Northumbria Research Link

www.northumbria.ac.uk/nrl

Impediments to the implementation of universal service funds in Africa – A cross-country comparative analysis

Abstract

The liberalisation of the telecommunications sector has undoubtedly contributed to the spread and adoption of mobile telephony across Africa but evidence also points to the fact that coverage gaps persist in some locations - mainly rural and remote areas - which are either unserved or underserved.

In order to address this problem, governments across Africa have established universal service funds (USF) as their universal service strategy. Nonetheless, various studies have suggested that the problem of limited coverage remains unaddressed due, in part, to the poor implementation of USF. This raises the question as to why USF have failed to address the limited coverage of telecommunication services in Africa?

We seek to answer this question by investigating the interplay between market liberalisation and universal service using a multiple case study approach with examples drawn from across the continent. We find that poor policy formulation limits the implementation of an effective USF model in Africa. In addition, inadequate stakeholder engagement, lack of accountability, inaccurate data, undue political influence and the narrow scope of universal service all impinge on the ability of USF to achieve their objectives. We, therefore, propose the need for future research to address these challenges and develop our framework to unravel some of the intractable areas of universal service such as determining what services should fall within the scope of universal service and how to prevent policy redundancy in a fast moving industry such as mobile telecommunications.

Keywords: Africa, liberalisation, telecommunications, universal service fund, universal service.

Impediments to the implementation of universal service funds in Africa – A cross-country comparative analysis

1. Introduction

Prior to the turn of the millennium, the telecommunications industry across Africa was largely run by state-owned monopolies (Berg & Hamilton 2002; Chavula 2013). The performance of fixed operators left much to be desired, as demonstrated in the low teledensity of both fixed and mobile lines partly due to the paucity of investments and technical capacities in the industry (Minges, 1998; ITU, 1999; GSMA, 2011). There was, therefore, a strong case for the need to extend telecommunication services to unserved and underserved locations in order to bridge the coverage gaps that existed. When we talk of telecommunications services in this paper, we refer to mobile telecommunications services delivered to end-users that include voice and data services. One of the reasons for focusing on mobile telecommunications is the fact that mobile telephony has enabled an unprecedented level of connectivity to millions of people across Africa (Gillwald, 2005; Esselaar, Gillwald, & Stork, 2007; Manson, 2013; ITU, 2016). Consequently, the adoption and penetration of fixed lines continue to decline with the increasing preference for mobile telecommunications (McCormick, 2005; ITU, 2016).

Investment in telecommunications infrastructure is a major part of coverage expansion (Hudson, 2006; 2010; ITU, 2015), and since most governments could not afford the investments they turned to the World Bank and its associated bodies for support (Irwin & Brook, 2003; Sutherland, 2014; Wanjiku, 2014). At the heart of the conditions for granting these loans was the need to introduce reforms, including the liberalisation of the mobile telecommunications sector (Sutherland, 2014; Wanjiku, 2014). Liberalisation has drastically reduced the coverage gaps in densely populated urban areas but the same cannot be said of rural and remote locations as a significant number of people in these areas are either unserved and/or underserved (Hudson, 2006; Foster & Briceno-Garmendia, 2010; Manimohan, 2013; GSMA, 2016; Mamabolo, 2016c).

In order to address this problem, most governments across Africa have established universal service fund (USF) as their universal service strategy. Several studies have suggested that the problem remains largely unaddressed due, in part, to the poor implementation of USF (Connect Africa, 2010; ITU, 2013; GSMA, 2014; Sepulveda, 2010). This raises the question as to why USF have failed to address limited coverage of telecommunication services in Africa? We seek to answer this question by investigating

the interplay between market liberalisation and universal service policy using a multiple case study approach with examples drawn from across the continent.

The rest of this paper is divided into six sections. Section 2 provides a brief overview of the state of the African mobile telecommunications industry, while Section 3 provides a broad overview of universal service. Section 4 focuses on the most widely adopted universal service strategy across Africa - USF - and proposes an analytical framework for the study. Section 5 discusses the methodology deployed in the study. The results and the discussion of emerging issues are outlined in Section 6 while the last section, draw conclusions and recommends issues for further research.

2. Liberalisation and competition

Liberalisation and competition have transformed the mobile telecommunications industry across Africa. Encouraged by global trends that saw governments reduce their involvement in the economy and open markets to foreign investment and competition (see, for example, Muriu, 2002; Hudson, 2006; Musila & Sigue, 2006; Jobodwana, 2009; Sutherland, 2014; Wanjiku, 2014; Ojo, 2016), governments across Africa have liberalised their telecommunication markets as they sought to address the lack of infrastructure and economic development that was evident across the continent (Jobodwana, 2009; Ojo, 2016; Sutherland, 2014). The shift from an industry characterised by natural monopolies to one that is liberalised and competitive has arguably been a great success – there are now more than 500 million mobile subscribers across Africa (GSMA, 2016). The market is now occupied by a mix of local and multi-national telecommunications operators – see, for example, Curwen and Whalley (2014) for an overview of the market structure of telecommunications in Africa. The largest mobile network operators (MNO) are MTN and Vodacom/Vodafone (Curwen and Whalley, 2014), and all but four countries are competitive (GSMA, 2017) [1]. In 42 African countries, there are three or more MNO, while in another eight countries there are two operators.

While there are more mobile subscribers than ever before, mobile penetration and adoption vary quite significantly across Africa (ITU, 1999; Aker & Mbiti, 2010; GSMA, 2017). While countries with fewer MNO, which are predominantly located in northern and

---

[1] As of March, 2017, those countries which are not competitive are Djibouti, Eritrea, Ethiopia, and Swaziland. They all operate a state run monopoly with the exception of Swaziland, which operates a private monopoly run my MTN.

southern Africa, have higher mobile penetration levels, countries from other regions such as the east, tend to have more operators but lower mobile penetration rates. In other words, not every country has embraced or benefited from liberalisation and competition to the same extent. The picture is further complicated when the use of multiple SIM cards and inactive lines are taken into account (AMTW 2014; Sutherland 2009; Thomas 2013; Telecompaper, 2016), as these inflate adoption levels.

As a consequence, it is not clear how many people have access to mobile telecommunication services across Africa. Several years ago Manson (2013) suggested 400 million people, while in the same year Nyambura-Mwaura and Akam (2013) suggested that two-thirds of Africans have access. More recently, Collins (2015) estimates 500 million people, GSMA (2016) says there are 557 million unique mobile subscribers and A4AI (2017) estimates over 50% of Africans are unconnected. Regardless of the actual accuracy of these figures, one thing that can be said for certain is that Africa is the least connected of all the continents (ITU, 2015). Also more certain is the patchy nature of coverage, with a series of studies demonstrating that the farther one travels from urban areas the less likely it is that optimum network coverage will be available (Gebreab 2002; Nyambura-Mwaura & Akam 2013; Mamabolo, 2016a; Southwood, 2017). This, of course, reflects the commercial orientation of MNO in a liberalised and competitive environment that inevitably results in their focus on urban areas and less so on rural and remotes areas (Irwin & Brook, 2003; GSMA, 2014). This is exemplified in Gillwald (2007) where findings can be observed in South Africa.

While liberalisation and competition have transformed the African mobile telecommunications landscape, un- and under-served areas remain across the content (Gebreab, 2002; Foster & Briceno-Garmendia, 2010; AfDB, 2013). If such areas are allowed to persist, a digital divide with all that this entails will continue. The presence of digital divides has been acknowledged across Africa, see, for example, Gillwald, 2011 for the case of South Africa. As a consequence, various governments have developed universal service policies with over 30 countries establishing USF. The remainder of this paper takes the form of a critical analysis of universal service policy and the evaluation of USF.

3. Universal service policy

There is a general lack of consensus regarding the definition of universal service with differing views across both academics and practitioners (Alleman, Rappoport, & Banerjee, 2010). Hence, Blackman (1995: 171) noted, "…*it* [universal service] *looks to be coated in*

myth, a slippery and ideological concept manipulated by various different parties to support their own case for special treatment." Some studies define universal service through the notion of policy (see, for example, Xia, 2016), others in terms of concept (see, for example, Madden, 2010) and obligation (see, for example, Srinuan, 2014). Synthesizing these definitions, it becomes clear that they were all referring to the same issue but using different notions that broadly describes universal service as a wider access to fixed and/or mobile telecommunication services in a manner that is available, accessible and affordable. For the purpose of this paper, we view universal service as a policy as this is more central to this study and is in line with government efforts across Africa to realise widespread telecommunications infrastructure and services (see Table 2).

The above argument shows that the definition of universal service is not straightforward and varies between countries (Xavier & Cave, 1995; Milne, 1998). This partly stems from the level of telecommunications penetration and the political will of a given country (Maddens, 2009). For many developed countries such as Canada, the UK and the US, universal service not only includes access to public switched telephone network but also directory services, emergency services as well access to internet and broadband at homes and some parts of the public (Jain & Das, 2001). Conversely, for developing countries, universal service policy focuses mainly on the provision of at least a common telephone within a given distance (Jain & Das, 2001).

Although the emergence of the Internet is changing the traditional scope of universal service in developing countries, it is not at the same pace as developed countries where universal service is used to drive advanced services like broadband (see, for example, Hudson & Rockefeller [2009] for the US, Ofcom [2016] for the UK and MIC [n.d.] for Japan). Some of the definitions that can be found in the literature are presented in Table 1 while Table 2 highlights practitioner views from across Africa.

[Tables 1 and 2 about here]

Although Tables 1 and 2 show that the definition of universal service varies across countries and literature, definitions in Table 2 largely target wider access to fixed and mobile telecommunication services for both individuals and the public. This is inconsistent with the literature, such as, for example, Jain and Das (2001), which argues that universal service in developing countries focuses mainly on the provision of at least a common telephone within a given distance. Furthermore, the definition of universal service in given countries in Africa seems rather ambiguous. For example, although most countries target universal service at 'unserved' and 'underserved' areas, no specification is provided. Only

Egypt explicitly states that this shall include regions with at least 300 inhabitants (ITU, 2013). Universal service definition in other countries also covers 'ICT' without explicitly saying what this is limited to. In practice, ICT could cover a lot of different services, technologies and networks and to imply that universal service in these countries covers unlimited scope is unattainable. Non-specification of 'minimum' internet speed is another misleading element within universal service definitions across Africa. This could be linked to poor policy formulation that limits USF as will be argued in Section 6.1.

Although the definitions in Tables 1 and 2 vary, but as highlighted earlier in this section, the commonalities among them include availability, affordability and accessibility. This shows that there is an overlap between the views in the literature and those expressed by regulatory bodies across Africa with respect to these principles. Since these may have different meanings, depending on influences like economic conditions, telecommunications penetrations, and political will (Milne, 1998), we adopt the definition of ITU (2013) :

▪ Availability implies that the level and quality of service should be the same for everybody regardless of where they live or work, at any time across geographies - rural and urban locations;

▪ Affordability implies the ability of everybody to afford or pay for telecommunication services, regardless of their locations or income level; and,

▪ Accessibility implies that everyone, without distinction of race, sex, religion, etc., should have access to telephone services without any discrimination such as price, telecommunication services and QoS.

These three components constitute the underlying principles of a 'good' universal service policy (Oestmann & Dymond, 2008, ITU 2013). Thus, regardless of the different definitions adopted by countries, universal service policies should encapsulate these three principles in order to achieve optimal result in closing mobile coverage gaps. In addition to these three principles, there is also the need to include 'needs assessments' because the purpose of developing policies and allocating scarce resources is to address human needs and at the heart of this is regular needs assessment (Okerlund, Parsons, & Hulterstrom, 1995). This would then help to identify the real problem in a given community including the relevant local content and thus lead to the formulation of more effective and efficient policy (Thomas & Grindle, 1990; Corkery, Land, & Bossuyt, 1995; Crosby, 1996; Mamabolo, 2016a).

In the absence of 'needs assessments' in universal service policy, it is unclear how the correct policy can be formulated when the 'actual' telecommunication needs are unknown. Furthermore, the satisfaction of the telecommunication needs of a given community includes the provision of services that are constantly and rapidly changing (Batura, 2016). Hence, what is perceived today as a need may become obsolete tomorrow.

In addition to needs assessments, 'awareness'[2] also needs to be included as part of the principles of universal service policy because providing mobile telecommunication services alone may not be a complete solution to the issue of limited coverage (Ameen & Willis, 2016; Mamabolo, 2016a). In other words building an all-inclusive digital society should not only be about physical access to mobile phones, it should also be about creating awareness of the potential value of mobile telecommunications services and having access to training (Gómez & Martínez, 2000). These will combine to increase mobile adoption and provide increased value to customers (Gómez & Martínez, 2000). While it is not possible to assume that every member of a given community may be ignorant of what to do with technology, there is a growing support for the need to create more awareness of the use of mobile telecommunications services (OECD, 2000; Msimang, 2012; Kapoor, 2016).

According to Kapoor (2016), the lack of awareness of the use of ICT-based services may contribute to limiting the adoption of mobile services in rural areas. Msimang (2012) and Lee (2014) also argued that with the emergence of the Internet and broadband delivering content and application, people need to become aware of their importance and how they can use them. Awareness is, therefore, needed to stimulate the adoption of mobile telecommunication services, generate traffic in order to maximise costs and increase earning margins for MNO (Kawash, El Morr, Charaf, & Taha, 2005; Msimang, 2012).

The above analysis highlights the fact that it is important to first ascertain the 'need' of a given community in terms of whether availability, accessibility, affordability, the possession of the right skills to use the available technology or a combination of these elements are the problem. Consequently, in this paper, access to telecommunication services means the combination of these five components - availability, affordability,

---

[2] Awareness here means informing people of the presence of telecom network so that they are aware of the potential value of telecom services (Gómez & Martínez, 2000). This will help encourage usage and that people have access to the relevant skills to use mobile devices.

accessibility, needs assessments and awareness - in the sense that, when any of them is missing, it will not be possible to achieve universal service to mobile telecommunications. For example, if coverage is ubiquitous in a given country with a high tariff, this may affect the level of service take-up, especially for the poor. Furthermore, a given country may have good coverage and affordable tariffs but the lack of awareness may undermine the rate of adoption. For universal service to achieve its goal of mobile services for everyone in a given country, these five principles should more or less be equally present.

Unlike the paucity of studies on universal service in Africa, an extensive literature exists in relation to developed countries (see, for example, Batura, 2014; 2015; 2016; Blackman, 1995; Clarke & Wallsten, 2002; Dordick, 1990; Feijoo & Karniti, 2007; Feijoo & Milne, 2008; Hasbi, 2015; Hatta 2008; Longstaff, 1996; Wirzenius, 2008; Xavier, 2008). Overall, these studies underline the fact that universal service forms a critical part of a liberalised telecommunications market as countries such the USA are using it to mitigate the problem of the digital divide between locations that are commercially attractive and those that are not (Longstaff, 1996; Simon, 2008).

A key issue that emerges from the literature on universal service is the strategy and the manner with which it is deployed (Oestmann & Dymond, 2008). Studies have shown that USF is the most adopted universal service strategy across Africa (Sepulveda, 2010; ITU, 2013; GSMA, 2014). This is consistent with our analysis which indicates that over 30 countries in Africa have opted for USF as the mechanism for implementing universal service policy. The next section will further explore the use of this mechanism by assessing the performances of 34 funds across Africa using an analytical framework adapted from Jain and Raghuram (2009) and ITU (2013).

4. Universal service funds in Africa

Although USF was first established in Latin America, mainly in the mid-1990s, South Africa became the first country in Africa to start a fund in 1998 following its market liberalisation (Oestmann & Dymond, 2008; Hudson, 2010; Msimang, 2012). In South Africa, USF is seen as a fund created to finance projects and programmes that relate to universal service and access to 'ICTs' for all its citizens (USAASA, 2017). In Nigeria, the USF is established to facilitate the widespread affordability of access to telecommunications services for social inclusion and equity of all Nigerians (USPF, 2015). The regulatory authority of Morocco simply states that the USF was created to fund universal service (ANRT, 2017). Moving away from regulatory views, the relevant

literature on Africa defines USF as a fund established by regulators to provide some form of financial incentives to MNO in order to encourage the deployment of networks in economically unattractive areas with the intention of achieving universal service (Sepulveda, 2010; ITU, 2013; GSMA,2014).

As noted in Section 2, the liberalisation of the telecommunications sector across Africa has improved the coverage of mobile telecommunication services, but such improvement is largely limited to commercially viable locations – typically urban areas with high population densities and where people with higher disposable income are concentrated (Castells, 1998; Gillwald, 2007). One of the implications of this is that areas perceived as less viable receive less attention from MNO and these locations are mainly in rural and remote areas where most of the African population reside (World Bank, 2015). In order to address this, governments in 34 countries in Africa have established USF with the objective of subsidising the expansion of telecommunications network and services into disadvantaged areas (Sepulveda, 2010; ITU, 2013; GSMA, 2014).

From the 34 countries surveyed it was revealed that USF in Africa are mainly financed from levies (see Figure 1) contributed by MNO via a percentage of their gross revenues with only Morocco and Togo adopting a 'pay or 'play' strategy that makes contribution through levies optional. The levies range from 5% in Tunisia to 0.5% in Mauritius and Kenya as well as 0.2% in South Africa. In some countries such as Burkina Faso, Ghana, Tanzania and Uganda, the government and international donors like the World Bank can also contribute to USF.

[Insert Figure 1 about here]

In certain countries, USF are administered by an 'independent' body created by parliamentary law or decree. For example, in Nigeria, the Universal Service Provision Fund (USPF) is administered independently and established under Part IV of The Nigerian Communications Act No. 19, 2003 (USPF, 2015). In Algeria, the Universal Telecommunication Service Fund (FSUT) was established by Decree Number 02-232 and amended Law 55-01 of 2004 (APRT, 2003; ITU 2013). In other countries, a 'quasi-independent' unit located within the relevant ministry or the regulator administers the fund. For example, in Morocco, Universal Service Telecommunications Fund (FSUT) was created by the Finance Act of 2005 and is administered by the Telecommunications Universal Service Management Committee, a group appointed by the government (ANRT, 2017). These administrators are typically responsible for the distribution of USF money via a 'competitive process' where various MNO bid for projects and the subsidy

is awarded to the bidder with the least subsidy request – minimum subsidy tender (Alleman, Rappoport, & Banerjee, 2010; ITU, 2013).

USF administrators are also responsible for identifying and deciding on which disadvantaged areas are to be targeted. Although in some countries like Nigeria, individuals from disadvantaged communities could also make a case for mobile coverage, but due to the lack of interest from community participation, USF administrators are largely responsible for deciding the beneficiaries (ConnectAfrica, 2010; Abdullahi, 2012). Following the award of the bid, the projects are then monitored based on agreed specifications such as its timely completion, technical and quality agreements. Ghana and Rwanda also deploy USF through the outsourcing of projects to specialised-independent service providers who build GSM base transceiver stations (BTS) in disadvantaged areas, which can then be used by MNO (Balancing Act, 2014; ITWeb Africa, 2017). Other projects funded by USF include computer and internet connectivity in schools across Ghana, broadband rollout across unserved and underserved locations in Lesotho and connectivity for public libraries under the E-Library Project in Nigeria.

From 1998, when the first fund was established in South Africa (Hudson, 2010) until 2014, when USF in Kenya received its first levy of $1 million from the three MNO in the country (Wanjiku, 2014), only a few comprehensive studies (for example, Sepulveda 2010; ITU 2013; GSMA 2014) have assessed the performance of these funds. These studies have shown that the operations of USF across Africa are inefficient and ineffective, with collectively around $400 million lying idle in the funds of over 20 countries[3](ITU 2013; GSMA 2014). According to ITU (2013), at the end of 2011, a total of around $575 million has been collected while only about $170 million had been disbursed. ITU (2013) and GSMA (2014) also revealed that most of these funds lacked regular financial reporting with a low level of activity and, in some cases, no activity, that is, the levies are collected but there is no evidence of projects being undertaken. Although the operations of the funds have been suspended in some countries – for example, Burkina Faso and Mauritius - governments continue to collect levies from MNO (ITU, 2013). The reasons for such

---

[3] Some examples of non-disbursing funds in Africa include Burkina Faso, where the collection of levies began in 2001 and at the end of 2009, a cumulative of about $20M was recorded as idle fund. Mali started collecting levies in 2002, at the end of 2009, about $5M of idle fund was accounted for. Lastly, Zimbabwe began collecting levies in 2004 and at the end of 2009, $14M was recorded as idle fund (Multiple sources).

suspensions include allegations of corruption and the mismanagement of funds (ITU, 2013).

4.1 Analytical framework

In order to contribute to the limited number of studies on USF in Africa, we assess the current state of funds and determine if they are delivering on their promises, we use the framework outlined in Figure 2. This framework is derived from a set of criteria identified in Jain and Raghuram (2009) and ITU (2013). Jain and Raghuram (2009) used the project life cycle strategy in their assessment of USF in India, while ITU (2013) focused on the analysis of USF and digital inclusion across selected countries in Africa, Middle East, Asia-Pacific, Europe and America. The framework, therefore, provides a list of key issues that guide our analysis of various USF across Africa.

At the heart of this framework is policy formulation. If policy is not well developed, it may impinge on the overall direction of universal service (Falch, 2007; Maddens, 2009; Connect Africa 2010). According to ITU (2013), for USF to be deployed effectively, clear and precise policies need to be developed and this partly stems from having a clear definition of universal service. The immediate and long-term success of a fund will thus depend on a robust policy formulation, and from this, other attributes of good practices will emanate. One of the key parameters here includes having a clear definition for universal service policy and setting realistic targets for USF.

[Insert Figure 2 about here]

The traditional scope or objective of universal service is the provision of fixed-voice telephony but following the advancement of mobile technologies this scope has now extended to new services like mobile and broadband (Longstaff, 1996; Xavier, 2008; Jain & Raghuram, 2009; Msimang, 2012). Therefore, the focus of universal service should no longer be solely on the provision of basic services (Levin, 2010). The key parameter here is the level of telecommunication service(s) deployed by USF including mobile voice and/or data.

Prior to liberalisation, universal service was treated as an obligation on incumbent operators but since more players entered the market it has been expanded to include other operators (Blackman, 1995; Jain & Raghuram, 2009). For the desired results of full coverage of mobile telecommunication services to be achieved there is, therefore, the need to establish a selection process for universal service providers on a competitive basis such as auction where the winner (incumbent and/or new entrant) of a bid is then responsible for

the deployment of telecommunication services in a given area (Nett 1998; Jain & Raghuram, 2009). The key criteria here is that the selection of providers should be based on a fair and competitive process that is open and equitable to all interested operators.

Another issue raised by Jain and Raghuram (2009) is the selection of targets, that is, projects or areas to fund. This involves identifying and then mapping unserved and underserved geographies. Since not all unserved and/or underserved locations can be funded at once, criteria for prioritising the most disadvantaged areas should be developed. Consequently, the selection of targets should not be the sole responsibility of policymakers but a collective process that reflects the input and participation of wider stakeholders (Thomas & Grindle, 1990; Corkery, Land, & Bossuyt, 1995; Crosby, 1996). Hence, the participation of stakeholders in the process of USF is a key parameter.

The essence of USF is to address the uneven telecommunications needs of society, as such, there is a need for those responsible for its management and implementation to be publicly accountable and transparent (Jain & Raghuram, 2009; ITU, 2013, Cramer, 2015). One of the parameters we use when measuring the level of accountability and transparency of USF is the level of publicly available financial records of income and expenditure. Another key issue highlighted in the analytical framework is performance monitoring and enforcement. Since monitoring and reviewing project impact is a key component of optimising policy formulation (Corkery, Land, & Bossuyt, 1995; NTRA, 2016), it is necessary to match expectations against performance in order to evaluate the results and develop interventions (Hudson, 1994). We, therefore, look for evidence that points to how the performance of USF is monitored and enforced across Africa.

Overall, for policymakers to successfully execute USF following the criteria presented in Figure 2, they need to have the right skill sets and competences (Gillwald, 2005; ITU, 2013). It then follows that since the success of USF partly hinges on policymakers having relevant skills, this should also be accounted for in evaluating the performance of USF in Africa by looking at personnel qualification and experience.

5. Methodology

The study adopts a multiple-case study approach (Yin, 2014) with examples drawn from across the continent. A total of 34 funds were surveyed with data derived from secondary sources such as ITU, GSMA and the World Bank, regulatory websites, research diary and electronic sources like BiztechAfrica, ITWeb Africa, Telecompaper and TeleGeography.

The process began by surveying the websites of various regulators to ascertain the universal service strategy adopted. When a strategy is identified, further triangulation is then carried out by referring to other secondary sources such as grey literature, ITU, GSMA and the World Bank databases, etc. This triangulation was necessary to verify the information provided by the regulatory websites and to also ascertain the current nature of the funds as information relating to universal service was, in some instances, obscurely placed on the websites of regulators lacking clarity and details, and was outdated or non-existing. For example, following the refusal of MNO to extend mobile coverage to communities with less than 1000 inhabitants, USF was introduced in Ghana and in 2010, 'rural telephone projects' were deployed (GIFEC, 2013). To establish the veracity of this claim we referred to ITU (2013) where this claim was not only verified but also explicitly stated that GIFEC had deployed 41 mobile towers across underserved areas including the piloting of a Last Mile Initiative at Nsaakye in the Eastern Region of the country.

Following this process, the proposed framework outlined in Figure 2 was then used to assess the performance of each fund following the criteria recounted earlier. The analysis of the 34 funds was carried out following an iterative process on a country-by-country case (Stake, 2010). In applying the framework, the parameters of Low (L), Medium (M) and High (H) were used to benchmark the performances of each fund against the criteria. For instance, if a country has up-to-date financial records of the funds collected and disbursed, 'H' would be recorded for such country indicating a relatively high level of accountability and transparency. Conversely, 'M' for countries with moderate availability of financial records, etc.

Uganda is a good case of the high level of accountability and transparency as this is the only country with the most consistent and complete financial records of income and expenditure from its inception in 2001/2002 to 2014/2015. These financial records are also publicly available on their website, hence, 'H' is recorded for Uganda for accountability and transparency. Contrast that with a country like Nigeria where the last public available financial records were at 2012 year-end, hence, 'M' was recorded because although some financial records are available, they are outdated. Some countries had no public financial records whatsoever but USF levies are being collected, for example, Cameroon, hence, 'L' is recorded indicating a lack of accountability and transparency. Overall the criteria discussed in Section 4.1 were used to assign performance parameters to each country. The complete result of this process can be found in Appendix A.

6. Discussion

From the multiple sources of evidence analysed in the assessment of the 34 established USF across Africa, it appears that only a handful of countries can be said to be relatively good examples of USF implementation following the criteria laid out in Figure 2. For example, USF in Nigeria (Universal Service Provision Fund – USPF) was established in 2007 under The Nigerian Communications Act No. 19 of 2003, Part IV. Over $146 million was collected between 2004 and 2009, and around 1.6 billion Naira in 2012 (which approximates to $10.2 million). USPF has deployed over 120 BTS, connected over 1300 schools and 74 libraries. USF in Uganda (Rural Communications Development – RCDF) was established in 2003 under the Communications Instrument of 2002. RCDF has a cumulative income and expenditure of 128 billion (which approximates to $38 million) and 126.9 billion (which approximates to $37.6 million) Uganda Shilling, respectively between 2001/2002 and 2014/2015. Over 7000 projects have undertaken executed including 24000 public payphones, 880 GSM sites, 622 broadband sites, etc. Other good examples can found in Ghana, Lesotho, Rwanda, and Tanzania.

Although these countries are relatively good examples of USF implementation in Africa, Uganda arguably satisfies all the criteria in our framework. This is particularly evident in the detailed and up-to-date financial record of the activities from the commencement of its implementation in 2001/2002 until 2014/2015, showing levies collected and funds allocated for executed and future projects. Conversely, the financial records for the other countries are somewhat patchy and outdated. It can be argued that this can bring into question the transparency and accountability of the funds as such vital information is not publicly available. USF in South Africa could have been added to this group of good examples but for the recent instability facing the fund, partly, due to allegations of corruption of board members and the irregularities associated with CEO appointments (see, for example, ITU, 2013; Bailey, 2014; van Zyl, 2014; Mzekandaba, 2016a; 2016b).

Having said that, the implementation of a majority of USF in Africa can be said to be ineffective and inefficient, underlining the findings from previous studies (Sepulveda, 2010; ITU; 2013; GSMA, 2014). This became apparent as we benchmarked their operation against the criteria outlined in Figure 2. Twelve USF are non-operational with money sitting idle while governments continue to extract levies from MNO. Furthermore, a majority of the funds seem to lack public information except for that USF have been

created and a certain percentage of MNO's revenue is being collected as levies. Overall, it becomes clear that the performance of USF in Africa is largely limited by factors such as poor policy formulation, undue political influence, lack of accountability and transparency, inadequate stakeholder engagement, etc. These findings are discussed below.

6.1 Poor policy formulation

As highlighted in Section 4.1, a well developed policy formulation is central and critical to the success of USF (Maddens, 2009). This partly stems from having a clear and precise definition of universal service policy, which, in turn, results in setting realistic targets for USF. From our survey, we found that the definition of universal service impinges on the performance of USF due to the rather vague positions that have been adopted across Africa as shown in Table 2. This translates to the setting of 'unrealistic' target(s) for USF. For example, in Kenya, CA (2017) states that "the purpose of the Fund [USF] is to support widespread access to ICT services, promote capacity building and innovation in ICT services in the country". Hence, the way universal service is defined across Africa seem to lack clarity in the sense that 'ICT services' could mean any of a wide-range of services, technologies or networks. As a consequence, the target(s) for USF seem to be 'unlimited', which is arguably unattainable.

Table 2 also suggests that no single country's definition completely captures and/or clearly delineate the underlying principles of a good universal service policy as outlined in Section 3. Therefore, one may argue that these definitions are flawed from the outset and this may lead to underachievement for universal service in the sense that a chosen mobile telecommunication service needs to be available, accessible and affordable (Oestmann & Dymond, 2008, ITU 2013). Furthermore, based on Section 3, the definition of universal service also needs to reflect need assessment and awareness as mobile telecommunications are constantly and rapidly evolving.

Having such an imprecise definition for universal service, which reflects unrealistic goal for USF and incomplete/unclear capture of the underlying principles of universal service, could prove problematic in the sense that without a more nuanced and robust definition of universal service it becomes difficult for USF to target the right set of outcomes. This is consistent with Penteriani (2016) and ITU (2013) where it was concluded that USF is failing around the world partly due to ill-conceived policies.

6.2 Selection of providers and targets

The analytical framework shows that it is critical for the selection process of USF providers to be fair, competitive and open to any interested operator. In the same light, when deciding on where to target USF, that is, when choosing disadvantaged areas, such decision should be guided by the 'public interest', that is, deploying USF to the most vulnerable places. From our analysis, the evidence suggests that this is not the case in some parts of Africa where both the selection process for USF providers and projects are marred by undue political influence. Across the funds analysed, most of the USF in Africa are administered 'independently', either by a department under the relevant ministry or by the sector regulator. Regardless, the actual 'independence' of these funds is highly debatable as it appears that government and political actors are constantly seeking to influence the operations of these funds in terms of appointments, disbursement of money collected and project allocations. An example of this undue political influence can be found in Cameroon where the Universal Service and Development Fund (FST) was established to manage the funds but the Minister of Telecommunications is the sole person authorised with disbursement (ITU, 2013).

The case of South Africa is also another instance. A former executive manager of programmes at USAASA alleged in court that he was dismissed from his position for failing to award a USF contract of 500 million South African Rand (which approximates to $42 million) based on instructions received from the African National Congress (Bailey, 2014; van Zyl, 2014; Mzekandaba, 2016a). Such practices expose the operation of USF to the manipulation of politicians which serves to undermine the funds.

6.3 Accountability and transparency

The analysis of the funds also raised the issue of accountability and transparency in terms of cash inflows and outflows as well as projects implemented. Although the various USF frameworks analysed state that the levies collected shall be properly accounted for, it appears that only governments know for certain how much is really being collected. Of the 34 countries in Africa that have a USF, over 20 countries (see Appendix A) lack up-to-date publicly available financial records for inflows and outflows of funds as well as a full account of projects they claim to have undertaken.

Although Lesotho, Nigeria, Rwanda and Tanzania are among the few examples of USF with publicly available financial records, such information is typically either insufficient and/or outdated. Uganda, however, stands out in this regard - RCDF is the only

fund out of the 34 surveyed, that has an up-to-date record of fees collected and disbursed (ITU 2013; GSMA 2014; UCC 2014).

6.4 Inadequate stakeholder engagement

Another problem encountered by USF is an inadequate representation of wider stakeholders such as MNO and local communities in the policy formulation and operation of USF. This is in contrast to the framework and other studies which stress the that the identification and involvement of a wider spectrum of relevant stakeholders are critical to the successful implementation of any universal service strategy (Smith, 2003; Choudrie, Papazafeueioulou, & Lee, 2003; Thai, Falch, & Williams, 2015). For example, although according to the ICT Act No. 5 of 2009 in Zambia, the Board of Zambia Information and Communications Authority should include one representative apiece from stakeholders such as ICT Ministry, Home Affairs Ministry, Trade Union, National Farmers Union, etc. (ZICTA, 2015), the regulatory body was criticised by other stakeholders such as MNO who felt they were not duly represented on the board (Connect Africa, 2010). Furthermore, representation from civil society was also not considered (Connect Africa, 2010). For the case of Kenya, see, for example, Wanjiku (2014) and CA (2017).

Uganda, however, provides a good example in Africa as the board composition of the RCDF include representation from a diverse group. The collective inputs from this group of representatives are evident in the success recorded by RCDF. Nigeria is another good case of how stakeholders consultation can help to optimise USF (Esselaar, Gillwald, & Stork, 2007).

6.5 Lack of performance monitoring and enforcement

Another impediment to the success of USF across Africa is a lack of performance monitoring and enforcement. It was highlighted in the analytical framework that as it is not sufficient to award USF contracts, policymakers should also consider how to monitor progress and enforce sanctions where operators default. Evidence from our survey shows that this is not the case. The regulatory authority in South Africa imposed various 'universal access and service obligations' on operators in the country in 2013 with the outcomes ranging from partial implementation to non-implementation. For example, Cell C was to provide internet access to 5000 public schools across the country but only 81 schools were actually connected (ICASA, 2013). Vodacom was to provide 2.5 million SIM cards to underserved areas but this was not implemented (ICASA, 2013). Despite the non-compliance, there is no evidence to suggest that any sanction was imposed.

Although countries across Africa have instituted various kinds of sanctions there is limited evidence to suggest there is actual enforcement against defaulters. From our survey, only a handful of regulators, such as Rwanda Public Utilities Regulatory Agency (RURA), have actually sanctioned an MNO for falling short of their obligation (see, for example, Balancing Act, 2011; Cellular News, 2011). In countries where the practice of a lack of performance monitoring and enforcement persist, the success of USF will be limited as operators are not held accountable for their commitment to coverage expansion.

6.6 The scope of universal service

Despite the rapid technological changes that have occurred across Africa following the liberalisation of the sector and subsequent mobile revolution, the provision of fixed public telephones is still enshrined in most universal service policies. This is somewhat surprising considering that the adoption of mobile telephony has outstripped fixed line by a considerable margin (Minges, 1998; Economist, 2005; Falch & Henten, 2008; ITU, 2015). Furthermore, although USF across Africa are used to construct telecentres in disadvantaged areas, more often than not, they are not sustainable as a result of factors such as the relevance of services offered and lack of electricity to power computers. See, for example, Mtega and Malekani (2009) for an in-depth analysis of four rural communities in Tanzania.

Since mobile telecommunications has helped to overcome some of these challenges, one is left puzzled as to why certain universal service policies in Africa still place emphasis on the provision of fixed telephones and telecentres with desktops and not mobile devices? Considering that majority of Africans access telecommunications through mobile devices (Manson, 2013), and the sharp decrease of fixed line, one would expect that the evolution of mobile technologies should be a prime focus that is captured in universal service policy (Bohlin, 2016). Some countries - for example, Egypt, Ghana, Lesotho, Nigeria, Rwanda and Uganda - are already doing this as demonstrated through the projects funded by their respective USF.

6.7 Inadequate skills and competencies

The discussion in Section 4.1 emphasised the importance of having regulatory bodies with the right skill sets so as to enable them to execute their regulatory functions such as policy formulation, performance monitoring and enforcement and stakeholder engagement. The criteria presented in the analytical framework cannot be operationalised without adequate regulatory skills and competence. It goes, therefore, without saying that regulatory skills

and competences are a key factor that links all the criteria in the framework together. This is exemplified in Gillwald (2005: 473), who states that "the structural flaws in the policy [of South Africa] were compounded by the paucity of specialised skills in the regulator …".

The regulatory authoriies typically in charge of USF are challenged by their lack of relevant skills across a whole swathe of areas such as technical, economics and legal needed to manage and deploy the funds (Smith, 2003). Countries in Africa are also not exempted from this challenge as illustrated by the few studies on USF in Africa (Connect Africa, 2010; GSMA, 2014). These studies demonstrate that a shortage of regulatory skills has hindered the management and implementation of USF. This poses a threat to the successful deployment of funds considering the level of complexity that may be involved in the process in terms of costing a project, choosing the right location for deployment and then managing it (Connect Africa 2010; Hudson 2010; ITU, 2013). This is illustrated in Alfreds (2016) where findings for South Africa can be observed.

One of the reasons why this is prevalent in many countries in Africa is that regulators face challenges in attracting and then retaining qualified professionals partly because of the salary limitations associated with the civil service compared to those available in the private sector (Smith, 2003). Undue political influence can also compound this problem, where a more qualified candidate may be overlooked as a result of the person not having ties with the ruling political party (see, for example, Moyo, 2016; Mzekandaba, 2016a and 2016b).

7. Conclusion

In this paper, we have examined the performance of 34 USF in Africa through a multiple case approach with the aid of the analytical frame outlined in Figure 2. The framework argues that policy formulaion is at the heart of a smooth implementation of universal service policy in the sense that if the right policy is not well developed, it may have a negative effect on the overall direction of universal service (Maddens, 2009; Connect Africa 2010). Using this framework to benchmark the performance of USF in Africa, we found that USF in Africa is largely limited by a range of issues such as poor policy formulation, undue political influence, lack of accountability and transparency, inadequate stakeholder engagement, lack of performance monitoring and enforcement, the narrow scope of universal service, inadequate regulatory skills, corrupt practices and inadequate data. The analysis showed that though USF can be successful, there is considerable

variation across Africa. Whilst this study draws parallels from across Africa, its findings are largely consistent with Gillwald (2005) that focused on South Africa. This serves to reinforce the argument that countries across the continent face dynamic but similar challenges when it comes to deploying USF as a policy tool for bridging the gaps in mobile telecommunications coverage.

We also contribute to the literature through highlighting the need to add two more components – needs assessments and awareness – to the existing three principles of universal service – availability, affordability and accessibility. By ascertaining the actual mobile telecommunication need(s) of a given community and making sure the people are aware of what services are there and ensuring that they also possess the necessary skills to use them, has as much importance as to ensuring the availability, accessibility, and affordability of mobile telecommunications services.

Although the main focus of this paper is not on the improvement of universal service policy, the argument made that extends the underlying principles to include needs assessment and awareness is central to the focus of this study - universal service of mobile telecommunications and what that constitute is constantly and rapidly changing. Moreover, when universal service was first conceived around 1907 (Mueller, 1993), the unprecedented use of mobile telephony and the ubiquitous information society we now live in did not exist. Hence, as mobile telecommunications evolve, the underlying principles for measuring universal service should reflect such changes otherwise mobile telecommunications may be provided and made available, accessible and affordable but may not address the information needs of a given community.

Furthermore, without relevant skills to use what is provided, low mobile adoption and underutilisation/redundancy of networks may persist. This can be partly observed in countries such as Kenya and South Africa where the promotion of digital literacy is included as one of the targets of universal service policy (see, for example, CA, 2017; USAASA, 2017). Thus, the five principles suggested in Section 3 are at the heart of developing USF that will build a digital society based on mobile telecommunications.

Our analysis is, of course, not without its limitations. Notwithstanding our effort to collect data and triangulate it, consistent data is lacking across Africa and this undermines our ability to compare and contrast the performance of USF. This could be mitigated if policymakers made relevant data available in the public domain. Perhaps stakeholders such as civil society have a role to play here in encouraging and/or pressurising policymakers to be more transparent and open regarding the management of USF. Furthermore, although

this study has shown, among other things, how different components within universal service framework interact, the challenges identified from this complex and dynamic relationship have not been fully addressed. Therefore, we propose the need for future research to address these challenges and develop our framework to achieve improvements in universal service policy. Such a study could also focus on helping to unravel some of the intractable areas of universal service such as determining what services should fall within the scope of universal service and how to prevent policy redundancy in a fast moving industry such as mobile telecommunications? The research could also identify who are the relevant stakeholders that policymakers should engage with, and what role should they play in the process?

Table 1: Definition of universal service policy from the literature

Source	Definition
Muller (1993: 353)	"In its common modern construction, universal telephone service means reaching every member of society, no matter how remote or poor."
Blackman (1995: 172)	"… access to telecommunication services as a basic right of all citizens… which is essential for full participation in the community and as a basic element of the right to freedom of expression… covering universal geographical availability, non-discrimination access, reasonable costs or affordability…"
Nett (1998: 661)	"Universal service in telecommunications comprises that a minimum standard of services has to be supplied to everybody at an affordable price."
Hasbi (2015: 422)	"It [universal service] aims to guarantee that affordable access to a minimum set of communication services of specified quality subsists after the end of the public monopoly."

**Table 2: Definition of universal service policy from practices across Africa**

Country	Definition	Source
Egypt	Egypt defines universal service as "… the provision of affordable basic telecommunication services to all citizens, especially in the economically non-feasible regions. This includes as well the fax and data services with speed rates that allow for accessing the internet within framework of technology neutrality and competitive environment".	NTRA (2017)
Malawi	Malawi delineated universal service from universal access and defined them thus: Universal access as "… allowing everyone in the country to have access to ICT facilities within a reasonable distance and at a reasonable cost". Universal service as "…a policy of the Government to make ICT services, including advanced ICT services available throughout the country at affordable prices so that they are either available or easily accessible to anyone whenever they are needed, regardless of their geographic or physical location, and with due regard to people with special needs".	MACRA (2013)
Morocco	In Morocco, universal service is defined as "… a mechanism to allow, in the long term, access to the entire Moroccan population to basic telecommunication services: telephony and internet".	ANRT (2017)
Nigeria	Universal service in Nigeria is seen as the promotion of "…the achievement of national policy goals for universal access and universal service to information and communication technologies (ICTs) in rural, un-served and under-served areas in Nigeria".	USPF (2015)
South Africa	In South Africa, it is referred to as "Universal service and access to facilitate the establishment of access to Information and Communication Technology (ICT) services in partnership with all stakeholders towards achievement of an information society".	USAASA (2017)
Tanzania	Tanzania defines universal service as "a minimum set of communications services of specified quality which is available to all users independent of their geographical location, and in the light of specific national conditions, at an affordable price."	UCSFA (2014)

Figure 1: USF levies across 34 African countries
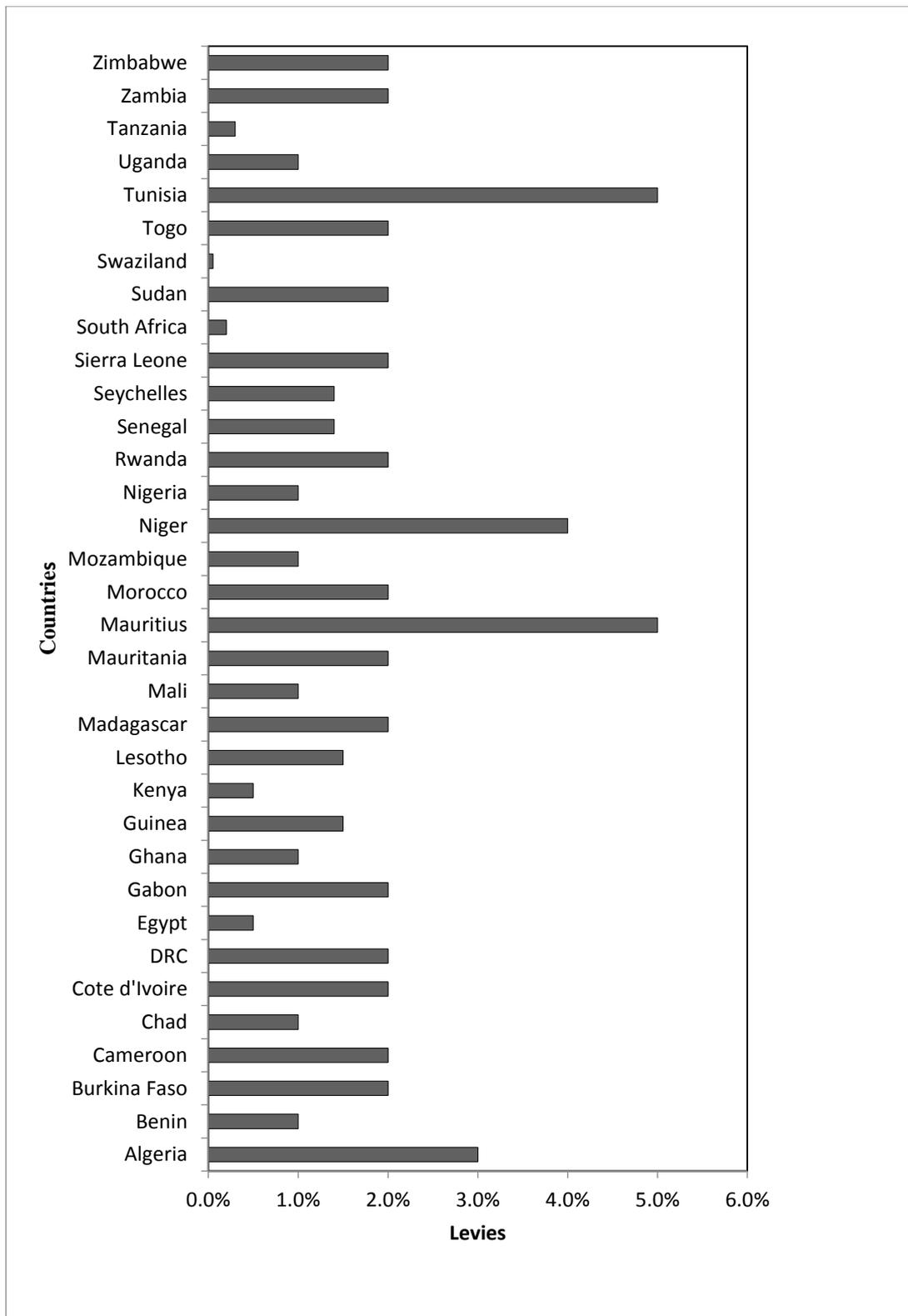
Sources: Compiled by the authors from a variety of sources such as governments, regulators, industry reports, ITU and GSMA databases, etc.

Figure 2: Framework for assessing USF in Africa
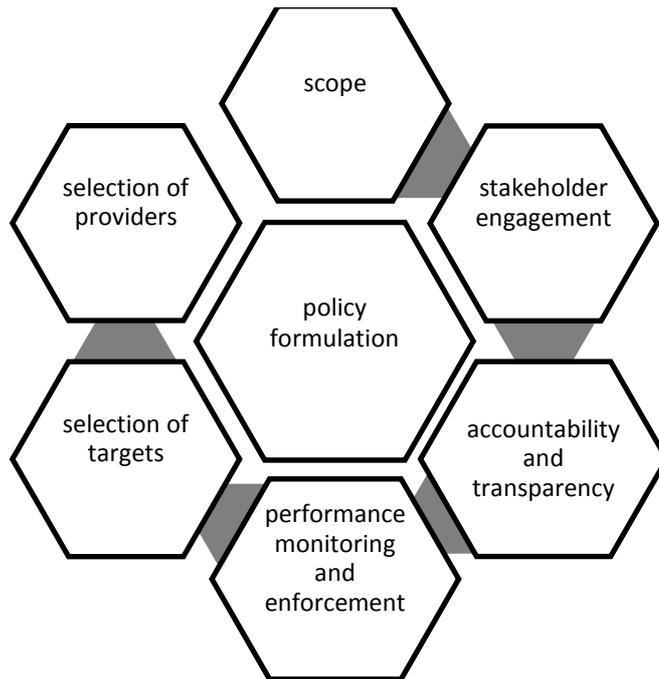
Sources: Adapted from Jain and Raghuram (2009) and ITU (2013).

Appendix A: Performances of USF across Africa

Country	Criteria							
	policy formulation	scope	selection of providers	selection of targets	stakeholder engagement	accountability and transparency	performance monitoring and enforcement	remarks
Algeria	-	-	-	-	-	-	-	-
Benin	-	-	-	-	-	-	-	-
Burkina Faso	H	H	H	H	H	M	L	Non-operational
Cameroon	L	L	H	L	L	L	L	Operational, mainly telecentres
Chad	L	L	-	-	-	L	-	Operational
Cote d'Ivoire	H	L	H	-	-	M	-	Operational
DRC	L	L	-	-	-	M	L	Non-operational, funds deposited directly to treasury
Egypt	H	H	H	H	-	-	-	Operational
Gabon	L	L	H	L	L	L	L	Non-operational,
Ghana	H	H	H	H	H	M	H	Operational
Guinea	H	H	-	-	-	L	-	Operational
Kenya	-	-	-	-	-	-	-	Still at the process of establishment
Lesotho	H	H	H	H	H	M	H	Operational
Madagascar	H	L	H	H	-	M	-	Operational

Mali	-	-	-	-	-	-	-	Non-operational
Mauritania	-	-	-	-	-	M	-	Non-operational
Mauritius	H	H	H	L	H	L	-	Operational, some operators have refused to continue their contributions due to the nature of its operations
Morocco	H	-	H	H	-	L	-	Operational
Mozambique	L	L	H	-	-	L	-	Operational
Niger	-	-	-	-	-	-	-	Non-operational
Nigeria	H	H	H	H	H	M	H	Operational
Rwanda	H	H	H	H	H	M	H	Operational
Senegal	-	-	-	-	-	-	-	Non-operational
Seychelles	-	-	-	-	-	-	-	-
Sierra Leone	-	-	-	-	-	-	-	Non-operational
South Africa	H	H	H	H	M	L	-	Operational, but temporarily suspended in 2011 when Board members were suspended due to allegation of corruption, funds are deposited in the National Treasury even when an independent body is

								responsible for managing the funds
Sudan	H	H	-	-	-	L	L	Operational
Swaziland	H	H	-	-	-	L	-	Disbursed $6M to MTN in 2009 and became non-operational
Tanzania	H	H	H	H	H	M	H	Operational
Togo	H	L	H	H	L	L	-	Operational
Tunisia	-	-	-	-	-	-	-	Non-operational
Uganda	H	H	H	H	H	H	H	Operational
Zambia	H	L	L	-	-	L	-	Non-operational
Zimbabwe	L	L	H	L	L	L	L	Non-operational

Data sources: Compiled by the authors from a variety of sources such as governments, regulators, industry reports, ITU and GSMA databases etc

References

A4AI. (2017). *A4AI Affordability Report 2015/16.* Washington DC: Alliance for Affordable Internet. Retrieved from Alliance for Affordable Internet.

Abdullahi, M. (2012, October 8-10). *Universal Service/Universal Access methodology*. Retrieved from The Universal Service Provision Fund (USPF): http://www.uspf.gov.ng

AfDB. (2013). *Connecting Africa: An Assessment of Progress Towards the Connect Africa Summit Goals.* Abidjan: African Development Bank Group.

Aker, J. C., & Mbiti, I. M. (2010). Mobile Phones and Economic Development in Africa. *Journal of Economic Perspectives, 24*(3), 207-232.

Alfreds, D. (2016, May 12). *USAASA Faces Shortfall on Broadband Roll-Out*. Retrieved July 26, 2016, from Fin24: http://www.fin24.com

Alleman, J., Rappoport, P., & Banerjee, A. (2010). Universal Service: A New Definition? *Telecommunications Policy, 34*(1-2), 86-91.

Ameen, N., & Willis, R. (2016, January 26). Current and Future Challenges Facing the Mobile Telecommunications Industry in the Arab World. *Proc. Of The 3rd World Congress on Computer Applications and Information Systems, Dubai*.

AMTW. (2014). *Africa & Middle East Mobile Factbook 2Q 2014.* London: Blycroft Publishing.

ANRT. (2017). *Presenting the Universal Service*. Retrieved from The National Telecommunications Regulatory Agency (ANRT): https://www.anrt.ma

APRT. (2003). Decrees. *Official Journal of the Republic of Algeria, 39*. Retrieved from The Postal and Telecommunications Regulatory Authority (APRT): https://www.arpt.dz

Bailey, C. (2014, June 22). *Special Investigating Unit Nails Dina Pule's Man.* Retrieved April 18, 2016, from http://www.iol.co.za

Balancing Act. (2011). *Rwandatel's License Revoked Permanently, Says RURA*. Retrieved April 15, 2015, from Balancing Act: http://www.balancingact-africa.com

Balancing Act. (2014, June 27). *Africa's Untold Universal Service Agency Story – Reaching the Parts Others Don't Reach*. Retrieved from Balancing Act: http://www.balancingact-africa.com

Batura, O. (2014). Universal Service in the EU Information Society Policy. *info, 16*(6), 24-34.

Batura, O. (2015). Can a Revision of the Universal Service Scope Result in Substantive Change? An Analysis of the EU′s Universal Service Review Mechanism. *Telecommunications Policy, 40*(1), 14-21. doi:doi:10.1016/j.telpol.2015.11.007

Batura, O. (2016). Liberalisation of Telecommunications Services: Social Embedding of the Liberalised Market as a Regulatory Challenge. In O. Batura, *Universal Service in WTO and EU law* (pp. 11-61). The Hague: TMC Asser Press.

Berg, S. V., & Hamilton, J. (2002). Institutions and Telecommunications Performance in Africa: Stability, Governance, and Incentives. In S. Berg, M. Pollitt, & M. Tsuji (Eds.), *Private Initiatives in Infrastructure: Priorities, Incentives, and Performance.* Chiba: Institute of Developing Economies, Japan.

Blackman, C. R. (1995). Universal Service: Obligation or Opportunity. *Telecommunications Policy, 19*(3), 171-176.

Bohlin, E. (2016). Where is the EU Going in Universal Service? *Pacific Telecommunications Council Research Workshop 17–20 January 2016.* Honolulu, Hawaii: The Pacific Telecommunications Council.

CA. (2017). *Universal Access: Overview*. Retrieved from Communications Authority of Kenya (CA): http://www.ca.go.ke

Castells, M. (1998). The Rise of the Fourth World: Informational Capitalism, Poverty, and Social Exclusion. In *End of Millennium* (pp. 71-165). Oxford: Blackwell Publishers Inc.

Cellular News. (2011). *Half a Million Rwandans Face Cell Phone Disconnection This Week*. Retrieved April 15, 2015, from http://www.cellular-news.com

Chavula, H. K. (2013). Telecommunications development and economic growth in Africa. *Information Technology for Development, 19*(1), 5-23.

Choudrie, J., Papazafeueioulou, A., & Lee, H. (2003). Applying Stakeholder Theory to Analyze the Diffusion of Broadband in South Korea: The Importance of the Government's Role. *ECIS 2003 Proceedings, 46.*

Clarke, G. R., & Wallsten, S. J. (2002). *Universal(ly Bad) Service: Providing Infrastructure Services to Rural and Poor Urban Consumers.* Washington, DC: The World Bank.

Collins, G. (2015). *Connecting Africa from the Village Up*. Retrieved January 19, 2016, from Linkedin: https://www.linkedin.com

Connect Africa. (2010). *Universal Service and Access Funds Research Report: Challenges to the effective use of USAFs*. Retrieved from Connect Africa Services: http://www.connectafrica.net

Corkery, J., Land, A., & Bossuyt, J. (1995). *The Process of Policy Formulation: Institutional Path or Institutional Maze?* Maastricht: European Centre for Development Policy Management: Policy Management Report 3.

Cramer, B. W. (2015). Privacy Exceptionalism and Confidentiality versus the Public Interest in Uncovering Universal Service Fraud. *Communication Law and Policy, 20*(2), 149-190.

Crosby, B. L. (1996). Policy Implementation: The Organizational Challenge. *World Development, 24*(9), 1403-1415.

Curwen, P., & Whalley, J. (2014). *Mobile Telecommunications Networks: Restructuring as a Response to a Challenging Environment.* Cheltenham, Northampton: Edward Elgar.

Dordick, H. S. (1990). The Origins of Universal Service: History as a Determinant of Telecommunications Policy. *Telecommunications Policy, 14*(3), 223-231.

Economist. (2005, March 10). *Technology and Development: The Real Digital Divide*. Retrieved from The Economist: http://www.economist.com

Esselaar, S., Gillwald, A., & Stork, C. (2007). *Towards an African e-Index 2007 Telecommunications Sector Performance in 16 African Countries: A Supply-side Analysis of Policy Outcomes*. Retrieved from Research ICT Africa: https://www.researchictafrica.net

Falch, M. (2007). Penetration of Broadband Services – The Role of Policies. *Telematics and Informatics, 24*(4), 246–258.

Falch, M., & Henten, A. (2008). Investment Dimensions in a Universal Service Perspective: Next Generation Networks, Alternative Funding Mechanisms and Public-Private Partnerships. *info, 10*(5/6), 33-45.

Feijoo, C., & Milne, C. (2008). Re-thinking Universal Service Policy for the Digital Era: Setting the Scene-An Introduction to the Special Issue on Universal Service. *info, 10*(5/6), 4-11.

Feijoo, C., Gomez-Barroso, J., & Karniti, E. (2007). More than Twenty Years of European Policy for the Development of the Information Society. *Networks and Communication Studies, NETCOM, 21*(1-2), 9-24.

Foster, V., & Briceño-Garmendia, C. (2010). *Africa's Infrastructure: A Time for Transformation.* Washington, DC: IBRD and the World Bank.

Gebreab, F. A. (2002). *Getting Connected: Competition and Diffusion in African Mobile Telecommunications Markets.* Washington, DC: The World Bank.

GIFEC. (2013). *GIFEC In History*. Retrieved January 12, 2016, from Ghana Investment Fund for Electronic Communications: http://www.gifec.gov.gh

Gillwald, A. (2005). Good Intentions, Poor Outcomes: Telecommunications Reform in South Africa. *Telecommunications Policy, 29*(7), 469-491.

Gillwald, A. (2007). Between Two Stools: Broadband Policy in South Africa. *Southern African Journal of Information and Communication, 8*(1), 53-77.

Gillwald, A. (2011, October 07). *SA Fails Test of Network Society*. Retrieved from Mail & Guardian Online: https://mg.co.za

Gómez, R., & Martínez, J. (2000). *Beyond Connectivity: New Information and Communication Technologies for Social Development*. Retrieved April 07, 2016, from https://idl-bnc.idrc.ca

GSMA. (2011). *European Mobile Observatory 2011.* London: GSMA.

GSMA. (2014). *Sub-Saharan Africa-Universal Service Fund Study.* London: GSMA.

GSMA. (2016, July 26). *Number of Unique Mobile Subscribers in Africa Surpasses Half a Billion, Finds New GSMA Study.* Retrieved July 29, 2016, from GSMA Newsroom: http://www.gsma.com/newsroom

GSMA. (2017, March 01). *Definitive Data and Analysis for the Mobile Industry*. Retrieved February 27, 2015, from GSMA Intelligence: https://www.gsmaintelligence.com

Hasbi, M. (2015). Universal Service Obligations and Public Payphone Use: Is Regulation Still Necessary in the Era of Mobile Telephony? *Telecommunications Policy, 39*(5), 421-435.

Hatta, M. C. (2008). Universal Service Obligations and Spectrum Policy. *info, 10*(5/6), 59-69.

Hudson, H. (1994). Universal Service in the Information Age. *Telecommunications Policy, 18*(8), 658-667.

Hudson, H. E. (2006). Toward Universal Access: Strategies for Bridging Digital Divides. In H. E. Hudson, *From Rural Village to Global Village: Telecommunications for Development in Information Age* (pp. 83-99). New York: Routledge.

Hudson, H. E. (2010). Universal Service Policy: Are they Accelerators or Anachronisms? *Inter Media, 38*(1), 16-21.

Hudson, H. E., & Rockefeller, J. (2009). *The Future of the E-Rate: US Universal Service Fund Support for Public Access and Social Services.* Lanham, MD: University of San Fransico.

ICASA. (2013, November 27). *Government Gazette Staatskoerant Vol. 581 No. 37071.* Retrieved March 02, 2017, from Independent Communications Authority of South Africa (ICASA): https://www.icasa.org.za

Irwin, T., & Brook, P. (2003). Private Infrastructure and the Poor: Increasing Access. In P. J. Brook, & T. C. Irwin (Eds.), *Infrastructure for Poor People: Public Policy for Private Provision* (pp. 1-19). Washington, DC: The World Bank.

ITU. (1999). *World Telecommunication Development Report: Mobile Cellular.* Geneva: ITU.

ITU. (2013). *Universal Service Fund and Digital Inclusion for all Study.* Geneva: ITU.

ITU. (2015, May). *The World in 2015: ICT Facts and Figures.* Retrieved from ITU: https://www.itu.int

ITU. (2016). *Measuring the Information Society Report 2016.* Geneva: International Telecommunications Union.

ITWeb. (2016, May 24). *USAASA Welcomes its New CEO.* Retrieved July 25, 2016, from ITWeb: http://www.itweb.co.za

ITWeb Africa. (2017, February 27). *Connectivity as a Service Rollout in Rwanda.* Retrieved from ITWeb Africa: http://www.itwebafrica.com

Jain, R., & Das, P. (2001). A Framework for Assessing Universal Service Obligations: A Developing Country Perspective. Washington, DC: A Paper presented at the Telecommunications Policy Research Conference.

Jain, R., & Raghuram, G. (2009). Role of Universal Service Obligation Fund in Rural Telecom Services: Lessons from The Indian Experience. *Indian Institute of Management.* Retrieved June 07, 2015, from www.iima.ac.in

Jobodwana, Z. N. (2009). Telecommunications Liberalisation in Africa: Proposed Regulatory Model for the SADC Region. *Journal of Digital Forensics, Security and Law, 4*(4), 73-94.

Kapoor, K. (2016). Dimensions of Digital Divide: Study of Gujarat. In N. Ruparel, & V. Modi (Eds.), *Management and Research Practices in Emerging Markets* (pp. 288-299). Ahmedabad: B.K. School of Management.

Kawash, J., El Morr, C., Charaf, W., & Taha, H. (2005). Building Mobile Virtual Communities for Public Transport Awareness. *2nd International Conference on Mobile Technology, Applications and Systems* (pp. 1-7). IEEE.

Lee, S. (2014). Smart Divide: Paradigm Shift in Digital Divide in South Korea. *Journal of Librarianship and Information Science*, 1-9.

Levin, S. L. (2010). Universal Service and Targeted Support in a Competitive Telecommunications Environment. *Telecommunications Policy, 34*(1-2), 92-97.

Longstaff, P. H. (1996). Telecommunications Competition and Universal Service: The Essential Tradeoff. *Program on Information Resources Policy, Harvard University, Center for Information Policy Research* (pp. P-96-2). Cambridge, MA: Harvard University.

MACRA. (2013). *National ICT Policy: An ICT Led Malawi.* Retrieved from Malawi Communications Regulatory Authority: www.macra.org.mw

Madden, G. (2010). Economic Welfare and Universal Service. *Telecommunications Policy, 34*(1-2), 110-116.

Maddens, S. (2009). *Trends in Universal Access and Service Policies: Changing Policies to Accommodate Competition and Convergence*. Retrieved November 27, 2015, from https://www.itu.int

Mamabolo, M. (2016a, July 26). *Latest From Mobile 360 Africa Conference.* Retrieved August 02, 2016, from ITWeb Africa: http://www.itwebafrica.com

Mamabolo, M. (2016b, July 27). *'Increase in mobile subscribers in Africa is a test for the industry'.* Retrieved August 02, 2016, from ITWeb Africa: http://www.itwebafrica.com

Mamabolo, M. (2016c, August 19). *Intelsat to Launch New Satellites*. Retrieved August 19, 2016, from ITWeb Africa: http://www.itwebafrica.com

Manimohan, M. (2013, November 14). *Mobile Technology: Time to Rethink Universal Service Funds*. Retrieved April 07, 2016, from The Africa Report: http://www.theafricareport.com

Manson, K. (2013, March 14). *Africa Takes Lead in Mobile Revolution*. Retrieved May 20, 2016, from Financial Times: https://www.ft.com

McCormick, P. K. (2005). The African Telecommunications Union: A Pan-African Approach to Telecommunications Reform. *Telecommunications Policy, 29*(7), 529-548.

MIC. (n.d.). *Universal Service Policy in Japan*. Retrieved from Government of Japan
Ministry of Internal Affairs and Communications (MIC): http://www.soumu.go.jp

Milne, C. (1998). Stages of Universal Service Policy. *Telecommunications Policy, 22*(9),
775-780.

Minges, M. (1998). *African Telecoms: Private Sector To The Rescue?* Geneva:
Telecommunication Development Bureau, ITU.

Moyo, A. (2016, June 15). *USAASA's New CEO Confident in Stability.* Retrieved July 04,
2016, from ITWeb: http://www.itweb.co.za

Msimang, M. (2012). The More Things Change, the More they Stay the Same: Strategies
for Financing Universal Broadband Access. In *Trends in Telecommunication
Reform 2012: Smart Regulation for a Broadband World* (pp. 79-109). Geneva:
ITU.

Mtega, W. P., & Malekani, A. W. (2009). Analyzing the Usage Patterns and Challenges of
Telecenters Among Rural Communities: Experience From Four Selected
Telecenters in Tanzania. *International Journal of Education and Development
using ICT, 5*(2).

Mueller, M. (1993). Universal Service in Telephone History. *Telecommunications Policy,
17*(5), 352-369.

Muriu, D. W. (2002). Paying Lip-Services to the Principles of Regulation: A Comparative
Critique of Kenya's Telecommunications Law. *Journal of African Law, 46*(1), 14-
30.

Musila, J. W., & Sigue, S. P. (2006). Accelerating Foreign Direct Investment Flow to
Africa: From Policy Statements to Successful Strategies. *Managerial Finance,
32*(7), 577 - 593.

Mzekandaba, S. (2016a, April 18). *USAASA CEO Makes Quiet Exit.* Retrieved April 18,
2016, from ITWeb: http://www.itweb.co.za

Mzekandaba, S. (2016b, August 01). *Legal Drama Brewing for Muthambi.* Retrieved
August 02, 2016, from ITWeb: http://www.itweb.co.za

Nett, L. (1998). Auctions: An Alternative Approach to Allocate Service Obligations.
Telecommunications Policy, 22(8), 661-669.

NTRA. (2017). *Universal Service*. Retrieved July 28, 2016, from National Telecom
Regulatory Authority: http://www.tra.gov.eg/en

Nyambura-Mwaura, H., & Akam, S. (2013, January 31). *Telecoms Boom Leaves Rural Africa Behind*. Retrieved November 18, 2015, from Reuters: http://www.reuters.com

OECD. (2000). Realising the Potential of Electronic Commerce for SMEs in the Global Economy. *Conference for Ministers Responsible for SMEs and Industry Ministers, 14-15 June, Workshop 3* (pp. 1-37). Bologna: OECD.

Oestmann, S., & Dymond, A. (2008). *Universal Access and Service: Module 4, ICT Toolkit.* Washington, DC: infoDev and ITU.

Ofcom. (2016, April 07). *Designing the Broadband Universal Service Obligation - Final Report to Government*. Retrieved from The Office of Communications: https://www.ofcom.org.uk

Ojo, T. (2016). Global Agenda and ICT4D in Africa: Constraints of Localizing 'Universal Norm'. *Telecommunications Policy, 40*(7), 704-713.

Okerlund, V. W., Parsons, R. j., & Hulterstrom, W. E. (1995). Needs Assessment Update: Establishing a Tradition of Integrated Evaluation and Awareness. *National Civic Review, 48*(1), 48-54.

Penteriani, G. (2016, April 18). *Are Universal Service Funds an Effective Way to Achieve Universal Access?* Retrieved from GSMA: http://www.gsma.com

Sepulveda, E. (2010). *Universal Access and Service Funds (UASFs) in the Sub-Saharan Africa (SSA) Region.* Geneva: ITU.

Simon, J. P. (2008). Universal Service: Between Socio-Political Mythology and Economic Reality-An International Cross Comparison EU-USA of the Regulatory-Economic Framework. *info, 10*(5/6), 138-151.

Smith, W. (2003). *Regulating Infrastructure for the Poor: Perspectives on Regulatory System Design.* Washington, DC: The World Bank.

Southwood, R. (2017, March 10). *Falling Into the Cracks in Data Coverage – How a Village Close to the Fibre and 45 Minutes From Nairobi Can't Get Data Access*. Retrieved March 23, 2017, from Balancing Act: http://www.balancingact-africa.com

Srinuan, C. (2014). Uncertainty of Public Pay Phone in Thailand: Implications for the Universal Service Obligation. *Telecommunications Policy, 38*(8-9), 730-740.

Stake, R. E. (2010). *Qualitative Research: Studying How Things work*. New York: The
	Guilford Press.

Sutherland, E. (2009). Counting Customers, Subscribers and Mobile Phone Numbers. *info,
	11*(2), 6-23.

Sutherland, E. (2014). *Mobile Telecommunications in Africa: Issues for Business,
	Government and Society*. Retrieved March 17, 2016, from SSRN:
	https://papers.ssrn.com

Telecompaper. (2016, May 04). *USAASA Appoints CEO and Sentech Names New CFO*.
	Retrieved July 25, 2016, from Telecompaper: http://www.telecompaper.com

Thai, D. M., Falch, M., & Williams, I. (2015). The Role of Stakeholders on Implementing
	Universal Services in Vietnam. *Paper Presented at 26th European Regional
	Conference of the International Telecommunications Society, Madrid, 24-27 June.*

Thomas, D. (2013). *Mideast Operators Join Race For African Telecoms*. Retrieved
	November 01, 2014, from http://www.ft.com

Thomas, J. W., & Grindle, M. S. (1990). After The Decision: Implementing Policy
	Reforms in Developing Countries. *World Development, 18*(8), 1163-1181.

UCC. (2015). *Rural Communications Development Fund: 10 Years of RCDF*. Kampala:
	Uganda Communications Commission.

UCSAF. (2015). *Rural Telecommunications Project: December 2015, Including Phase 1,
	Phase 1A, Phase 1B, Border & Special Zones, Phase 2A and Phase 2B Projects*.
	Retrieved July 25, 2016, from Universal Communications Service Access Fund:
	http://www.ucsaf.go.tz

USAASA. (2017). *About USAF*. Retrieved from Universal Service and Access Agency of
	South Africa (USAASA): http://www.usaasa.org.za

USPF. (2015). *About USPF*. Retrieved from Universal Service Provision Fund (USPF):
	http://www.uspf.gov.ng

van Zyl, G. (2014, June 25). *USAASA CEO Zami Nkosi Reacts to SIU Court Action*.
	Retrieved April 18, 2016, from ITWeb: http://www.itwebafrica.com

Wanjiku, R. (2014). *Kenya starts Universal Service Fund Implementation*. Retrieved
	December 01, 2015, from IDG News Service: http://www.itworld.com

Wirzenius, A. (2008). Telecommunications Universal service in Finland. *info, 10*(5/6),
	107-120.

World Bank. (2015). *Data Bank*. Retrieved February 21, 2015, from
	http://data.worldbank.org

Xavier, P. (1997). Universal Service and Public Access in the Networked Society. *Telecommunications Policy, 21*(9/10), 829-843.

Xavier, P. (2008). From universal Service to Universal Network Access. *info, 10*(5/6), 20-32.

Xavier, P., & Cave, M. (1995). *Universal Service Obligations in a Competitive Telecommunications Environment.* Paris: OECD.

Xia, J. (2016). Universal Service Policy in China (I): Institutional Elements and Ecosystem. *Telecommunications Policy, 40*(2-3), 242-252.

Yin, R. K. (2014). *Case Study Research: Design and Methods* (5th ed.). Thousand Oaks, California: SAGE Publications.

ZICTA. (2015). *About Us.* Retrieved July 27, 2016, from Zambia Information and Communications Authority: http://www.zicta.zm