politics of ICTs in light of Uganda's political history. This work fits well into the historically interpretive paradigm, which gives due attention to the impact of history on current institutional arrangements (Thelen, 1999). Before examining the opportunities and challenges regarding the NRM's use of ICTs, a discussion of the methodology will help readers understand the approach used to conduct this research.

Methodology

Methodologically, this paper comprises a "small n" study, and utilizes the case study method (Yin, 2003). An in-depth case study proves to be the best way to trace the factors implicated in the development and adoption of a specific policy (Yin, 2003). The unit of analysis is the nation state. Comparative social science has a long tradition of strong and rich qualitative work, and often uses case method as well as historical method (Ragin, 1989).

Four 3-week visits to Uganda were conducted in 2006, 2007, 2010, and 2015. This long period of observation provides a time series effect which is useful in considering the growth of the ICT sector. Respondents were selected using a nonprobabilistic snowball sample (Fowler, 2009; Weiss, 1994). A snowball sample is often considered appropriate for hard-to-reach populations characterized by the lack of a serviceable sampling frame (Goodman, 2011; Handcock & Gile, 2011). In constructing a snowball sample, the goal is not to find a representative sample, but rather to speak to information-rich respondents (Chetkovich & Henderson, 2014; Miles, Huberman, & Saldana, 2014; Weiss, 1994).

Thirty semi-structured interviews were conducted with politicians, policy makers, civil society activists, citizens, academics, medical personnel, regional government officials, and business people including the Ugandan Minister of Information, the Director of the Ugandan Communications Commission, the director of the Rural Communications Development Fund, and three prominent ICT related NGOs.

The author examined the placement of ICTs in hospitals, schools, post offices, tele-centers, and regional government offices in the towns of Jinja and Mukono, Uganda in 2015. Kampala was selected as a site because it is the capital. Jinja and Mukono, Uganda were selected as sites because they were peri-urban, and thus gave a good indicator of the nature of ICT infrastructure in areas close enough to the capital to have some access, but far enough away to start noticing access gaps. In a recent study of health services, Katusiimeh (2015) used a similar approach to site selection, and noted that Mukono is an excellent case study because of the variation found in degree of urbanization, its proximity to Kamala, and its combination of urban and rural parishes. One limitation of the data is that site visits were not made in very rural or remote areas. This problem has been resolved to a certain extent by relying on secondary sources of data which helped the author to understand conditions in Kanungu and Gulu (Campos, 2018; Yagos, Olok, & Ovuga, 2017).

Data were collected from both primary and secondary sources. Multiple sources of data were reviewed to enhance both internal and external validity (Erickson, 1986). Data collection focused on participant observation, informal conversations, review of documentary sources in addition to interviews with key stakeholders, as well as participation in East African conferences related to ICTs (Merriam, 1988). Documentary source used includes clippings from the national and international print and electronic media, government documents, and selective use of secondary sources.[4]

All interviews and field notes were transcribed, coded, and analyzed, using ethnographic techniques (Emerson, Fretz, & Shaw, 1995; Weiss, 1994). Numerous tactics were employed for generating meaning, including noting patterns and themes, clustering, and looking for conceptual and theoretical coherence (Miles et al., 2014). Since all data were collected and analyzed by only one author, inter-coder agreement was not an issue (Compton, Love, & Sell, 2012). The author also reviewed numerous primary source documents obtained from the government of Uganda, as well as secondary analyses of the Ugandan ICT sector.

Explaining ICT in Uganda: The Historical, Political, and Policy Context

Understanding the way Ugandan politics and policy making looks today requires an understanding of Uganda's difficult political past. Following the lead of MacLean et al. (2016; MacLean, Baldwin, Brass, & Gore, 2019) in a series of articles considering electricity provision in African states (MacLean et al., 2019), this study posits that politics and public service provision are linked.

Taken by itself, ethnicity does not fully explain ICT distribution, because as will be shown below, ICT artefacts are widely distributed throughout the nation public access points. Further, donor access does explain the arrival of ICT in African nations, but it does not by itself explain why some countries exceed expectations for diffusion of the technology despite similar levels of donor involvement.

As discussed in the theoretical section above, placement of ICTs in Uganda may be explained in part by three political variables, including efforts by the state to attract a witnessing public (Ezrahi, 1990); efforts to show a commitment to modernity (Mercer, 2006); and finally, efforts by politicians to distribute a form of rents, club goods, or "pork" to citizens (Green, 2011). These political variables must be grounded in an understanding of the nation's politics to be fully understood. Historical analysis and process tracing (Collier, 2011) help scholars to understand how and why Uganda under Museveni focused on ICT as a key component of infrastructure, and in particular, why Uganda outperforms some nations which have higher per capita incomes, and higher levels of democracy. Accordingly, this section explores some of the historical and political factors that have played a role in the evolution of ICTs in Uganda.

Uganda records one of the most diverse ethnic compositions of any nation on the globe (Habyarimana, Humphreys, Posner, & Weinstein, 2007; Occiti, 2000). The country experienced a nonviolent transition to independence, However, the 1960s and 1970s saw the country devolve into violence and chaos. After Yoweri Museveni's military victory in the mid 1980s, Uganda stabilized politically, although it has not completely transitioned to a democracy.

The Ugandan government, as currently configured, exhibits a combination of authoritarian and democratic elements (Carbone, 2008; Freedom House, 2016; Kagoro, 2015; Marshall & Gurr, 2014; Tripp, 2010). The Ugandan military plays an outsized role in the Ugandan governance, particularly for a country that counts itself a democracy. The military has retained significant control over Uganda's transition to democracy, resulting in a reserved domain for the military in that nation leading to creeping authoritarianism (Tusalem, 2014).

Government in Uganda: After State Collapse, a Stable Hybrid Regime Emerges

After a peaceful transition to independence, Uganda initially experienced a vibrant multi-party system (Makara, 2010). The years following independence, however, were characterized by "widespread civil conflict" (MacLean et al., 2016). Soon after independence, Prime Minister Milton Obote suspended the 1962 constitution and installed himself head of both state and government (Makara, 2010; Saul, 1976; Uzoigwe, 1983). Obote utilized the method of divide and rule, resulting in a high level of tribal and religious tension throughout the country. Obote's approach facilitated the rise, in 1971, of General Idi Amin, a high-ranking military office from the North, who seized power in a *coup d'état*, and imposed a brutal dictatorship (Makara, 2010). Amin relied on a narrow constituency and used murder, fear, and abuse of human rights to ensure compliance and to stay in power (Flanary & Watt, 1990; Short, 1971). Under his rule, the GDP declined 20% and the country was reduced to "howling anarchy" (Uzoigwe, 1983). Amin was overthrown in a violent coup in 1979.

In the post Amin period, the Ugandan government lacked representativeness and encouraged high levels of political violence. After a protracted armed struggle, the National Resistance Army, led by Yoweri Museveni, came to power in Uganda in 1986, after more than two decades of civil war (Katusiimeh, 2015) establishing "no-party" democracy (Makara, 2010). In order to establish territorial control throughout the country, Museveni had to co-opt people from diverse and even opposing groups, religions, languages, and parts of the country (Carbone, 2008). Initially, Museveni's "movement ideology" aimed to include all of Uganda's main ethnic and religious groups in an organization based on national unity, perhaps in imitation of the Tanzanian model. Despite these efforts, Joseph Kony's Lord's Resistance Army has been destabilizing northern Uganda since 1987 displacing hundreds of thousands, and dramatically disrupting the economy of parts of the country (Dunn, 2004; Okiror, 2016; Ward, 2001). Although Museveni originally distributed political power broadly through the country, power has slowly shifted toward his loyalists in the West (Green, 2011; Tripp, 2010).

Museveni began his rule of Uganda as a military dictator characterized by anti-democratic actions and human rights abuses (Omara-Otunnu, 1991). Yet, at times, Museveni has enjoyed status as a statesman, and as a donor's darling, in part because of his ready acceptance of liberalization (MacLean et al., 2016; Ottaway, 1999). On the positive side, Carbone (2008) argues that under Museveni, human rights abuses have declined, and popular participation as well as respect for rule of law has increased. Uganda has moved quite slowly to consolidate democracy, yet the outcomes of elections are neither wholly credible nor completely legitimate (Makara, 2010). Although Museveni's government operates in a semi-authoritarian manner, the leader must

nonetheless consider how the policies he chooses will be received by those groups in the society that pose a credible threat of unrest (Stasavage, 2005). Superficially, the Ugandan government observes the trappings of democracy. Elections are held regularly and multiple candidates from multiple parties compete in Ugandan national elections.

On the negative side, although Uganda holds regular procedural elections, substantively, the nation shows many signs of being an authoritarian state. Indeed, MacLean et al. (2016) refer to the nature of the regime in Uganda as "electoral authoritarianism." Museveni forced through a controversial 2005 amendment to the Constitution to allow him to run for the presidency for a third term. Further, his percentage of the vote has been steadily declining from 75% of the vote in 1996 to only 63.8% of the vote in 2011 (Conroy-Krutz & Logan, 2012). Museveni was reelected as president of Uganda in February 2011. Privacy International states that the electoral process was marred by widespread evidence of vote-buying and misuse of state funds. The removal of constitutional term limits has interfered with the development of multi-party democracy (Makara, 2010). On February 18, 2016, Museveni ran for another 5-year presidential term against Kizza Besigye, the leader of the Forum for Democratic Change, winning with 60% of the vote to Besigye's 35% (Electoral Commission of Uganda, 2016). Besigye was placed under house arrest by the government for much of the time leading up to and during the election. Katusiimeh observes how Museveni has manipulated state institutions and the government in an effort to remain in power, and argues that he has brought "the state virtually under his total control" (Katusiimeh, 2015, p. 90). He further observes that there has been a blurring of the Ugandan state and the person of Museveni, who has "concentrated power in the executive and himself."

How External Donors Shaped ICT Policy

In addition to understanding how Uganda's post colonial history has shaped the emergence of ICTs, understanding the arrival of ICTs onto the Ugandan policy agenda requires attention to the role of external donors. The late 1990s witnessed a global frenzy of deregulation, and as part of this wave the World Bank emphasized an open trading regime, liberalization, foreign investment, and technology licensing designed in part to help open African telecommunications and ICT markets for external investment. In the late 1990s, donors, particularly the UN, promoted an ideology which verged on "cyber-euphoria" in Africa. Many believed that "there could be a 'cyber bullet'—the Internet—with the instant power to improve everything from gross national product, to health care, to education" (Opoku-Mensah, 1998).

Uganda entered the 1990s as an information poor environment. In the late 1990s, Uganda had only 70,000 phone lines, and citizens had to travel to Kampala to get crucial information (Opoku-Mensah, 1998). In that period, Uganda had one national telephone operator, two mobile cellular operators, two Internet service providers ("ISPs"), and two international data gateways. In the 1990s, telecommunications, computing, and information technologies began to converge. As a result, companies that previously could only provide telephony were able to provide Internet, Voice over Internet Protocol, and build infrastructure.

At the turn of the millennium, Uganda was an attractive telecommunications market to outside investors in terms of telecommunications. Uganda's communications minister at the time, John Naasira, observed that these untapped markets represented an opportunity for high profits in the telecommunications sector. The Ugandan Parliament explicitly wanted to encourage investment and also aimed for full liberalization. As a result, Uganda entered its ICT policy-making period with one of the most competitive telecommunications sectors in the region.

The Uganda Communications Act of 1996 unbundled the postal service, the banking service, and the monopoly telecommunications agency and created the regulator: The Ugandan Communications Commission ("UCC") (Econ One, 2002; Kinyingi & Mijumbi, 2003; Nyaga, 2014). The World Bank was the driving force behind liberalization in all East African countries, but whereas some countries were saddled with "conditionalities," Uganda received incentives, including increase in the size of grants and loans (Dasgupta, 1997).[5] The telecommunications agency was privatized (becoming UTL), with the Ugandan government retaining a 49% strategic stake and 51% being sold to a strategic investor from a South African consortium, with second and third national operators licensed shortly thereafter.

Multilateral donors were heavily involved in the Ugandan ICT policy process, and remain closely involved in both the ICT policy-making process as well as in funding and overseeing implementation. In the year 2000, the Uganda National Council for Science and Technology initiated the process of developing a national ICT policy.[6] The initial development of the policy framework was supported by IDRC, UNESCO, and UNECA and was completed in 2001. The draft ICT policy framework was submitted by the Minister for Works, Housing, and Communication to the Cabinet in June, 2002. UNDP provided funding for the implementation of the policy in conjunction with the Ministry of Finance, Planning and Economic Development, and the UCST.

Buoyed by the optimism surrounding information communication technologies, donors became heavily involved in both the development of Ugandan ICT policy as well as in building out experimental projects. For example, the Acacia Initiative of the Canadian International Development Research Center (IDRC) readied five Ugandan districts for hookup to modern telecommunications through "tele-centers" that aimed to provide public access to telephone, fax, email, and the Internet. The World Bank enthusiastically touted tele-centers as a mechanism for jumpstarting rural development reducing poverty. These one-stop shops were viewed as places to improve access to government services, market prices, education, and libraries (Opoku-Mensah, 1998).

Taken as a whole, ICTs have been a good investment for the government, which receives revenues from the private sector, and grants from the multilateral sector. The funding mechanism for the RCDF is a 1% service levy of gross revenues on the annual turnover of all Ugandan communications service providers (Edwards & Bowman, 2014; Kinyingi & Mijumbi, 2003; UCC, 2014). In addition to this levy, several donors helped fund the RCDF including the Swedish government and the World Bank. By 2004, the World Bank credited Uganda with US $5 million under the Energy for Rural Transformation Project. By 2007, the country had received about $8.4 million from the World Bank, comprising about 50% of the RCDF's operating budget. Complying with the wishes of the multilateral donors and pursuing an ICT policy which conforms

to donor expectations has helped the Ugandan government keep donor money flowing freely.

The Ugandan case stands out because distribution of the infrastructure by the government has been influenced by a national vision and distribution of ICT artefacts has been broad and relatively even in public access points. Unlike its neighbors in Kenya and Tanzania, which were undertaking similar reforms, the Ugandan government specifically focused on increasing the geographic coverage of service, and linking telecommunications provision with socio-economic development and poverty alleviation (Econ One, 2002). According to his advisors, President Museveni "was concerned that the rural areas would be left out." In addition to liberalizing Uganda's advanced telecommunications environment, The Ugandan Communications Act of 1996 established a universal service fund (the Rural Communications Development Fund or "RCDF") to be administered by the UCC. The Rural Communications Development Policy (RCDP) was commissioned in 2001 and completed in July 2001, with "the goal of developing communications infrastructure in rural Uganda, and ensuring that people in rural areas have reasonable and affordable access to communications services" (Barugahara, Kiyingi, & Mijumbi, 2002; UCC, 2014). The RCDF was officially launched in 2003. The fund has been guided by policy documents in the form of somewhat Soviet like "five year plans" spanning 2003–2009 and 2010–2014.

The flurry of activity in the public sector had positive spillovers in the private sector. Expansion in the Ugandan ICT sector was rapid in the first decade of the new millennium. By 2011, the country had three cellular operators, 17 ISPs, 8 international data gateways, 117 private FM radio stations, and 22 private television stations (Barugahara et al., 2002; Makara, 2010). By 2012, Uganda boasted five major mobile operators as well as approximately 20 Internet and data technology providers (Ndiwalana & Tusubira, 2012). Yet the influence of the state and politics in Uganda's ICT sector was already apparent by the turn of the millennium, and this influence was not always positive. Corruption began to seep into the ICT sector. Thirty percent of MTN's interests in Uganda was owned by a Ugandan businessman, Charles Mbiire, who was also a close associate of Museveni's brother, Major General Salim Saleh. Other politicians writing at the time noted that Uganda was missing an opportunity to create local subsidiaries to produce phone cards or assemble handsets instead of importing these accessories (Sebunya, 2001).

Meanwhile, at the same time that the private telecommunications sector was burgeoning, and multilateral flows were flowing into government accounts, the Ugandan government was making strides toward developing a regulatory framework (Econ One, 2002). By 2004, the Ugandan National Council for Science and Technology had formulated a National Information and Communication Technology Policy Framework (July, 2002) to guide the growth of ICTs in the country and submitted the policy to the Cabinet for adoption. The Ministry of Information and Communications Technology was created in 2006 (Tusubira, Kaggwa-Sewankambo, Keyune, Ndiwalana, & Ssemboga, 2007). This consolidation of multiple ministries with overlapping duties undoubtedly provided unified policy oversight, but it also may have been an effort by President Museveni to centralize control of the ICT sector, as he has centralized many other aspects of the Ugandan government (Katusiimeh, 2015).

Analyzing Motivations: Explanatory Political Variables

This section of the article discusses the empirical foundations that strengthen the theoretical idea that political influences represent can help us understand the manner in which ICTs have been adopted in Uganda. As documented above, multilateral donors were heavily involved in the Ugandan ICT policy process, and both funded and oversaw implementation. What distinguishes Uganda is the unique way in which ICT, which arrived in many African nations as a continent-wide initiative, has been distributed. This article presents fieldwork data which strengthen the proposition that in Uganda, ICTs should be viewed in part as a sociotechnical imaginary which politicians are trying to implement (Bowman, 2015; Jasanoff, 2015). Further, this article provides empirical support for the proposition that the uneven placement of ICTs in Uganda may be explained in part by efforts by politicians to attract a witnessing public to a form of development (Ezrahi, 1990), efforts by politicians to show a commitment to "modernity" (Mercer, 2006), and efforts by politicians to distribute a good which can be viewed as rents, club goods, or "pork" to citizens (Green, 2011) or, alternatively, that Museveni believes that ICTs are part of the politics of attribution (Brass, 2016; Harding & Stasavage, 2014). Finally, I present evidence supporting the contention that ICTs can be used in ways that censor and suppress free speech (Morozov, 2011a). Indeed, in Uganda, increasingly ICTs have been used by politicians as a tool for surveillance and censorship of political opponents.

The relatively broad distribution of ICT artefacts in Uganda suggests that a vision of ICTs as socially transformative motivated the Ugandan government (see e.g., Jasanoff, 2015). Kassimir (1999) observes that Museveni styles himself a bit of an intellectual who has commented on Africa's economic and social development. Importantly, Museveni has always advocated the developmentalist and modernization paradigms of his university education in the late 1960s and early 1970s (Kassimir, 1999). In an interview with Al Jazeera in 2012, Museveni focused on how Africa would transition "from backwardness to modernity" (Burnett, 2012). In a visit of the President of the Republic of Korea to Uganda in 2016, Museveni focused on the socio-economic transformation of Uganda through the modernization of infrastructure, and the development of ICT (Museveni, 2016). In a 2018 speech, Museveni emphasized the importance of ICT backbone as a kind of infrastructure, and noted the role of infrastructure, including roads, electricity, and ICT as an "indispensable base of production," and noted that through this emphasis on infrastructure development, the NRM has been able to "resurrect a small island of modernity."

Governments in East Africa have been caught up in the excitement of ICT as an economic driver, and possibly as a development tool (Bowman, 2015). For example, Graham notes that the government of Rwanda has invested heavily in IT infrastructure to bring high speed Internet connections to its remote areas (Graham, 2010). Kenyan policy makers and businesspeople want to focus on the economic potential of international business outsourcing (Mann & Graham, 2016). East African entrepreneurs have been inspired by the possibilities ICTs offer to work with businesses around the world (Graham, 2010).

This study notes that, compared to its neighbors, Uganda's government has been aggressive at distributing the technological artefacts mentioned in that policy, placing technology in hospitals, schools, post offices, Internet cafes, and tele-centers. These

accomplishments are particularly impressive given the fact that Uganda is the second poorest nation in the East African community. Distributing infrastructure means reaching into the most remote rural areas, which is more difficult in an area with difficult terrain, or a large territory. About 82% of Uganda's population is located in rural areas (Uganda Bureau of Statistics, 2016, p. 12). Indeed, an emphasis on rural development is evident both in the third revision of Uganda's poverty eradication action plan as well as the Ugandan Telecommunications Policy.

History suggests that one lesson of the failed Amin and Obote administrations is that force alone is insufficient to rule Uganda. Accordingly, the Ugandan government has to make a convincing show of distributing desired goods and services throughout the country to stay in power. For example, Uganda's establishment of free primary education is a dramatic example of an African government increasingly spending on basic service provision as part of an effort to maintain political legitimacy (Stasavage, 2005). Arguably, Ugandan government realizes that it can use ICTs to support the Ugandan government's developmental efforts to provide basic services like health and education.

ICTs can be distributed to key constituencies to make a statement to both domestic and foreign audiences. In this sense, ICTs simultaneously fulfill a "witnessing function" while also fulfilling a developmental function. Several Ugandan individuals who were interviewed—from academia, to government, to the private sector—referenced the political benefits of ICTs. Because they are highly visible, ICTs are useful for demonstrating that the NRM keeps its promises to rural voters. In the mid 2000s, the role which ICT might play in garnering rural political support was described by an executive from the Ugandan Telecommunications Limited Company. His comments point to both the witnessing function of ICTs as well as the "pork" function.

> The ideology of the NRM is that you have to serve rural people. Most of the rural people vote in one block. To keep that block, they have to roll out services. If the roads are not tarmacked, they should at least be well graded. During the elections NRM made speeches. They said we brought you better telephone services. We improved your schools, your health clinics and your telephone. They will say, we brought your telephone here. You used to have to go to town to make a call. Now you can go to your farm, and call, and ask the price of maize flour at Owino Market.[7]

According to one Makerere professor, the ICT projects built by the government are "politically motivated." His remarks emphasize the witnessing or political attribution aspect of ICTs.

> Some of these ICT centers are being set up just to set up. I am a politician. I want to show my communities that I am doing something, for them, so I build a tele-center.[8]

When asked why the Ugandan government and Museveni were so enthusiastic about supporting ICTs, a top official at the RCDF reinforced the idea that distributing ICTs has political benefits and emphasized that it is a visible demonstration of the "government supporting the people."

> What he [Museveni] gets is very clear. It is the government supporting his people. And the Rural Communications Development Plan is one of the only national programs of its kind that has worked. Here, with ICTs, you can see what is being done, and it is being done throughout the country, in every corner: everywhere. And any president, even if he did not start the project, would want to be associated with it.[9]

The focus on rural distribution of ICTs in Uganda has been consistent and unflagging between the years 2004 and 2014. Observers in civil society lauded the government's success in building infrastructure. For example, one observer noted that "there has been a tremendous development in payphones in rural areas." A high ranking official in the Ugandan telecommunications sector observed that getting ICT infrastructure to every corner of the country is crucial. He noted that the motivations for technocrats to complete the project aligned well with the political motivations of building a successful project that politicians could reference.

> If you leave out one district, you leave out several people. We tend to want to do it using professional motivation, not political motivation. But we get support from politicians because it is in line with them getting re-elected. So our interests are the same. It didn't start with them as politicians, it started with equitable distribution. Along the way you meet stakeholders. You must get the stakeholders to guide the project, to own the project. And politicians are some of those stakeholders.[10]

This idea of stakeholders may also be relevant to the manner in which the ICT policy itself was developed. By engaging key parts of Ugandan society in developing the policy, the Ugandan government may be better able to get their buy in. Part of the development of the Ugandan ICT policy was a public consultative process. The Ugandan government directed its ICT policy process through a unit called the National Planning Authority which established a national ICT working group. This team of approximately 15 persons had representatives from civil society and private sector groups interested in ICTs such as WOUGnet, CIPESA, Kabissa, and I-network, as well as numerous Ugandan government entities. NGOs and private sector organizations were encouraged to review the government's draft and give comments, and the UCC held workshops with civil society, the private sector, academia, and parliament. According to one private sector respondent, "the participatory consultation was extensive." During the development of Uganda's ICT policy, relationships between the government and civil society sectors appeared to be cordial. According to one NGO leader,

> We have been called upon, participated and given input. The output is not ours. Almost everything [we] proposed was accepted. We got our words into the document.[11]

On the one hand, the civil society members comment that "the output is not ours," pointing to the fact that although civil society participates, it does not have significant muscle or leverage to change the final outcome of policy. On the other hand, civil society, academia, and the private sector had a voice in ICT policy making, but in a controlled manner. Input from Uganda's vigorous civil society has remained highly coordinated (Cannon, 1996). This approach resembles a consultative or corporatist process (Moehler, 2006; Streeck & Schmitter, 1985) and is in line with observations that Ugandan civil society has been co-opted (Tripp, 2010). Katusiimeh (2015) observes that civil society organizations exist, but are not strong enough to demand accountability from the national government.

Although the consultation which the state conducted on ICTs may have not been as in depth as some would desire, this article suggests that the consultation process may be motivated by another, subtler form of thinking. Having a consultative process that engages large parts of the society enhances the "witnessing" quality of the ICT policy.

Large parts of the Ugandan intelligentsia were involved in forming and commenting on government ICT policy, enhancing awareness, and possibly the credibility of the project inside of their formal and informal social networks.

The rhetoric of the RCDF, found in the ICT policy and in the 10-year monitoring and evaluation report, suggests that the Ugandan government holds visions of ICT as a driver of economic growth, increased government efficiency, and social transformation simultaneously. The enabling language of the RCDF explicitly articulates a view that "Uganda's rural and underserved communities should be able to harness ICT for social and economic development" (UCC, 2014).

In fact, Uganda's RCDF has successfully increased communication access in rural and underserved regions (UCC, 2014). Uganda is divided into four roughly equal major administrative regions: Central and Southern, Eastern, Northern, and Western (https://www.gou.go.ug/about-uganda/sector/maps-regions). As of 2015, Uganda had 112 districts, 249 counties, and 1403 subcounties. (Ugandan Electoral Commission, 2015). A conversation with former ICT Minister, Dr. Ham Mulira, provided a developmental focus on distributing ICTs to rural areas, which he viewed as necessary to attain economic growth, as well as to improve government service delivery.

> ICT can help promote growth. ICT can assist the government to deliver services more effectively and help ensure rural people access to markets, because people in the villages do not have the basic means of communication.[12]

Because basic forms of communication are not present in the village, giving rural citizens access to computers and connectivity, particularly in public access points, may be viewed as a form of "pork." Pork and patronage are a prevalent aspect of governance in Uganda. One example of such patronage is found in the fact that the contemporary Ugandan state has experienced a proliferation of subnational administrative units (Grossman & Lewis, 2014), which may reify ethnic boundaries while creating a sense of improved group control over local affairs. Green (2011) suggests that the creation of these new districts is a form of "pork." Political patronage is the order of the day in Uganda, takes many forms, and is highly visible. The International Crisis Group believes that the Museveni government focuses on patronage instead of addressing widespread economic needs (ICG, 2017). For example, the cabinet boasts 72 ministers. Whatever the benefits of patronage to defined constituents, it is costly to taxpayers.

ICTs buttress the already popular social justice and developmental goals of improved education and improved healthcare (Singh & Ovadia, 2018). They are popular with donors, and they are "modern." Much like roads and electricity, facilities such as computer laboratories in schools, tele-medicine facilities in hospitals, and tele-centers are a tangible, visible symbol of government effort which can enhance citizen perceptions of state legitimacy (Brass, 2016; Jasanoff, 2004b). By pointing to computers in schools and hospitals, Museveni and his political allies can demonstrate the contributions that his government has made throughout the country.

Analyzing Successes: What Is Going Right?

This study has provided empirical evidence that the broad distribution of ICTs throughout the Ugandan countryside may result in political benefits for the government. On

the positive side of the ledger, ICT policy in Uganda is an example of functioning institutional capacity. Importantly, USAID has noted that Uganda's RCDF is among a handful of African countries which has collected and disbursed funds, and built infrastructure, and that "it may serve as [an] example to other African funds more recently formed or now becoming operational" (Edwards & Bowman, 2014). Further, Uganda has one of the most competitive ICT private sectors in the Eastern African Community.

Cyber-Optimism: Visions Realized

There is some reason for optimism regarding visions of ICT outlined earlier in the paper. Fourati (2009) suggests that increasing levels of mobile penetration are correlated with increase in GDP in developing countries. ICTs constituted 6% of Uganda's gross domestic product by 2010 (Research ICT Africa, 2016). The Market Information System in Uganda (MIS) has resulted in higher farm-gate prices, supporting the hypothesis—much ballyhooed at the advent of the new millennium—that market information improves farmers' relative bargaining position vis-à-vis local traders (Svensson & Yangaziwa, 2009). Extending this work, farmers in neighboring Kenya who participated in an ICT-based MIS system demonstrated a positive and significant effect on labor productivity and land productivity (Ogutu, Okello, & Otieno, 2014).

Despite challenges with distribution, connectivity, and electrification, ICTs show great promise in Uganda in the health sector. One study looking at neonatal and infant mortality in Masindi and Kiryandongo districts (Ayiasi, Kolstern, Batwala, Criel, & Orach, 2016) suggests that a combination of home visits and mobile phone visits positively influenced maternal and newborn care. Improved information infrastructure, among other upgrades, could improve health delivery services in the East Africa (Gathoni & Kamau, 2015). In a northern Uganda study, Yagos et al. (2017) observe that health care in Uganda is decentralized, and Uganda's rural areas lack qualified health-care workers. They suggest that use of ICTs may reduce the isolation of rural health-care workers. One study conducted in Mbarara, Southwestern Uganda reported a high level of success for an Internet based, HIV prevention system for adolescents (Ybarra, Bull, Prescott & Birungi, 2014). Interestingly, this project utilized computers located in schools, thus indicating a potentially significant health benefit of increasing the presence of ICTs in educational settings.

With regard to socio-political transformation, advocates viewed ICTs as "harbingers of a bright future with universal, ICT-supported, personal and collective empowerment" (Mansell, 2012). Former Secretary of State Hilary Clinton trumpeted the perceived possibility of the Internet to "spread freedom and democracy" (Morozov, 2011a, b). Researchers have been intrigued by the "revolutionary" possibilities created by the mobile nature of cellular telephony (De Bruijn, 2008; Molony, 2012). Chambi Chachage (2010) observes that ICTs open new spaces for citizen engagement in Africa. Often, notes Molony (2012), the mobile phone and radio are the only technologies owned by individuals in the developing world, indicating a democratizing aspect of these small and affordable ICTs. Further, observers hope that the rapid growth of Internet use in Africa will democratize knowledge production (Ojanpera & Graham, 2017). At a minimum, ICTs strengthen the ability of citizens to communicate with each other across regional and language borders through shared access points which may

strengthen civil society and community-based organizations. These views have some basis. Grossman, Humphreys, and Sacramone-Lutz (2014) have found that opening a new SMS channel in Uganda increased access by marginalized groups to their elected officials. However, they also found that prices matter, and that small increases in cost can really reduce the usability of such political communication channels.

Deployment of ICTs in Education and Health Facilities

Recent research on the use of ICTs in Uganda indicates that ICTs can be a useful tool, if adopted and implemented appropriately, to support educational outcomes, and provide young people with skills they need to participate effectively in the global economy (Newby, Hite, Hite, & Mugimu, 2013). ICT hardware and software have been broadly deployed in Ugandan schools. By 2014, the government had subsidized 1027 school ICT labs. Computer studies has been made a compulsory subject for all schools in Uganda. Indeed, by 2014, according to the Ugandan government, 1027 of the 1150 government secondary schools (97%) have ICT laboratories. A field visit to a secondary school computer lab in Jinja in 2015 found it to be well equipped, with well qualified teachers.

The RCDF has pursued a strong expansion plan in the health sector. The UCC has focused its efforts on public facilities.[13] In the health sector in Uganda, ICT is supposed to have two main roles. First, ICT is supposed to be used for data management, and second, ICT is to be used for clinical purposes. Each public general hospital in Uganda's 112 districts is supposed to be provided with a basic level of computer support. In addition, each public hospital in the district should have three computers, connectivity, a local area network, and a "wide area network" (WAN). Computer software is supposed to help doctors and government officials conduct analysis more quickly and efficiently. By 2014, according to the Ugandan government, all the government hospitals and 50 of the 144 health center facilities in the country were interconnected, and given access to Internet.

Analyzing Challenges: Failures and Warnings

By 2015, the World Economic Forum ranked Uganda 116 out of 148 countries in the world in terms of its Network Readiness Index (World Economic Forum, 2015). According to this index, Uganda is strongest on affordability, and is weakest on individual usage. The country scores relatively well on the political and regulatory environment and the business and innovation environment and scores lower on infrastructure and skills. Sustainability is not discussed as a factor in this index. As this study will discuss, sustainability remains a problem for ICTs in Uganda, in part due to challenges with electricity infrastructure (Table 2).

Challenges to Sustainability of ICT Infrastructure in Government Facilities

Despite the successes with ICTs in Uganda's health sector, challenges remain. Sustainability and usability continue to be a challenge for ICT facilities, both governmental and nongovernmental in Uganda. The Ugandan Communications

Table 2. Operators in the Ugandan Information and Communications Technology Sector From 1996 to 2015

Year	Telephone Operators	ISPs	FM Radio Stations	International Data Gateways	Television Stations
1996	1	2	4	2	4
2004	3	17	117	8	22
2015	5	36	292	8	28

Sources: Uganda Communications Commission Post, Broadcasting and Telecommunications Market and Industry Report (2015); Kinyingi and Mijumbi (2003); Minges, Brown, and Kelley (2001).

Commission notes that at the inception of the RCDF in 2002, no post office had a postal tele-center. By 2013, 45 postal centers had ICT facilities in place. Despite these impressive efforts, connections between the rural government offices and the capitol were not as strong as one might expect, given the high level of distribution of ICT artefacts. A lack of electricity (Gore et al., 2018; MacLean et al., 2016) hampers usability, and a lack of maintenance and technical support hampers functionality. Even government officials concede that the government has not been completely unified in its commitment to ICTs. In a candid interview, the director of the RCDF indicated that the

> parent sectors, such as the Ministry of Health and the Ministry of Agriculture are not doing enough to integrate ICT into their respective ministries.[14]

Wells and Wells (2007) observed that educational ICT in Ugdan reflects efforts to integrate ICT into schools and curricula, but with mixed effort and success. Further, as of the date of this article, many teachers, students, and subject areas lack access to ICT. As the millennium approached its second decade, this unevenness remained. The HIV intervention study piloted in schools in Mbarara, Uganda mentioned good Internet access in the schools utilized, but found overall that access to the Internet in Ugandan schools was often limited (Ybarra et al., 2014). However, observations in a more remote area, Ruchinga, Uganda in the southwest of the country saw far fewer computers, departing from the Ugandan government's rosy narrative. Indeed, the only computer noted by the researcher in a secondary school was in the principal's office. In addition, secondary teachers were often reduced to drawing a picture of a computer on the chalkboard, trying to label the different components on the chalk picture (Campos, 2018).

Despite vigorous efforts by the central government to distribute information hardware to the health sector in Ugandan rural areas, the reality observed in the field diverged considerably from the ideal. Indeed, fieldwork supported Katusiimeh's (2015) assertion of poor infrastructure in public health care. A 2017 field visit to a public hospital (Mukono Health Center IV) approximately 100 km from Kampala revealed three laptops present. Conversations with doctors and staff members, however, indicated that two of the laptops were not functional, and the Internet was intermittent. More importantly, electricity was extremely unreliable, rendering it very difficult to use the computers at all.

> We received computers from the UCC two years ago. We use technology for creating patient records and ordering lab tests. We then send the records to the district health office. This has increased our efficiency because we can easily retrieve patient records. However, power outages are common. We can have power outages which last up to one week long.[15]

Finally, the doctors and hospital officials were unable to use the software to send data to the district health office. The software had not been configured in the same way at all government offices and all hospitals.

> The Ministry of Health is not engaged. There is no unified software due to the lack of engagement. We need inpatient computing. We need ultrasound and imaging. We need standardized software. One doctor can talk to another doctor about a patient, but over email, not through a LAN.[16]

As a result, doctors and nurses had to print out their data regarding patients and ailments, and walk it across the road about half of a mile to the district health office where the information was entered manually into the Ministry of Health's system, nearly eliminating the benefits of electronic interconnectivity. Equally concerning, ICT facilities in rural Northern Uganda health clinics are often "rudimentary and may not be functional" and many health-care workers in Uganda lack the skills to operate ICTs, should they have access to them (Yagos et al., 2017).

Similar problems with sustainability, equipment function, and usability were found in the postal sector. A visit to the Jinja post office indicated gaps in maintenance and repair and business savvy. In 2010, the UCC donated five computers to the Jinja post office. Initially, postal officials stated that they had 10 to 20 citizens visiting the post office and using the computer daily. Yet, by 2015, only four out of those five computers were working. Further, the Posta employee in charge of running the computer center left. The staff of the Posta unit complain that the computers are slow, and that since the computer specialist left, there are no customers. Further, despite technical problems, Posta still charges the same price as the local Internet cafes which offer on the spot technical support. Staring at the computers on clean desks with empty chairs, a postal official stated glumly,

> Customers can go somewhere else, get faster speeds, and help.[17]

These problems with technical support and hardware adequacy stretch to regional government. A visit to a Resident District Commissioner's office in Jinja indicated that the office had one computer, which the commissioner and the deputy commissioner share. The officials stated that they used the computer to write reports, type internal memos, and type press statements, and then send them to the national government with the Internet. The sub-county chiefs have not been given computers by the government, although some NGOs give them computers. Other sub-county chiefs buy their own computers. Regardless, as in the case of the health centers, reports are usually delivered from the sub-county level to the district level in person, with hard copies, again dramatically reducing the efficiency benefits of computerization. The increase in the proliferation of administrative units (Green, 2011; Grossman & Lewis, 2014) may place strains on the resources needed to fully equip these new political entities. Importantly, merely receiving a computer is not sufficient to ensure connectivity. The deputy resident district commissioner observed,

> We need technical support. The government used to provide someone to repair the computers. The government used to pay for Internet and repair. Now our office repairs the Internet. More technology would be better.[18]

Finally, the lack of electrification represents a serious challenge to ICT access in Uganda, regardless the sector. Indeed, the ICT health-care intervention piloted at a

school in Mbarara, Uganda discussed above had to rely on a car battery to power the router (Ybarra et al., 2014). Although this solution is ingenious, it points toward a long-term problem with technological sustainability. According to Yagos et al. (2017), most rural areas in northern Uganda are not electrified. According to MacLean et al. (2016), Uganda has one of the lowest electrification rates on the continent. The Ugandan government's strong emphasis on the distribution of ICT hardware "artefacts" at the same time that the nation does not have strong electrification presents a policy and infrastructure paradox which merits further study.

Cyber-Pessimism: Using ICT in Uganda for Surveillance and Control and Suppression

Given the problems with sustainability in the Ugandan context documented above, the developmental benefits of ICTs may be more difficult to attain then originally envisioned (Sahay & Avgerou, 2002). Critics have noted that many analysts have overly optimistic expectations for the developmental role of ICT (Avgerou, 2008; Dobra, 2012). Further, establishing the socially transformational effects of ICTs has been difficult (Byrne, Nicholson, & Salem, 2011). One set of authors used Sen's capability approach and note that although perceptions of the impact of ICTs on the quality of life in Uganda are high, actual impact was relatively low (Kivunike, Danielson, Ekenberg, & Tusubira, 2011).

Far before the phrase the Internet was a household word, Langdon Winner (1980) warned us that a variety of technologies including the automobile, the telephone, the radio, and the space program have been viewed as potential guarantors of democracy and social justice, yet failed to fulfill those lofty expectations. Theories such as those propounded by Scott (1999) also support a darker view of e-government. Scott's theories suggest the possibility that e-government could expand the reach and control of the state over its population.

Although the Ugandan ICT sector is competitive in terms of a large number of outlets, most FM radio stations are owned by NRM politicians limiting how competitive the views expressed may be (Makara, 2010). Other limits on free speech are occurring. Increasingly, the Ugandan government blocks and disperses public assemblies (Human Rights Watch, 2018). Authoritarian governments have been finding ways to use ICTs to control society from technical regulations, monitoring communications and creating campaigns to co-opt social media (Deibert, 2015). Often, governments invoke "the familiar mantras of anti-terrorism and cybersecurity" to justify their actions (Deibert, 2015). A range of countries are involved in such malfeasance, ranging from Egypt to China, from Ethiopia to Thailand.

One egregious example of an authoritarian use of ICTs in Uganda was the use of malware against opposition leaders. The Ugandan police force and parts of the military used malicious software (malware) to infect the communication devices of opposition leaders in the 2011 elections (Privacy International, 2015). The application FinFisher, purchased with Ugandan state funds, allows a person's computer or phone to become monitored in real time. This effort targeted key opposition leaders as well as media leaders (Privacy International, 2015). The goal of this covert surveillance effort was to obtain personal information for use in blackmail.

The Ugandan government is also attempting to set up a communications monitoring center. The Ugandan Parliament passed the Regulation of Interception of

Communications Act, and the inter-agency ICT technical committee invited bids from seven countries, including China, Israel, and the UK (Privacy International, 2015). The Ugandan Parliament passed the Regulation of Interception Act, which makes it illegal to target political opponents for surveillance. However, the Ugandan Parliament also passed the Anti-Terrorism Act in 2002, which gives the government significant discretion to intercept communications and conduct surveillance (Privacy International, 2015). In a shocking move to limit free speech, a research fellow at the storied Makerere University, Dr. Stella Nyanzi, was charged in 2017 with "cyber harassment" and "offensive communication" for challenging the president and the education minister for failing to fulfill a campaign pledge (Human Rights Watch, 2018). Such efforts present a strong counter to the narrative of ICTs as democratizing, and also suggest that the Ugandan government is moving in an increasingly authoritarian direction.

In addition to employing malware and engaging in ICT-based surveillance, as elections in Uganda become more competitive, the Museveni government has attempted to censor political communication over ICTs. This echoes similar moves by the governments of Kenya, the Congo, the Sudan, Egypt, etc. (Deibert, 2015). During the 2016 Uganda presidential elections, social media networks such as WhatsApp, Facebook, and Twitter were shut down, to great outcry. This Internet shutdown was carried out by the electoral commission itself "for security reasons," and lasted throughout voting, until February 21, 2016 (ChapterfourUganda, 2016). Mobile money services in Uganda were also affected during this time period. The Ugandan government blocked social media again before Museveni's inauguration in the second week of May 2016.

However, civil society—and indeed, the very spread of ICTs—has proved a limit to such censorship. Interestingly, the government of Uganda was unable to impose a complete blackout of social media during the Spring 2011 "walk to work" protests (Privacy International, 2015). Despite a direct order by the Ugandan Communications Commission for providers to shut down Facebook and Twitter, ISPs in Uganda declined to do so. Many Ugandan users were still able to access social media during the election using virtual private networks (encrypted private networks) (Duggan, 2016; Propa, 2016). One of the numerous candidates challenging Yoweri Museveni's multi-decade presidency, Amama Mbabazi, tweeted to his followers how to set up a VPN to his 138,000 followers. At least 15% of the Internet-using Ugandan population downloaded VPN software to return to social media (Phillips & Atuhaire, 2016). A number of African civil society organizations, including two Ugandan ICT groups who were active in the ICT Policy planning process—CIPESA and Wougnet—among others sent a forceful letter to the African Union, the East African Community, NEPAD, and several Ugandan ministries protesting the shutdown of the Internet which affected Facebook, Twitter, and other communications platforms.

Conclusion

As this study attempts to illustrate, technical, social, economic and political considerations "interpenetrate" and overlap in the arena of ICTs (see e.g., Horwitz, 2001). The Ugandan government—through the leadership of technocrats at the UCC and RCDF—has distributed ICTs widely. This paper has argued that an examination of

ICT policy and ICT distribution in Uganda from 2000 to 2019 indicates that the political benefits of distributing ICTs have made it possible to distribute a key technology broadly throughout the country. This study provides empirical support for the contention that technology, and specifically, ICTs, represent a political resource in Uganda. This study has presented evidence that politicians in Uganda have used their placement of ICTs in an attestive manner, creating infrastructure that can be "witnessed" by the public as evidence of development (Ezrahi, 1990; Humphreys & Weinstein, 2012; Lancaster, 1986) in part as a form of "pork barrel" or rents which can be distributed to constituents (Green, 2011). ICTs are used by politicians in Uganda to demonstrate their commitment to modernity, nation-building, and economic development to both internal and external audiences.

Despite the enthusiasm and utopian visions surrounding the application of ICTs in the developing world, this study has presented evidence that Uganda faces significant challenges with regard to the sustainability of this technology. Ensuring access to ICTs in rural Uganda presents technical, policy, and human resource challenges. The government's approach is top down. Further, technology has not been distributed evenly throughout the country, nor have all sectors benefited to the same extent. Fourati (2009) observes that although Uganda had been cited by the ITU as an example of best practices in terms of universal services, ICT infrastructure and services remain low in the country. This study provides empirical support for that contention. A lack of electrification in Uganda—with less than 20% of households with electricity—means that ICTs often cannot be used to their full effect (MacLean et al., 2016). Importantly, although the Ugandan government has placed a high degree of emphasis on distribution of artefacts and infrastructure, insufficient efforts have been paid to the sustainability of the technology. As Kleine (2010) observes, a more bottom up approach with a focus on participation may reduce the failure rate, and increase the holistic benefit of ICT technology.

One takeaway from the examination of ICTs in Uganda is that a naïve supply side approach does not—in and of itself—automatically increase access. Buying hardware alone, which is to say the computers themselves, and placing them in tele-centers, post offices, schools, and hospitals in rural towns accomplishes little, particularly when required electricity is unavailable and intermittent. Repair and maintenance of ICTs remain problematic, even in key government facilities. Skilled workers are needed to train others to use and maintain the technology (Steinberg, 2003). Electricity is uneven, software is incompatible, Internet is sporadic, and language barriers remain, limiting the usability of this promising technology. The Ugandan state has addressed different policy priorities unevenly, and in ways that may actually conflict with each other.

Finally, despite the optimistic visions of the use of ICTs in Africa at the beginning of the twenty-first century, ICT is not inherently democratizing (Morozov, 2012). The story of Ugandan ICTs reveals that the government can, and does use ICTs for repression. In 2011 and 2016, the Ugandan government used ICTs for surveillance of the opposition and social control. Diffusing ICT to Uganda, the African continent, or the developing world presents a complex set of inter-related problems. These problems comprise building technological systems that include regulations, and political decisions about placement, ownership, and control. These systems include commercial and state decisions about infrastructure as well as sociological concerns about access

and human concerns about training and capacity to maintain the systems. A commitment to transparency and accountability can help ensure that the technology, which is in and of itself neutral, is used, on balance, for good and not for ill.

Acknowledgments

Notes

 1 Samuelson (1954) observed that public goods are generally undersupplied by market-based arrangements. Accordingly, government intervention is often required to correct these deficiencies.
 2 Braman (2011) observes that an interdisciplinary approach to information policy considers information and communications technologies, applications, users, institutions, business, and cultures. It brings within its umbrella policy issues "as disparate as access to broadband networks, privacy rights, and intellectual property into the same conversation." This article utilizes such an umbrella approach.
 3 This approach may also be viewed as the politics of attribution (Brass, 2016; Stasavage, 2005).
 4 Documentary sources examined include government documents, including draft ICT policies, final policies, legislation, regulations, government websites, and comments of stakeholders, agendas of meetings, notes and minutes by participants in key meetings among others. The project also draws on press reports on ICT and telecommunications in Uganda. Finally, where appropriate, secondary sources of data, such as journal articles and summaries of meetings, form part of the data base.
 5 Sub-Saharan African countries often received loans with many conditions and rigorous oversight.
 6 Interview with BL, 2015. Kampala. RCDF.
 7 Interview with JB, 2007. UTL.
 8 Interview with MB, 2007. Makerere University.
 9 Interview with BL, 2015. Kampala. RCDF.
10 Interview with BW, 2010. Kampala. Ministry of ICT.
11 Interview with DO, 2010. Kampala. ICT Related NGO.
12 Interview with former Minister Ham Mulira, 2007. Kampala, Ministry of Information Technology.
13 Interview with BL, 2015. Kampala, RCDF.
14 Interview with Doctor 1, 2017. Mukono Health Center.
15 Interview with Doctor 2, 2017. Mukono Health Center.
16 Interview with BW, 2010. Kampala, Ministry of ICT.
17 Interview with PO, 2017. Jinja Post Office.
18 Interview with Deputy RDC, 2015. Jinja.

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