Bridging the digital divide in Africa via universal service funds: An institutional theory perspective

Journal:	*Information Technology & People*
Manuscript ID	ITP-01-2023-0042
Manuscript Type:	Article
Keywords:	Digital divide < Phenomenon, Institutional theory < Theory, Qualitative method < Method, Mobile communication < Technology, Social inclusion < Theoretical concept, Developing countries < Study setting

Bridging the digital divide in Africa via universal service funds: An institutional theory perspective

Abstract

Purpose – The purpose of this paper is to provide evidence-based policy recommendations for improving the implementation of universal service funds (USF) with a view to closing the digital divide in Africa.

Design/methodology/approach – The paper adopts a qualitative approach that draws examples from various African countries supported by 25 interviews from key stakeholders with hands-on experience and roles that shape telecommunications policy in Africa and other developing countries.

Findings – Our findings point out that institutional voids which characterize several African countries inhibit the effectiveness of USF in African countries. We identify several institutional and organisational factors and explain how they negatively affect the performance of USF. We find that in order to overcome these obstacles, there is a need for a clear redefinition of UAS policies, restructuring the governance of USF, encouraging cross-sectoral collaborations, and bottom-up initiatives to bridge the digital divide in African countries.

Originality/value – The paper contributes to the underexplored USF literature by shedding light on the role of institutional factors in determining the success of USF. The paper thus complements and provides a different perspective on promoting digital inclusion in Africa from the viewpoint of institutional voids, bringing new insights into the existing literature on how to deal with an intractable area of UAS policy and the wider digital divide debate in developing countries.

Keywords: Africa**;** digital divide; institutional voids; mobile telecommunications; universal service funds

Paper type: Research paper

1. Introduction

Information and Communication Technologies (ICTs) are a crucial part of the modern society. Specifically, mobile telecommunications are increasingly becoming a critical socio-economic enabler (Dey et al., 2019). Despite their importance, there are serious inequalities in accessing mobile telecommunications across the world (Park et al. 2015). Most of the offline population lives in developing countries with Africa having the lowest penetration rate with only 28 percent of the population having access to the Internet (ITU, 2018). Consequently, Kabbiri et al (2018, p. 253) highlight that "one of the most outstanding global problems facing Africa is the digital divide". Digital divide is defined as "the gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regards to their opportunities to access ICTs and to their use of the Internet for a wide variety of activities" (OECD 2001, p. 5). For this study, digital divide refers to the uneven distribution of mobile telecommunication networks and services given that mobile technology is the primary means of telecommunications across Africa.

Despite the progress that has been achieved in the last 20 years, access to mobile telecommunications remains uneven across the African continent (GSMA Intelligence, 2017; Muto & Yamano, 2009). While countries in Northern and Southern Africa have over 50 percent mobile penetration rates, many countries in Eastern Africa have below 50 percent (GSMA Intelligence, 2017). Overall, it is estimated that around 500 million people still lack access to mobile telecommunications on the continent (Collins, 2015). The digital divide is more significant between densely populated urban areas and disperse suburban and rural areas (GSMA Intelligence, 2017). Policymakers across Africa have introduced various Universal Access and Service (UAS) policies as intervention measures aimed at achieving widespread access to 'basic' telecommunications in a manner that no one is excluded from the emerging information society (Oestmann & Dymond, 2008; Souter, 2016). In particular, over 30 African countries have adopted universal service funds (USF) as their preferred UAS strategy for facilitating digital inclusion (Arakpogun et al., 2017). USF can be defined as funds established by policymakers to provide a financial subsidy to mobile network operators in order to facilitate the deployment of networks in commercially unviable areas with the intention of achieving UAS and bridging the digital divide (ITU, 2013; Stern & Townsend, 2007). Despite the popularity of USF in Africa as an intervention policy, there is still limited empirical evidence on the reasons behind its limited success in reducing the digital divide in Africa.

The institutional theory literature highlights that institutional void - the weak or absence of institutions - explains why certain countries lag behind in filling the digital divide. This perspective can offer potential explanations for why USF fails to be effective under certain circumstances (ITU, 2013; World Bank, 2016). Our study thus responds to the growing call for more evidence-based research on mobile phone coverage (Asongu et al., 2018) in order to enhance the effectiveness of USF in Africa. Building on institutional theory, our study seeks to address these gaps in the literature by asking *1) what are the institutional (and other) obstacles that inhibit the successful implementation of USF? And accordingly, 2) how institutional capacity can be developed to improve USF and reduce the digital divide in Africa?* In order to address our research questions, we adopt a qualitative approach and conduct 25 interviews with key stakeholder representatives to provide evidence-based policy recommendations for improving the implementation of USF in Africa. We contribute to the digital divide literature by providing an in-depth understanding of the institutional challenges of using USF in Africa. In order to overcome these challenges, we argue that effort should be directed at institutional capacity building to allow for the effective governance of USF. We propose a framework underpinned by three specific mechanisms that can enhance institutional capacity in the context of USF implementation.

The rest of the paper is structured as follows. Section 2 outlines an overview of the digital divide literature with a focus on the institutional determinants of USF success. Section 3 presents our research design and the methods used to collect and analyse our data. Finally, we present the findings and discussion of the results along with implications for UAS policy, theory and future research.

2. Literature review

2.1 Digital divide and universal service funds

Although digital divide could be attributed to disparities in both the supply of telecommunications infrastructure and the demand for services (Mistry, 2014), most of the literature has focused on the demand-side of ICTs. For instance, prior research investigated how socio-economic disparities cause digital divide, especially the accessibility, usage and skill level of people (Alam & Imran, 2015; United Nations, 2012). The limited research from the supply-side highlights that digital divides in Africa are significant in suburban and rural areas where mobile network operators are reluctant to deploy networks due to a perceived lack of commercial viability (GSMA Intelligence, 2017; Williams & Kwofie, 2014).

In response, numerous efforts have been directed at encouraging investments in the form of FDI to bridge the digital divides in African countries (Friederici, et al., 2017). For example, international development organisations such as the African Development Bank is championing the 'Connect Africa' initiative with over $50 billion pledge (Graham, 2019), whereas the World Bank offers seed funding and grants to developing countries to expand telecommunications coverage to disadvantaged areas (Arakpogun et al. 2017; Hudson 2010). The International Telecommunication Union contributes to digital inclusion through, for example offering training for regulators in developing countries who generally lack the relevant skills and technical experience for formulating robust UAS policies, while mobile network operators contribute to USF levies for subsidising network deployment in disadvantaged areas (GSMA, 2014).

USF has particularly gained popularity among developing countries (e.g., see Jani & Das, 2001 for the case of India and Hudson, 2010 for the cases of Colombia and Peru) as a potential solution to bridge the digital divide (Dorward, 2013). South Africa was the first country to create USF in Africa in 1998 and various countries subsequently followed with Kenya and Gabon among the latest in 2015 and 2017 respectively (Arakpogun et al., 2017; Hudson, 2010). Findings from early research on USF indicate that their implementation and performance have produced mixed but largely poor results, with about eight, including Egypt and Nigeria, having active operating funds (Arakpogun et al., 2017).

In contrast, over 20 USF in Africa, including Cameroon and South Africa, are underperforming because of disruption that stems from corruption and political interference (Bailey, 2014; Mzekandaba, 2018). Furthermore, underperforming USF are characterised by inactivity, for example, Burkina Faso had over $20 million of unspent USF in 2009 while Mali had over $5 million (Arakpogun et al., 2017). Such inactivity has led to the increase of idle funds so much so that mobile network operators in countries like Mauritius has discontinued the remittance of levy due to the poor management and non-utilisation of funds (Arakpogun et al., 2017). Although there is a general lack of public disclosure and financial probity when it comes to accounting for money collected and disbursed for underperforming USF, it is estimated that from the $575 million collected at the end of 2011, only $175 million was disbursed across Africa (ITU, 2013). A recent estimation shows that there is about $408 million in unspent money across 37 countries (Thakur & Potter, 2018).

Since government and public institutions are responsible for the administration and implementation of USF across Africa, one could argue that the antecedent of digital divide in

African countries is partially due to poor institutional setup. Given that institutions set "the rules of the game in a society or humanly devised constraints that shape human interactions" (North 1990, p. 3), institutional absence and/or underdevelopment will fail to create an environment for actors to actively initiate interventions that encourage market participation and citizens engagement. This phenomenon is known as institutional voids (Doh et al., 2017; Khanna & Palepu, 1997). Institutional voids refer to "the utter absence of institutions" (Khanna & Palepu, 1997, p. 42) whereby many types of institutions are either absent, weak and/or underdeveloped (Khanna & Palepu, 2005). Institutions in developing countries, albeit to a varying degree, typically fall short when it comes to providing the necessary building blocks for business operations (Khanna & Palepu, 1997; Mair & Marti, 2009). This is consistent with the submission that many African countries suffer from institutional voids (Luiz & Stephan, 2012). Institutional voids thus limit the potential of market formation, growth of the economy as well as the overall social and economic development (Mair et al., 2012). Therefore, it is apposite for this paper to examine digital divide in Africa through the lens of institutional voids.

2.2 Institutional voids and universal service funds

The features of telecommunications infrastructure investment make it a unique form of economic transaction, particularly susceptible to the country's institutional environment, as such transactions involve governments, private investors (largely MNOs) and other stakeholders (Spiller, 1995). Telecommunications investment involves three features that introduce the possibility of government opportunism and contractual hazards for mobile network operators. First, a high component of network investments is sunk, meaning that it "cannot be redeployed without significant loss of value" (Henisz & Zelner, 2001, p. 127), hence creating a hold-up problem. Second, telecommunications are widely consumed by the public, hence their performance and prices are of interest to politicians and interest groups who might want to introduce/change regulations to appease the electorate (Spiller, 2013). And finally, due to economies of scale and scope, only a few mobile network operators are likely to deploy networks in each locality, which is likely to be followed closely by regulators to curb any potential monopolistic practices. These three aspects make governmental opportunism a potential hazard in mobile network operators and governments interactions regarding network investments.

Institutional theory suggests that a well-developed institutional environment can limit the potential of governmental opportunism (Spiller, 1996). In addition, strong institutions draw and implement effective policies (Spiller, 2013). For example, incentive schemes such as USF

usually require granting discretion to USF regulators. But as Spiller (2013) argues, granting such discretion to regulators in the absence of strong institutions that discriminates between arbitrariness and useful discretion can result in incentives not generating the expected results. Indeed, as Arakpogun et al (2017) highlight USF in Africa are often criticised for their lack of transparency and clarity on how funds are being allocated. The credibility and effectiveness of USF policies and their ability to incentivise mobile network operators to deploy networks in rural areas are, therefore, dependent on a country's institutional environment.

Institutional theory partly explains how institutional voids and market failures increase uncertainty and transaction costs for mobile network operators and, therefore, limit their investments. Early research focused on how institutional voids hinder the growth of markets and the role businesses play in response (Khanna & Palepu 2000), the strategies they make (Doh et al., 2017) and how less powerful actors including social entrepreneurs address institutional voids (Kummitha, 2016). Such alternative developmental models largely depend upon a basic understanding that it is hard to fix the gaps in the capacity of the state. However, a different stream of literature, argues for the need to strengthen developing countries' institutional capacity (Andrews, 2013). Andrews et al. (2013) propose that a problem-driven interactive adaptation approach from the supply-side can offer a necessary context to fill the institutional voids. The authors highlighted the importance of (i) solving the problems rather than selling solutions; (ii) enacting environments to encourage experimentation and positive deviance; (iii) developing active learning mechanisms and iterative feedback loops; and (iv) broad engagement to assure viability, legitimacy and relevance of the proposed solutions.

The development of partnership and cooperation between governments and the private sector as well as increasing awareness for users is crucial for improving digital inclusion (Mistry, 2014; Ricci, 2000). The argument goes on to emphasise that the state must make a minimum regulatory regime for both business and civil society players to play an effective role, without which initiating interventions may be counterproductive (Andrews, 2013). Institutional change and development models such as "deliberation" (Evans, 2004), "good-enough governance" (Grindle, 2004) and "second-best institutions" all underscore the idea that importing policy interventions without attempting to enhance institutional capacity will have limited impact. One specific evidence in this direction is that several African countries have recently shown their intent to strengthen their institutional capacity by enacting new policies to fill their institutional voids. This is especially applicable to the telecommunications sector which requires a substantial amount of investments to upgrade old and deploy new networks,

which at the same time requires institutional safeguards to motivate mobile network operators to undertake such risk. Thus, this research aims to understand the mechanisms that may be useful to strengthen country's institutional capacity in the context of USF.

3 Methodology

3.1 Research methods

This paper draws on a study that is wider than USF (see Arakpogun, 2018) and adopts a qualitative approach that draws on the examples of active and inactive USF across Africa. While over 30 of the 55 countries in Africa have established USF, 18 countries (e.g., Burkina Faso, Chad, Egypt and Morocco) have recorded some form of activity with the implication that a significant minority of USF (e.g., Mali, Sierra Leone and Tunisia) are inactive despite the continuous remittance of USF levies by mobile network operators (Arakpogun et al., 2017; Arakpogun, 2018; Dorward, 2013). The paper draws on examples through cross-references between countries with active and inactive funds across Africa (see summary in Table 4). The criteria for selecting country examples in Table 1 (Gerring, 2009) were underpinned by evidence of the establishment of USF and the collection of USF levies while evidence of the USF project executed/planned was then used to determine active and inactive funds. This allowed us to identify similarities and differences in USF governance practices across cases (Elsahn et al., 2020). These criteria were central to this paper given its objective of attempting to identify the institutional obstacles and suggest ways for improving the current form of USF – by providing insights into what works and what does not work in various African countries.

3.2 Data collection

This paper uses both primary and secondary data to ensure triangulation and improve the credibility of our findings (Stake, 2010). Secondary data from multiple sources was initially collected to gain insights into the state of USF across African countries. Table 1 outlines a summary of the secondary sources along with the insights generated.

Insert Table 1 here

The paper builds on the insight generated from Table 1 and in-depth interviews generated from semi-structured questions derived from analysing secondary sources (Arakpogun, 2018). The interviews were undertaken by the first author, supervised by the second and third authors. The interviews started by asking respondents about the digital divide in Africa, followed by more specific questions on USF performance and the obstacles faced by mobile network operators, and the possible ways of overcoming these obstacles (Arakpogun, 2018). In addition to using

the secondary sources in Table 1, the paper incorporates the country-based analysis of over 30 African countries signposted in Table 4 to further identify key potential respondents with hands-on experience and detailed knowledge of the telecoms market across Africa and other emerging economies, especially when it comes to the debate on digital inclusion. After identifying over 60 potential respondents, we searched through the Internet for their contacts – emails, phone numbers, blogs, LinkedIn and Twitter (Arakpogun, 2018; Arakpogun et al., 2018). Some contacts were available in the secondary sources in Table 1, and via the country analysis while others were approached in person at various conferences and workshops in, for example, the UK and Ghana (Arakpogun, 2018; Arakpogun et al., 2018). In the end, a total of 25 respondents were interviewed as highlighted in Table 2. This is consistent with the recommendation of 12-30 participants for a heterogeneous population (Saunders, 2012; Saunders & Townsend, 2016).

Insert Table 2 here

The respondents include key decision-makers such as regulators, public policy directors for mobile network operators, researchers and consultants whose input influences telecoms policy decision making in African countries and other emerging economies as well as whose insights are increasingly important to the implementation of USF in Africa. Table 3 describes the experiences of interviewees with anonymised identities (using Interviewee1 to Interviewee25) in line with the wider study's ethical consent (which is outlined in Arakpogun, 2018). The varied background of participants thus allowed for the triangulation of responses (Klein & Myers, 1999; Stake, 2010).

Insert Table 3 here

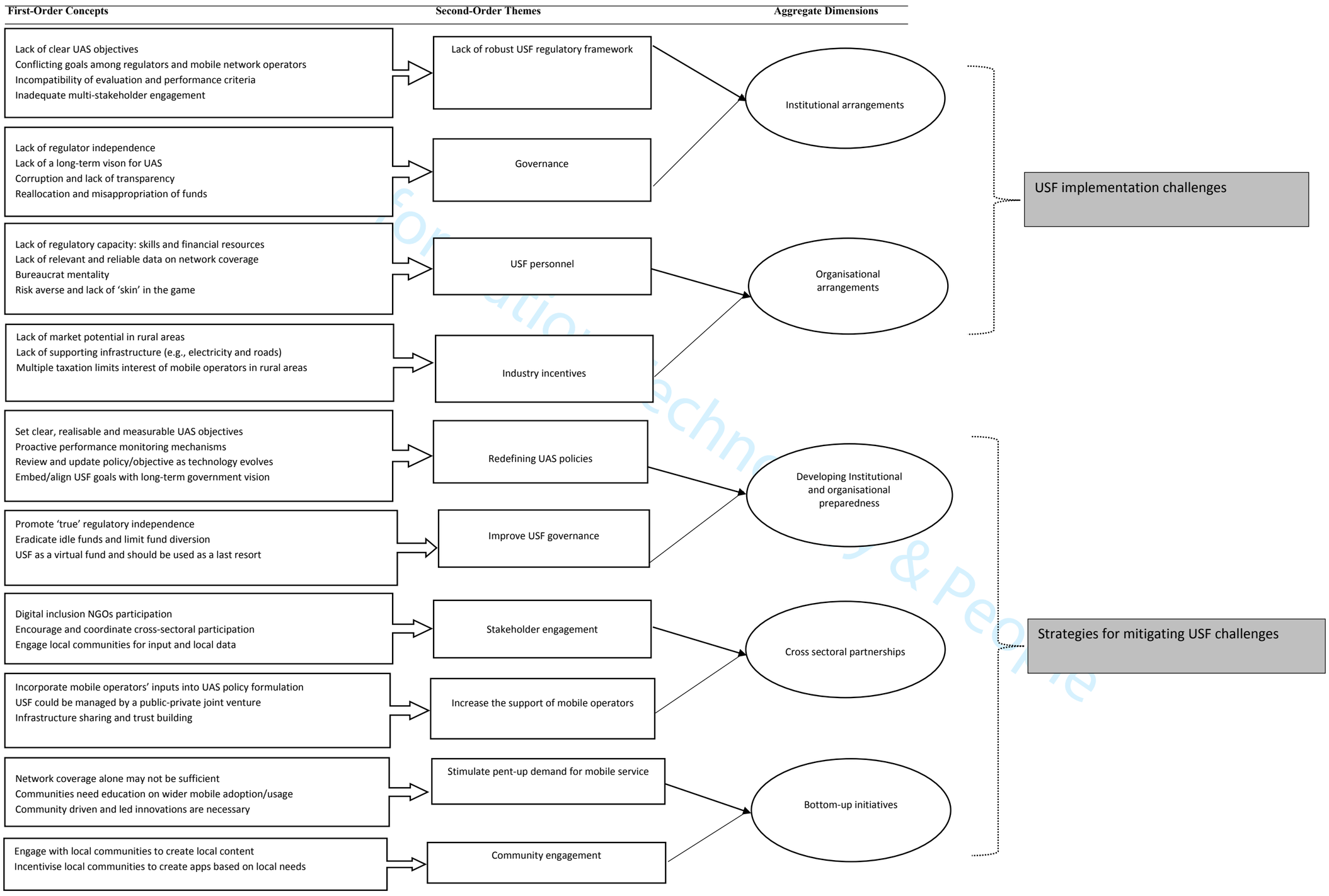
All interviews were conducted in English language by the first author between October 2015 and April 2018 and were recorded and transcribed verbatim. The shortest interview lasted for 35 minutes whereas the longest one lasted for about 60 minutes. On average, after transcription, each interview generated a six-page transcript. Thus, the interview transcripts generated around 210 pages. To complement the interview data, secondary sources were collected. This reflects the wider scope of the data collection exercise, which investigated the digital divide in Africa (as demonstrated in Arakpogun, 2018), as well as the dynamic nature of the issue under investigation.

3.3 Data Analysis

Following Arakpogun (2018) and Arakpogun et al (2018), this paper followed an interpretivist approach to make sense of the data (Ryan & Bernard, 2003; Saldana, 2016). We adopted the Gioia et al (2013) approach for data analysis whereby we iterated between theory and data. Open coding began upon a second reading of the transcripts in order to give the second and third authors more time to immerse themselves and become familiar with the data (Ryan & Bernard, 2003), bearing in mind that the interviews were conducted by the first author. During this stage, raw data was turned into first-order descriptive codes which reflect the respondents' language. During this stage, we were guided by our research questions and the focus on understanding the institutional factors that influence the performance of USF. After inductively developing these codes, we started to iterate between theory and data to group first order codes into second-order themes. In this stage, we were guided by the institutional theory literature (Spiller, 2013) and the USF framework proposed by Arakpogun et al (2017, p. 623). In the final stage, we grouped these second-order themes into five aggregate dimensions that cover USF implementation challenges (institutional and organisational arrangements) and strategies for mitigating USF challenges. Our data structure is presented in Figure 1.

Guided by the set of criteria identified in our literature review in Section 2 and the analytical framework by Arakpogun et al. (2017, p. 623), interview transcripts were thematically analysed using open coding on MS Word (Hahn, 2008). Open coding began upon a second reading of the transcripts to enable the other authors time to immerse themselves and become familiar with the data (Ryan & Bernard, 2003), bearing in mind that the interviews were conducted by the first author. Open coding thus helped the other authors, who have not participated in fieldwork, to take independent active participation in the sense-making of the data while we collectively added, deleted and modified the codes in line with the identified criteria as well as evidence from our secondary sources (Saldana, 2016; Weick, 2007).

Figure 1: Data Structure



4 Findings

This section highlights the findings from our fieldwork, which is divided into two different sections. While the first section highlights the challenges facing the implementation of USF, the second section discusses the means for mitigating the challenges, thereby addressing the two research questions that were raised in Section 2.

4.1 USF implementation challenges

The data analysis map in Figure 1 indicates that two aggregate dimensions - institutional and organisational constraints - can help to explain why the use of USF has been largely unsuccessful in African countries. This, in turn, has caused the digital divide to persist in varying proportions across Africa.

4.1.1 Institutional constraints

In this section, we present our findings regarding the institutional factors that constrain the successful implementation of USF. Institutional factors are those formal and informal rules of the game (North, 1990) which shape actors conduct within a certain domain.

4.1.1.1 Lack of robust USF regulatory framework

Although most countries target UAS in disadvantaged areas, interviewees asserted that policymakers often fail to set clear, realisable and measurable UAS objectives from the outset. To illustrate this, Interviewe24 and Interviewee6 commented that:

> *…there should be a governmental national prepared policy to improve connectivity within a country. For example, there should be a strategy paper… that declares the political commitment to achieve certain goals, and this paper should be…as succinct as possible… and it should be very, very clear and it should contain a list of policy actions…* (Interviewee24).

> *...go back and ask yourself what do we want to deliver? Do we want rural coverage? Do we want, say as in New Zealand, to connect all the schools? Do you want to connect the hospitals and the medical clinics? Is that your objective? Then, what do you have to do to deliver that? I am giving these answers to draw contrasts to others that have done it differently…* (Interviewee6).

Interviewee10 added that it is the responsibility of policymakers to design a framework where specific targets for rural coverage are clearly defined and this should be well communicated and documented when issuing/renewing GSM licences. The main thrust for such argument is that since USF draw from UAS framework, setting clear UAS objectives would go a long way in making the implementation of USF less complex, not least through succinctly articulating to mobile network operators 'where' (location), 'what' (type of telecommunication services) USF

are focused and help mobile network operators avoid conflicting their goals with that of the regulators. This would also mean that better evaluation and performance monitoring criteria are put in place to forestall a 'free-rider problem' - where mobile network operators take USF money without delivering projects. This lack of clear UAS objective was also evident in our country analysis. For example, most countries target UAS at 'unserved' and 'underserved' areas, no specification is provided as to exactly what this entails except for a few countries like Egypt and Ghana. Egypt explicitly states that such areas include regions with at least '300 inhabitants' (ITU, 2013). Ghana, on the other hand, defines unserved areas as locations with 'no communications service' and underserved areas as communities with only '2G services' or 'poor 3G services' (NCA, 2017).

4.1.1.2 Governance

Most UAS frameworks that underpin USF across Africa state that funds are typically governed 'independently' by a unit within the relevant ministry, the sector regulator, or by a separate body with the fund managers having 'autonomy' over the administration and disbursement of USF without the encumbrance of government (e.g., see Dorward, 2013; ICTA, 2004). It has been argued that funds that are independently governed will lead to more transparency and accountability relative to those managed by government ministries (Intelecon, 2009; Hudson, 2010). However, there is evidence within our data to suggest that this is not the case in African countries as political interference is seen as a threat to the success of USF - governments and politicians appear to influence the operation of USF in terms of, for example, appointment/recruitment of staff, disbursement of fund and project allocation.

Interviewees argued that in countries where governments and politicians capture the affairs of regulators for self-gain other than promoting a wider sector development, the autonomy of USF could be eroded, resulting in poor outcomes in terms of closing the digital divide. Interviewees2 and 23 help to illustrate poor USF governance thus:

> *From my experience as a regulator, some of the problems undermining the performance of the fund include political influence where the government sometimes divert the amount collected towards another project entirely not related to telecommunications.* (Interviewee2).

> *USF do not have the autonomy, they don't have the independence, they don't have the power and they have to depend on other people who don't see the implementation as a priority* (Interviewee23).

Since regulators are afraid of losing their jobs, Interviewee5 continued, they simply comply even when they know that such a decision is detrimental to the performance of USF. This was

also highlighted in the secondary sources. For example, while Bailey (2014) highlights the case of politicians seeking to influence the award of USF project in South Africa, Moyo (2016) suggests that political interference has led to a high turnover of the chairperson of the Independent Communications Authority of South Africa (ICASA). Furthermore, ITU (2013) highlights the case of the sector minister in Cameroon as the sole authoriser of USF disbursement despite having an 'independent' regulator in charge of USF.

Interviewees further argued that the failure of policymakers to allow USF to function independently has wider implications. For instance, institutional voids driven by, for example, corruption and lack of objectivity in managing these funds constrain the potential of the overall intention of closing digital divide:

> *Corruption gets involved in most of the cases, as a result, the purpose is not met. If you do an assessment of liberalisation of telecom sector across countries say 10 or 15 years ago from the monopolies from which they were liberalised, you will realise that these funds were created but it has not been a success simply because of governance*. (Interviewee17).

Interviewees also suggested that political interference limits the ability of regulators to independently discharge their duties by changing the primary trajectory of USF to fit the short-term gains of politicians, thereby raising questions about the accountability and transparency of USF. Furthermore, it reduces the financial resources that are critical for the discharge of regulatory duties like policing and enforcing USF as funds are misappropriated and/or reallocated to other sectors. Interviewees argued for the need to uphold the independence of regulators and called on governments to stop diverting USF money if meaningful progress is to be made on digital inclusion. Guaranteeing the independence of regulators would also encourage policymakers to ring-fence USF and ensure funds are spent only on projects that improve digital inclusion.

4.1.2 Organisational constraints

This section presents our findings on the organisational arrangements of USF. By organisational arrangements we refer to the actors (USF personnel), their skills and capabilities, and the structures of USF (e.g., processes and incentives) which together determine how USF is managed and organised.

4.1.2.1 USF personnel

When it comes to the organisation of USF, interviewees suggested that a key factor that will continue to limit the implementation of USF in African countries is the lack of institutional capacity – regulatory skills and financial resources. For example, Interview23 commented that:

> *My experience of USF is that they are not run by people with either the technical or the business expertise to adequately design solutions. So, I think it not really surprising that USFs have underperformed because there is no push on the USF to really do anything remarkable.* (Interviewee23).

Furthermore, while people with relevant talent may be available locally, many of them end up working for multinationals, given the low pay associated with the civil service relative to the private sector (Smith, 2003). Gillwald (2005) and Jerlin (2010) thus asserted that while skills and competencies such as technical, economic and legal are critical to the organisation of USF and other regulatory functions, regulatory bodies in Africa, albeit in varying degrees, are typically faced with a lack of relevant skills. Other interviewees highlighted a link between institutional and organisational constraints – in the sense that political interference can also compound talent shortages by favouring the recruitment of those with political ties instead of qualified people. This may lead to the appointment/recruitment of people that lack the required skills or a skill mismatch, which could then hinder the smooth organisation of USF.

Concerning the availability of financial resources, evidence abounds of policymakers diverting USF resources to fund projects that are not related to mobile coverage. For example, the president of Kenya recently 'ordered' the Communications Authority of Kenya (CA) to give around $10 million of USF money to support the policing of cybersecurity (Matinde, 2018). A move that has been criticised by civil society who argued that this is not the purpose of USF (Matinde, 2018). Karombo (2016) also highlights the case of Zimbabwe where the government has diverted $172.9M of USF money to fund the digitisation programme of the state TV station as well as an additional $10 million to partly fund the $40 million acquisition of a 60% stake in Telecel from VimpelCom. Such activities combine to limit the financial resources needed to organise USF, especially when it comes to sourcing relevant and reliable data on network coverage and policing awarded projects.

4.1.2.2 Lack of industry incentives

Digital divide in African countries is largely driven by spatial segregation, as such, mobile network operators find it unviable to deploy networks in rural areas. Interviewees posited that a host of issues pertaining to the costs and benefits of network deployment would make an area

either commercially viable or unviable. This, in turn, would incentivise mobile network operators and their investment decisions. Interviewees1 and 13 commented thus:

> *...it is simply a matter of economics that the existing technology used by the mobile network operators and the operational costs associated doesn't make it profitable for them to extend their networks into remote sparsely populated rural areas, and those areas bring their own challenges as well.* (Interviewee1).

> *You can't spend $6000 or $7000 a month* [OPEX] *on a site that gives you only $200.* (Interviewee13).

Interviewees further argued that the lack of commercial viability across Africa (which has over 50% of its population in rural areas) is further compounded by the lack of supporting infrastructure like electricity and the practice of imposing multiple taxation on mobile network operators in various countries as signposted below:

> *The tax pressure is extremely high and increasing by the day. You have the general tax, the income tax, and then you have what we call a telecoms-specific tax, inbound tax, SIM cards import, handsets, tax on literally everything... why would you, in a place where service is so expensive and penetration is so low, impose a tax on handsets importation, for example?* (Interviewee13).

Interviewee17 added that government actions like taxing mobile devices and other telecommunications equipment appear puzzling considering that regulation ought to be driving down the transaction costs of getting people connected to mitigate market failure. Interviewee17 argued that such practice tends to undermine the success that has been recorded in the sector post liberalisation. This can be illustrated with the case of Nigeria where IHS, a tower company, is in dispute with three states in the country (Cross River, Enugu and Kogi) over 'illegal' charges on top of the standard corporate tax. It then follows that while issues such as spatial segregation and the legacy problem of lack of supporting infrastructure can contribute to reducing the commercial viability of network deployment, unfavourable government policies such as multiple taxation further creates disincentives for mobile network operators to participate in the organisation of USF and overall digital inclusion agenda.

4.2 Strategies for mitigating USF challenges

The second part of our findings draws from the responses of interviewees and evidence from various secondary sources to propose three specific sets of strategies that could help mitigate USF challenges.

4.2.1 Developing institutional and organisational preparedness

As far as the market potential is concerned, the African continent has about 12 percent data penetration whereas voice penetration is about 60 (Arakpogun et al., 2017). Therefore, there is

a significant potential for policymakers and mobile network operators to find innovative ways to connect the last mile given the disproportionate levels of unconnected people across Africa relative to other parts of the world (Arakpogun, 2018; Arakpogun et al., 2018). However, due to the reasons discussed in Section 4.1, it may not be an ideal environment for mobile network operators to operate given the prevalence of institutional voids and other constraints. Thus, there is an overall need for stakeholders to come together and improve USF performance and boost infrastructure in the continent (Arakpogun et al., 2018).

4.2.1.1 Redefining UAS policies

The first step to mitigating the institutional and organisational constraints identified earlier is for policymakers to design a UAS framework where specific targets for rural coverage are clearly defined and this should be well communicated and documented when issuing/renewing GSM licences. The main thrust for such argument is that since USF draw from UAS framework, setting clear UAS objectives would go a long way towards making the implementation of USF less complex by succinctly articulating to mobile network operators the 'where' (location) and 'what' (type of telecommunication services) of USF focus.

Insights from interviews indicate that at the heart of setting such clear objectives is having a clear UAS definition that does not only consider access from the viewpoint of network availability but also reflects other UAS principles such as accessibility, affordability, assessment and awareness (see Arakpogun et al., 2017 for details). Apart from a few countries like Egypt and Kenya, most countries define access without fully accounting for the underlying principles of UAS with the implication that such definitions are fundamentally flawed *ab initio*. One of the interviewees that support this position stated that:

> *A lot of universal services policies focus on access from the viewpoint of availability - on whether there is network or infrastructure but if no one actually connects to it or exploits it, it is of no economic value.* (Interviewee17).

Furthermore, against the backdrop that UAS positions are largely vague in terms of lacking a clear vision and setting unrealisable targets for USF, for example, widespread access to 'ICT' facilities and services as proposed in Malawi (MACRA, 2013), interviewees asserted that it is imperative for policymakers to be explicit upfront on what they want to achieve in terms of service specificity. The reason is that 'ICT' could mean any one of a series of services, technologies or networks. As such, setting such a target for USF is arguably unrealisable. A clear indication of such services, for example, mobile and/or fixed broadband of specific speed, etc., will go a long way in addressing the current ambiguity associated with UAS. Policymakers

should also ensure that such objectives are constantly monitored and updated in order to forestall organisational constraints associated with policy redundancy in a fast-moving industry where technology, market and users' preferences are constantly changing.

4.2.1.2 Improve USF governance

Interviewees argued for the need to uphold the independence of regulators and called on governments and politicians to stop interfering in the affairs of USF with a view to improving its governance given that failure to do so has far-reaching implications as highlighted in Section 4.1. Since regulators and USF managers are part of the wider public institutions created, funded and run by governments, this raises the question of how to guarantee regulatory independence? The response of Interviewee13 appears apt:

> *Obviously, you cannot have an institution that is separate from government but independence comes from the fact that the process that has been put in place to create that institution, appoint people to run that institution, does not allow government to give them direct instructions in terms of how they should run the sector…* (Interviewee13).

This suggests that 'true' regulatory independence comes from the fact that such an institution should be empowered and set up in a way that no matter who comes to power, the decisions and operation of the regulatory body would be difficult to influence.

When the independence of USF is maintained, this goes a long way in addressing, for example, the appointment of incompetent people or staff with the wrong skillsets. The recruitment of capable personnel is only possible when the regulator is empowered to act objectively. This leads to the appointment of competent people who would then gather reliable data to measure who lacks network coverage so that resources are not allocated 'blindly' (see LCA, 2016, for the case of Lesotho) and drive the smooth organisation of USF. This would also help to mitigate against other organisational and institutional constraints such as the risk of idle funds, corruption resulting in the mismanagement of USF and the diversion of USF to other sectors. Other interviewees recommended organising USF as a 'virtual' fund - some sort of accounting mechanism rather than a fund where mobile network operators could be mandated to invest a given proportion of their income in mobile coverage in disadvantaged areas instead of giving the actual money to policymakers. The following quote serves to strengthen this recommendation:

> *…in order to rid it* [USF] *of some of the deficiencies associated with traditional funds, such funds may be set-up with features like being a virtual fund…* (Interviewee5).

The main thrust of this argument is that a virtual fund has the potential of mitigating an organisational constraint like idle funds. Interviewees contended that in a country where there

is a political will to adopt this strategy, there is no need for a central pool of money sitting idle across Africa. This will also prevent countries like Kenya and Zimbabwe from diverting USF to other projects as there would be no idle cash for them to reallocate. Furthermore, nobody needs to guard themselves against the accusation of malpractices since there would be no physical cash stored up anywhere as illustrated in the case of South Africa where the allegation of corruption has disrupted the activities of USF. In this sense, a virtual fund can help to improve institutional constraints associated with the lack of accountability and transparency as no physical money is collected, which may be susceptible to corruption or financial impropriety.

4.2.2 Cross-sectoral partnerships

In this section, we present our findings on how wider stakeholder engagement and cross-sectoral partnerships can help in overcoming some of the institutional and organisational obstacles that were previously discussed.

4.2.2.1 Stakeholder engagement

In light of the institutional constraint associated with inadequate stakeholder engagement, interviewees stressed the importance of a wider stakeholder engagement where various interest groups within the telecommunications ecosystem meet to exchange ideas for good practice and the smooth organisation of USF. For example, Interviewees4 and 11 stated that:

> *I think in countries where USF have not been successful, the government should be willing to sit down with other stakeholders to evaluate the framework of USF, particular where the funds are there, after all, these monies are from operators and their subscribers and as such, it should be spent wisely*. (Interviewee4).

> *…no single stakeholder can solve the problem alone. If the government just sets policy without consulting the industry, it won't work, and the industry can't achieve anything without the support of the government. So, they need to come together and listen to each other and consult with each other and then come up with some policies…* (Interviewee11).

In addition to this, Interviewee1 stated that stakeholder engagement should be a continuous process to reflect the constant and rapidly changing pace of technology and services. Apart from the continuity of the process, Interviewee11 added that it is important for policymakers to define 'who' the relevant stakeholders are, as this may change with the evolution of technology. This can be illustrated by the emergence of over-the-top players like Facebook and Google in the telecommunications sector.

Broadly speaking, it came across from interviewees that policymakers need to widen the conversation to include tower companies, telecommunications vendors (including handsets manufacturers), satellite providers, over-the-top players, international lending organisations (like the World Bank), not-for-profit organisations (NGOs), civil society and local communities. Interviewees argued that a wider stakeholder engagement might lead to shared interest and risk as each group brings valuable input into UAS debate. For example, according to Interviewee13, mobile network operators could fill the gaps in some of the expertise and skillsets needed to organise USF, which may be lacking in the regulator while telecommunications vendors could come up with more affordable mobile devices. NGOs may look for ways to subsidise the cost of mobile devices for some communities. Furthermore, lending organisations can provide expertise from other countries with good examples. Therefore, apart from helping to mitigate institutional constraints, inputs generated from a wider stakeholder engagement also have the potential of improving some of the organisational constraints discussed in Section 4.1.

4.2.2.2 Increase the support of mobile network operators

Apart from being the major attractors and contributors of FDI that have transformed the telecommunications sector in African countries, mobile network operators are also the major contributors to USF levies. Interviewees thus suggested that governments need to look for ways to increase the support of mobile network operators and not alienate them from USF implementation. For example, interviewees argue that if governments continue to collect USF without disbursement, this may discourage mobile network operators from participating in the whole process. This could then impinge on the ability of governments to collect USF levies, which some policymakers are already finding problematic. For instance, when Interviewee2 was asked what challenges were facing USF in their country, they commented that:

> *From my experience as a regulator, one of the challenges of USF is trying to involve the operators, as they may not agree with the rules of engagements set by government… This leads to another challenge of trying to collect the money from operators at the end of each period*. (Interviewee2).

Apart from ensuring funds are disbursed, interviewees also suggested that policymakers could increase mobile network operators' participation by incorporating their views into UAS policies right from the formulation stages. It was further argued that the current governance structure of USF could be amended to allow USF to be managed by a joint venture that includes mobile network operators and other stakeholders. This could revolutionise USF and create more management scrutiny at the same level as any other business with a 'skin' in the game

and strong internal policies. Apart from straightening the institutional transparency of USF, the synergy created, and expertise of mobile network operators would help improve the organisation of USF.

4.2.3 Bottom-up initiatives

Several respondents have highlighted the need to simultaneously focus on demand and supply-side initiatives. Respondents argued that demand-side initiatives need to be built up from the bottom-up based on people's needs rather than the top-down of most USF.

4.2.3.1 Stimulate pent-up demand for mobile service

While we have acknowledged in Section 1 that this paper is largely focused on the supply-side of digital divide, it is also important to state that our data (albeit limited) also uncover issues related to the demand-side – for example, the unaffordability of mobile devices, digital literacy and skills, the wider adoption/usage of mobile technology as well as online safety and privacy concerns. Interviewees submitted that while it is pertinent for policymakers to improve the implementation of USF in order to address the fundamental and first-level dimension of providing physical telecommunications infrastructure, focusing on network coverage alone is not sufficient in addressing digital divide. There is a need to adopt a joined-up strategy of looking at both the supply-and-demand-sides.

As network coverage increase with improvement in USF, there is a need to facilitate a range of bottom-up initiatives to stimulate a pent-up demand for mobile service adoption and consistent usage. This could be in the form of promoting digital literacy and skills as technology evolves to increase the ability and awareness of consumers as well as their use of mobile devices and optimal Internet engagement. Such a suggestion arises from the fact that policymakers and mobile network operators are not doing enough to promote digital skills and educate end-users on how to use technology:

> *...lack of awareness is also a problem, as people don't fully know the benefits that accrue from using telecom services such as broadband... They don't even know, for example, what learning they can do from the internet, how they can improve their crop yield that they can limit the rate of animals falling sick, on which their livelihood depends...* (Interviewee23).

There was consensus among interviewees that it is the responsibility of policymakers to lead the campaign of awareness creation in collaboration with other stakeholders in the industry. When awareness is created, it stimulates demand and mobile network operators would most

likely go and increase network coverage when they know that people would use their services with or without the support of USF.

4.2.3.2 Community engagement

To achieve the above, policymakers, mobile network operators and other stakeholders need to increase the level of community engagement with the view to uncovering local needs and co-create local content, which would be relevant and useful to respective communities. It came across from the interviews that although stakeholders such as policymakers and mobile network operators often assume they know the telecommunication needs of a given community, practice would suggest otherwise. For example, Interviewee17 asserted:

> *One of the things that should be done to achieve a better result with USF is, before anyone even thinks of disbursing any fund on actual projects, they should spend a small amount of money on really understanding what is really the access gap? What is the problem? People always assume they know what the problem is and that all the money should be spent on the answer but going back to one of the things I said before, is the problem really coverage? Do the government and the regulator really know what coverage is in these areas? Is it changing all the time?* (Interviewee17).

This argument was further highlighted in the data where Interviewee13 said they assumed that affordability was the reason why a given community was not demanding more data. Hence, they decided to give free smartphones preloaded with data to a selected number of people in order to see if that would stimulate demand. Surprisingly, after a given period, the users did not consume a large part of the data. Why? The interviewee responded:

> *…because they did not know what to do with all the data we gave them… So, we realised that giving them handsets with data is not the solution. There were dimensions that needed to be added: relevant content and education…* (Interviewee13).

The interviewee in question assumed that affordability was the only telecommunications need in the community, but in hindsight, it turned out that a lack of digital education and relevant local content were part of the puzzle.

Apart from engaging with local communities to stimulate pent-up demand, interviewees further asserted that the local communities could provide vital knowledge to help policymakers and mobile network operators mitigate organisational constraints associated with the lack of accurate information on network coverage and better anticipate what is actually lacking in respective communities. The whole process, moderated by policymakers, could result in collective tinkering that would ensure relevant opinions and experience are considered when designing a clear and dynamic USF framework. This would further help to address the weak participation of the local community in ICTs related issues given that people from the

grassroots are often overlooked even when UAS policies and the wider digital divide debates are about them:

> *I think a bottom-up expression of demand and using civil society, are very valuable inputs, which has been sort of overlooked.* (Interviewee5).

This was also alluded to by Interviewee2 who suggested that this problem could be mitigated by an increase in awareness and engaging local communities by giving them some responsibilities in the implementation processes. For example, engaging with them to provide manual labour and land for the construction of infrastructure such as underground cables and towers. Having said that, for regulators to carry out such wider consultation, they need financial resources to plan and organise meetings, follow-ups and produce reports. Therefore, opportunistic political actions such as the diversion of USF money can derail this process and make it more difficult for a regulator to execute community engagement due to lack of regulatory capacity.

Table 4 provides a summary of our findings with examples that outline insights into the contextualisation and implementation of USF in Africa. For the purpose of providing nuances in our analysis, note that active USF have been split into groups 1 and 2. Group 1 encapsulate countries whose active funds frequently execute projects and amend UAS framework to enable USF to deploy new services (e.g., internet connectivity in health centres and schools) and technologies (e.g., broadband). Conversely, while group 2 countries also have active funds, they tend to deploy projects infrequently and have rigid UAS framework, which makes USF to target fixed services and technologies (e.g., fixed payphones and telecentres). This is counterproductive in a continent where mobile telephony is preferable. Accordingly, the institutional setup in group 1 countries better supports the evolution of USF in closing digital divide relative to group 2 countries and those with inactive USF. Overall, group 1 countries tend to have the necessary institutional building blocks for USF to succeed, hence providing good exemplars for other African countries to learn from.

Insert Table 4 here

5. Discussion

There is an increasing recognition of the important role that governments need to play in closing the digital divide (Mistry, 2005) through developing institutions that reduce transaction costs (Doh et al., 2017) for network operators to incentivize them to deploy networks in underserved areas. In this context, UAS as a policy intervention and the use of USF has

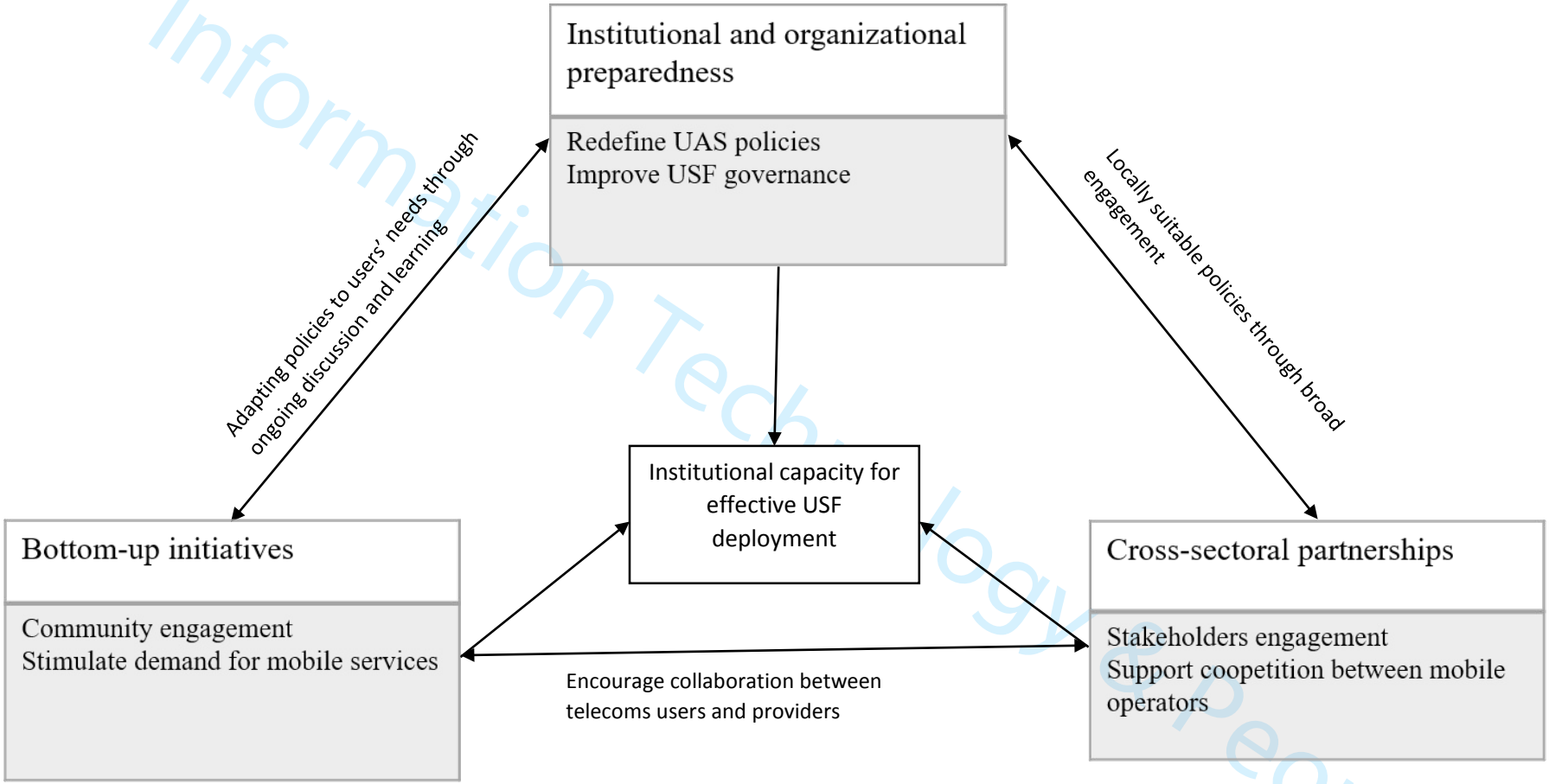
emerged as a popular development instrument aimed at achieving widespread access to 'basic' telecommunications. Yet our understanding of the challenges underlying USF governance in African countries is still limited. This is particularly important given that many African countries suffer from institutional voids - where the necessary institutions for the telecommunications sector are either absent, weak, or fail to provide the necessary condition to reduce digital divide.

Our findings indicate that despite the popularity of UAS as a reform policy among African countries, many of these funds are inactive or poorly performing (Arakpogun et al, 2017). The literature on policy reform and governance, indicates that this situation is common in developing countries whereby policy reforms are created but frequently not implemented due to lack of institutional capacity (Andrews et al., 2013; Arakpogun et al, 2018). As our findings showed, in several countries, these reforms in the telecommunications sector involved changes at the surface level (Andrews, 2013 through establishing USF for example, yet the core processes related to USF governance such as how funds are effectively allocated remained underdeveloped (Arakpogun e al, 2017; Arakpogun et al, 2018). The relative success of USF schemes in other developing countries in Asia and South America (e.g., see Jain & Das, 2001 and Hudson, 2010, respectively) have prompted international organizations and practitioners to encourage African countries to follow a similar path. As argued by Andrews et al (2013), underlying this dynamic is a process of isomorphic mimicry whereby developing countries adopt "popular" policies to enhance their legitimacy in the international community. Yet because of their lack of institutional capacity, many countries have failed to successfully implement these policy reforms and ending up with a situation where form and function are decoupled (Andrew, 2013; Meyer & Rowan, 1977). Accordingly, our study attempted to explore how institutional capacity can be strengthened to reduce the digital divide in Africa.

It is well established in the institutional development literature that institutional monocropping through "the imposition of blueprints based on idealized versions of Anglo-American institutions" is a problematic approach to building institutional capacity in developing countries (Evans, 2004, p. 30). Alternatively, the institutional development literature points out the importance of local experimentation (Evans, 2004; Mukand & Rodrik, 2005) and an incremental approach to institution building (Adler et al., 2009; Grindle, 2004). We contribute to this literature through our cross-case comparison of USF performance in African countries by identifying several mechanisms to enhance institutional capacity that have been employed by the better performing USF. We propose three specific mechanisms to build

institutional capacity to enhance USF performance in African countries – developing institutional and organizational preparedness, promoting cross-sectoral partnerships, and supporting bottom-up initiatives. As shown in Figure 2, these three mechanisms are interrelated. Developing appropriate UAS policies and improving USF governance requires broad stakeholder engagement which allows policymakers to redefine UAS policies through continuous learning and adaptation to local requirements. Our proposed approach, therefore, emphasizes (1) developing UAS policies and regulatory frameworks that are locally suitable, through (2) wide engagement with both private sectors and local communities to allow (3) continuous learning and adaptation through feedback loops (Andrews et al., 2013). We next discuss each of the proposed mechanisms in our framework presented in Figure 2.

Figure 2: A framework for improving USF performance in Africa



Institutional and organizational preparedness: Our findings indicate that two specific constrains at the institutional and organizational levels contribute to the growing digital divide in African countries. Specifically, a lack of a robust regulatory framework that oversees the governance of the USF along with the absence of industry-level incentives, supporting infrastructure, and multiple taxation in the industry disincentive mobile network operators' participation and drive away investors (Arakpogun et al, 2017; Arakpogun et al, 2018). The establishment of USF in many African countries was focused on *institutional form* (how they should look like) rather than their *institutional function* (what they should actually do) (Pritchett et al., 2013). The better performing USF in contrast developed relatively clear UAS frameworks that provide clear definitions of universal access, target regions and populations, the scope of projects covered by USF, and how funds are to be allocated. In developing such frameworks, a problem-driven contextual approach is needed that considers the characteristics of the local context (Andrews 2013; Faustino & Booth, 2014; Pritchett et al., 2013). By focusing on local problems, policymakers can avoid copying UAS policies that are incompatible with the types of digital divides in their context (Andrews et al., 2013). Taking a local problem-driven approach to building institutional capacity however requires active participation by a broad set of stakeholders (Andrews 2013).

Cross-sectional partnerships: Our second mechanism demonstrates the need for advancing cross-sectoral partnerships. As mobile network operators are one of the major stakeholders affected by UAS and USF they need to play an active role in the development of these frameworks. This is because as pointed out by institutional change scholars "an institutional template that is not enacted by all members of an organizational field would invariably fail to become an institution at all" (Whittle et al., 2010, p. 552). The engagement of mobile operators in the development of USF would allow the development of a framework with appropriate incentives that ensure their participation (Arakpogun et al, 2018). This collaborative space can also enhance trust among the providers which can enable trust-building and consequently infrastructure sharing to reduce the transaction costs associated with serving unviable areas. In order to balance and ensure the local needs are reflected in UAS policy and governance, our findings indicate that the representation of relevant NGOs and local communities may be a way forward for creating inclusive planning (Mistry, 2014; Ricci, 2000). Such an engagement further offers legitimacy for any proposed digital initiatives (Andrews et al., 2013).

Bottom-up initiatives*:* Engaging stakeholders in institution building should not be limited to mobile operators but to a wider stakeholder, including local communities that are most affected

by digital divide. Focusing on strengthening institutions in order to enhance network coverage may be necessary but not sufficient as communities often lack the necessary knowledge and skills to use technology (Van Dijk 2006). Thus, our last mechanism is to encourage bottom-up initiatives. Kummitha and Crutzen (2019) highlight that citizen-driven initiatives ensure the flow of the local knowledge and participation of the communities. As highlighted in the institutional entrepreneurship and change literature, institutional change involves multiple distributed actors and requires support from different actors. Accordingly, for UAS and USF to be effective they need to account for the concerns and issues encountered by local communities and be designed according to their level of digital knowledge and skills (Arakpogun et al, 2017; Arakpogun et al, 2018). Creating spaces through which local communities can voice their opinions and develop initiatives is crucial. This involves a process of convening (Dorado, 2005) and connecting (Andrews et al., 2013) whereby community leaders and entrepreneurs work collaboratively with policymakers and mobile operators to develop and experiment with different locally suitable solutions. This process of institutional capacity building needs to be underpinned by continuous learning and feedback loops (Andrews et al., 2013) and therefore UAS policies need to be updated based on the input provided by local communities.

6.1 Theoretical Contribution

Our study offers several contributions to the digital divide literature. First, when it comes to digital divide, some of the earlier research (e.g., Campbell 2001; Nour 2017; Rana et al. 2019) have focused solely on demand-side factors and offered ways in which the divide can be reduced through, for example, upgrading the skills of users. This body of research also suggests that in the absence of necessary state institutions, institutional voids can be bridged through the active role of civil society and private sector organizations. Our study complements and adds to this body of research by providing insights from a supply-side perspective on the one hand and some demand initiatives on the other to argue for a joined-up solution to improving digital dived from both the demand-and-supply-sides. We argue that both the demand-and-supply-sides of digital divide are complementary in the sense that without network coverage, one cannot access mobile service and, on the other hand, without the demand for mobile services, mobile network becomes redundant. Furthermore, it is not a given that the civil society and private sector can bridge the institutional voids in the absence of necessary state institutions without a certain level of regulatory capacity in the African context (Arakpogun et al, 2017; Arakpogun et al, 2018). Building on insights from the institutional change and development

literature (Andrews et al., 2013), we proposed three specific mechanisms that can enhance institutional capacity in the context of USF implementation.

We further contribute to the digital divide literature by providing a more in-depth understanding of the institutional challenges of using USFs in Africa. Despite the popularity of UAS and USFs as a telecommunications reform policy, prior literature has predominantly focused on USF in Asia (Jain & Das, 2001; Xia & Lu, 2008), Europe (Feijoo & Milne, 2008; Simon, 2008), South America (Hudson, 2010) and the US (Hudson & Rockefeller, 2009), with little research exploring the African context. Arakpogun et al (2017) is a notable exception in this respect. Our study helps to bridge this knowledge gap by informing our understanding and explicating the specific institutional and organizational constraints on the effective implementation of USF in Africa. The African context is particularly important given the disproportionate levels of digital divide in Africa relative to other parts of the world and its unique institutional characteristics.

6.2 Practical Implications

Our findings also provide some practical recommendations, which policymakers could implement to improve the current form and function of USF. At the heart of these recommendations is the need for policymakers to formulate clear, realisable, and measurable UAS objectives in order to mitigate the complexity and ambiguity associated with USF. For example, UAS policy should be clear on the minimum population density that qualifies a location for USF, what kind of services should USF cover - mobile and/or fixed broadband of specific speed and quality of service. Having established clear UAS objectives, policymakers can then set out to collect relevant data, which is critical for planning, resource allocation, and implementation. This would also help policymakers to measure who lacks what and where the most needs are instead of allocating resources 'blindly'. This process of policy formulation needs to be underpinned by a broad engagement of stakeholders (e.g., local communities, civil society organizations, and mobile operators)

Policymakers can then determine the level of resources (human, technical and financial) that are needed, and specify the indicators to incorporate into the USF contract upon which performance could be measured and monitored. Such data gathering processes can also help policymakers to identify relevant stakeholders from the affected communities, as well as other actors like mobile network operators and equipment vendors, whom they will interact with to bring connectivity to disadvantaged areas. The paper thus validates the argument that setting

clear UAS objectives is arguably the most important step for USF given that a well thought and developed objective would have an overall positive effect on the management and operationalisation of USF (Jerling, 2010; Maddens, 2009).

We argue that these practical steps would go a long way in bringing a paradigm shift that would help African countries move beyond a state of becoming to actually closing the digital divide for all and sundry across Africa. This paradigm shift would prevent millions of people from falling through the digital cracks given that technology is fast becoming the conduit for participating in a series of socio-economic activities. Overall, we believe that African policymakers should consider adapting our framework, not least, because USF is the primary UAS policy instrument for dealing with the digital divide in Africa. Improving USF, therefore, is important in order to achieve the UN universal access goal of connecting at least 90% of people to the information society by 2050 (Souter & van der Spuy, 2019; UN, 2018).

6.3 Research Limitation & Scope for Future Research

As with most studies, this paper is not without limitations. First, we were unable to secure more interviewees on the one hand and a more balanced category of interviewees on the other. As such, the results may be skewed towards academics, independent researchers, industry experts and UAS consultants who accounted for half of the interviews. While we acknowledge this as one of the potential limitations to our study, it is also useful to state that interviewees have a varied number of years of experience while performing single or multiple key roles in the telecoms industry. For example, we had some interviewees that previously worked for regulators now working as public policy directors for mobile network operators and over-the-top players as well as consultants and vice-versa. The dynamics of our interviewees helped, to a degree, mitigate bias in some cases as a particular participant, say a mobile network operator, may give an account of the state of a regulator when s/he was a regulator even while speaking as a mobile network operator. It is useful to also stress that such limitation is not unique to this paper given the difficulty encountered in getting policymakers in Africa to participate in a UNESCO report on global Internet development despite the attempt of using various UN agencies to engage with African countries (Souter & van der Spuy, 2019).

Moreover, since this paper has mainly focused on improving physical access to telecommunications, it has offered a limited contribution to the demand-side of digital divide. Future research can thus focus on drawing more interview data from a wider stakeholder group to complement the supply-side approach adopted in this paper. Another line of research could

explore the impact of poor USF implementation on the demand-side of digital divide. For example, the impact of USF on digital gender divide, digital skills, and the affordability of mobile tariffs and smartphones.

References

A4AI 2018. 2018 Affordability Report. Washington DC: Alliance for Affordable Internet.

African Union 2018. African Union Handbook 2018. Addis Ababa and Wellington: African Union Commission and New Zealand Ministry of Foreign Affairs and Trade.

Alam, K. & Imran, S. 2015. The digital divide and social inclusion among refugee migrants. *Information Technology & People*.

Andrade, A. D. & Urquhart, C. 2010. The affordances of actor network theory in ICT for development research. *Information Technology & People*.

Andrews, M. (2013). *The limits of institutional reform in development*. New York: Cambridge University Press.

Andrews, M., Pritchett, L. & Woolcock, M. 2013. Escaping capability traps through problem driven iterative adaptation (PDIA). *World Development,* 51**,** 234-244.

Arakpogun, E. O., Wanjiru, R. & Whalley, J. 2017. Impediments to the implementation of universal service funds in Africa–A cross-country comparative analysis. *Telecommunications Policy,* 41**,** 617-630.

Arakpogun, O. E. (2018). Closing the digital divide in Africa: The role of mobile telecommunications and universal access and service policies. The University of Northumbria at Newcastle, United Kingdom.

Arakpogun, E. O., Wanjiru, R., & Whalley, J. (2018). Improving the implementation of universal service funds to close the digital divide in Africa: A multi-stakeholder perspective. 2nd International Telecommunications Society African Regional Conference, 15-16 March. Lusaka, Zambia.

Ashraf, M., Grunfeld, H., Hoque, M. R. & Alam, K. 2017. An extended conceptual framework to understand information and communication technology-enabled socio-economic development at community level in Bangladesh. *Information Technology & People*.

Asongu, S., le Roux, S., Nwachukwu, J. C. & Pyke, C. 2018. The mobile phone as an argument for good governance in sub-Saharan Africa. *Information Technology & People*.

Asongu, S. & Nwachukwu, J. C. 2018a. Comparative human development thresholds for absolute and relative pro-poor mobile banking in developing countries. *Information Technology & People,* 31**,** 63-83.

Asongu, S. A. & Nwachukwu, J. C. 2018b. Openness, ICT and entrepreneurship in sub-Saharan Africa. *Information Technology & People,* 31**,** 278-303.

Bailey, C. 2014. *SIU nails Dina Pule's man* [Online]. Independent Media. Available: https://www.iol.co.za/news/siu-nails-dina-pules-man-1707113 [Accessed April 18 2016].

Billon, M., Marco, R. & Lera-Lopez, F. 2017. Innovation and ICT use by Firms and Households in the EU. *Information Technology & People*.

Calandro, E., Gillwald, A., Lewis, C., Mothobi, O. & Rademan, B. 2018. Final Version: Response to an Invitation to Provide Written Comments on the Electronic Communications Amendment Bill on the 17th of November 2017 (Government Gazette 41261, Government Notice No. 1293). Cape Town: Research ICT Africa.

Campbell, D. 2001. Can the digital divide be contained? *Int'l Lab. Rev.,* 140**,** 119.

Castells, M. 2002. *The Internet galaxy: Reflections on the Internet, business, and society*, Oxford University Press on Demand.

Cave, M. & Hatta, K. 2008. Universal service obligations and spectrum policy. *info,* 10**,** 59-69.

Clarke, G. & Wallsten, S. 2002. *Universal (ly bad) Service: Providing infrastructure services to rural and poor urban consumers*, The World Bank.

Collins, G. 2015. *Connecting Africa from the Village up* [Online]. LinkedIn. Available: https://www.linkedin.com/pulse/connecting-africa-from-village-up-gerry-collins/ [Accessed January 19 2016].

Dasgupta, S., Lall, S., & Wheeler, D. (2005). Policy reform, economic growth and the digital divide. *Oxford Development Studies, 33*(2), 229-243.

Dey, B. L., Babu, M. M., Rahman, M., Dora, M., & Mishra, N. (2019). Technology upgrading through co-creation of value in developing societies: Analysis of the mobile telephone industry in Bangladesh. *Technological Forecasting and Social Change, 145*, 413-425.

Doh, J., Rodrigues, S., Saka-Helmhout, A. & Makhija, M. 2017. International business responses to institutional voids. Springer.

Dorado, S. (2005). Institutional entrepreneurship, partaking, and convening. *Organization Studies, 26*(3), 385–414.

Dorward, L. A. 2013. Universal service funds and digital inclusion for all. Geneva: International Telecommunication Union.

Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of management review,* 14**,** 532-550.

Elsahn, Z., Callagher, L., Husted, K., Korber, S., & Siedlok, F. (2020). Are rigor and transparency enough? Review and future directions for case studies in technology and innovation Management. *R&D Management*, *50*(3), 309-328.

Evans, P. (2004). Development as institutional change: The pitfalls of monocropping and potentials of deliberation. *Studies in Comparative International Development, 38*(4), 30–52

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), pp. 4-11

Friederici, N., Ojanperä, S. & Graham, M. 2017. The impact of connectivity in Africa: Grand visions and the mirage of inclusive digital development. *The Electronic Journal of Information Systems in Developing Countries,* 79**,** 1-20.

Gerring, J. 2008. Case selection for case-study analysis: Qualitative and quantitative techniques. *The Oxford handbook of political methodology.*

Gillwald, A. 2005. Good intentions, poor outcomes: Telecommunications reform in South Africa. *Telecommunications Policy,* 29**,** 469-491.

Graham, M. 2019. Changing Connectivity and Digital Economies at Global Margins. *In:* Graham, M. (ed.) *Digital Economies at Global Margins* Cambridge, Massachusetts: MIT Press.

Grindle, M. (2004). Good enough governance: Poverty reduction and reform in developing countries. *Governance, 17*, 525–548.

GSMA 2014. Sub-Saharan Africa – Universal Service Fund study. London: GSMA.

GSMA Intelligence 2016. The Mobile Economy Africa 2016. London: GSMA.

GSMA Intelligence. 2017. *Definitive data and analysis for the mobile industry* [Online]. London: GSMA. Available: https://www.gsmaintelligence.com/ [Accessed].

Hudson, H. E. 2010. Universal Service Policy: Are they Accelerators or Anachronisms? *Inter Media,* 38**,** 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

Intelecon 2009. Universal Access and Service Funds: 2009 Update from Intelecon. Vancouver, BC: Intelecon Research & Consultancy Ltd.

ITU 1999. World Telecommunication Development Report 1999. Geveva: International Telecommunication Union.

ITU 2013. Universal Service Fund and Digital Inclusion for all Study. Geneva: International Telecommunication Union.

ITU. 2015. *ICT Facts and Figures 2015* [Online]. Geneva: International Telecommunication Union. Available: https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf [Accessed June 15 2017].

ITU 2018. Measuring the Information Society Report Volume 1 2018. Geneva: International Telecommunication Union.

Jain, R. S., & Das, P. (2001). A framework for assessing universal service obligations: A developing country perspective. arXiv preprint cs/0109050.

Jerling, D. 2010. *Universal Service and Access Funds Research Report: Challenges to the effective use of USAFs* [Online]. Lusaka: Connect Africa. Available: http://www.connectafrica.net/wp-content/uploads/2013/02/CONNECT-AFRICA-USAF-Research-Report-March-4-2010ABF.pdf [Accessed January 19 2016].

Karombo, T. 2016. *Zimbabwe impounds telecom fund for digitalisation* [Online]. ITWeb Africa. Available: http://www.itwebafrica.com/ict-and-governance/273-zimbabwe/236758-zimbabwe-impounds-telecom-fund-for-digitalisation [Accessed February 12 2017].

Kauffman, R. J., & Techatassanasoontorn, A. A. (2009). Understanding early diffusion of digital wireless phones. *Telecommunications Policy, 33*(8), 432-450.

Khanna, T. & Palepu, K. 1997. Why focused strategies may be wrong for emerging markets. *Harvard business review,* 75**,** 41-54.

Khanna, T. & Palepu, K. 2000. The future of business groups in emerging markets: Long-run evidence from Chile. *Academy of Management journal,* 43**,** 268-285.

Khanna, T., Palepu, K. G. & Sinha, J. 2005. Strategies that fit emerging markets. *Harvard business review,* 83**,** 4-19.

Klein, H. K. & Myers, M. D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS quarterly***,** 67-93.

Kummitha, R. K. R. 2016. *Social entrepreneurship: Working towards greater inclusiveness*, SAGE Publications India.

Kummitha, R. K. R. & Crutzen, N. 2019. Smart cities and the citizen-driven internet of things: A qualitative inquiry into an emerging smart city. *Technological Forecasting and Social Change,* 140**,** 44-53.

LCA 2016. Universal Service Fund Strategic Business Plan - 2014-2017. Maseru, Lesotho: Lesotho Communications Authority (LCA).

Luiz, J. M., & Stephan, H. (2012). The multinationalisation of South African telecommunications firms into Africa. *Telecommunications Policy, 36*(8), 621-635.

MACRA. 2013. *National ICT Policy: An ICT Led Malawi* [Online]. Blantyre: Malawi Communications Regulatory Authority (MACRA). Available: http://www.macra.org.mw/wp-content/uploads/2014/07/Malawi-ICT-Policy-2013.pdf [Accessed].

Maddens, S. 2009. Trends in Universal Access and Service Policies: Changing Policies to Accommodate Competition and Convergence. Geneva: International Telecommunication Union.

Manson, K. 2013. *Africa takes lead in mobile revolution* [Online]. Nairobi: Financial Times. Available: https://www.ft.com/content/0846ab76-8c8d-11e2-8ee0-00144feabdc0 [Accessed October 24 2014].

Mair, J. & Marti, I. 2006. Social entrepreneurship research: A source of explanation, prediction, and delight. *Journal of world business,* 41**,** 36-44.

Mair, J. & Marti, I. 2009. Entrepreneurship in and around institutional voids: A case study from Bangladesh. *Journal of business venturing,* 24**,** 419-435.

Mair, J., Marti, I. & Ventresca, M. J. 2012. Building inclusive markets in rural Bangladesh: How intermediaries work institutional voids. *Academy of Management Journal,* 55**,** 819-850.

Matinde, V. 2018. *Kenya: CA ordered to avail Kshs1 billion to fight cybercrime* [Online]. ITWeb Africa. Available: http://www.itwebafrica.com/ict-and-governance/256-kenya/242671-kenya-ca-ordered-to-avail-kshs1-billion-to-fight-cybercrime [Accessed February 08 2018].

Mistry, J. J. 2005. A conceptual framework for the role of government in bridging the digital divide. *Journal of Global Information Technology Management,* 8**,** 28-46.

Mohamed Nour, S. 2017. Africa bridging the digital divides. *The Nordic African Institute Policy Note,* 4.

Moyo, A. 2016. *USAASA's new CEO confident in stability* [Online]. ITWeb Africa. Available: https://www.itweb.co.za/content/BO2rQGMArX2qd1ea [Accessed June 20 2016].

Mueller, M. 1993. Universal service in telephone history: A reconstruction. *Telecommunications Policy,* 17**,** 352-369.

Muto, M. & Yamano, T. 2009. The impact of mobile phone coverage expansion on market participation: Panel data evidence from Uganda. *World Development,* 37**,** 1887-1896.

Mzekandaba, S. 2018. *Parliament to decide ICASA chairman's future* [Online]. ITWeb Africa. Available: https://www.itweb.co.za/content/JBwEr7n5kNWv6Db2 [Accessed February 05 2018].

NCA. 2017. *NCA Gives Opportunity to Telcos to Deploy 3G Coverage to Rural Areas* [Online]. Accra: National Communications Authority (NCA). Available: https://nca.org.gh/media-and-news/news/nca-gives-opportunity-to-telcos-to-deploy-3g-coverage-to-rural-areas/ [Accessed June 15 2018].

North, D. C. 1990. *Institutions, institutional change and economic performance*, Cambridge University Press.

OECD. 2001. Understanding the Digital Divide. OECD Digital Economy Papers(49).

Oestmann, S. & Dymond, A. 2008. Universal Access and Service: Module 4, ICT Regulation Toolkit. Geneva: infoDev

Ojo, A., Janowski, T. & Awotwi, J. 2013. Enabling development through governance and mobile technology. *Government Information Quarterly,* 30**,** S32-S45.

Park, S. R., Choi, D. Y. & Hong, P. 2015. Club convergence and factors of digital divide across countries. *Technological Forecasting and Social Change,* 96**,** 92-100.

Pick, J. B. & Nishida, T. 2015. Digital divides in the world and its regions: A spatial and multivariate analysis of technological utilization. *Technological Forecasting and Social Change,* 91**,** 1-17.

Rana, N. P., Luthra, S. & Rao, H. R. 2019. Key challenges to digital financial services in emerging economies: the Indian context. *Information Technology & People*.

Ricci, A. 2000. Measuring information society: Dynamics of European data on usage of information and communication technologies in Europe since 1995. *Telematics and Informatics,* 17**,** 141-167.

Rodrik, D. (2008). Second-best institutions. *American Economic Review: Papers and Proceedings*, 98(2), 100–104.

Ryan, G. W. & Bernard, H. R. 2003. Techniques to identify themes. *Field methods,* 15**,** 85-109.

Saldaña, J. 2015. *The coding manual for qualitative researchers*, London: Sage Publications Ltd.

Saunders, M., Lewis, P., & Thornhill, A. (2012). Research Methods for Business Students. Essex: Pearson Education Limited..

Saunders, M. N. K., & Townsend, K. (2016). Reporting and Justifying the Number of Interview Participants in Organization and Workplace Research. *British Journal of Management*, 27(4), 836–852.

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), pp. 138-151.

Stake, R. E. 1995. *The art of case study research*, London: Sage Publication.

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

Smith, W. 2003. Regulating infrastructure for the poor: perspectives on regulatory system design. Infrastructure for Development: Private Solutions and the Poor, May 31 - June 02 2000 London.

Souter, D. 2016. *Inside the Information Society: A short history of the Internet* [Online]. Association for Progressive Communications (APC). Available: https://www.apc.org/en/blog/inside-information-society-short-history-internet [Accessed October 22 2016].

Souter, D. & van der Spuy, A. 2019. UNESCO'S Internet Universality Indicators: A Framework for Assessing Internet Development. Paris: The United Nations Educational, Scientific and Cultural Organization (UNESCO).

Stern, P. A. & Townsend, D. N. 2007. New models for universal access to telecommunications services in Latin America: lessons from the past and recommendations for a new generation of universal access programs for the 21st century: Main report (English). Washington, DC.: World Bank.

Thakur, D. & Potter, L. 2018. Universal Service & Access Funds | An Untapped Resource to Close the Gender Digital Divide. Washington, DC: World Wide Web Foundation and the Alliance for Affordable Internet.

UN. 2012. United Nations E-Government Survey 2012: E-Government for the People. New York: United Nations.

UN. 2018. *World's most vulnerable countries on track to achieve universal Internet access by 2020 – UN report* [Online]. New York: United Nations. Available: https://news.un.org/en/story/2018/01/1001061#.WmkReZOplBw [Accessed January 23 2019].

Van Dijk, J. A. 2006. Digital divide research, achievements and shortcomings. *Poetics,* 34**,** 221-235.

Weick, K. E. 2007. The generative properties of richness. *Academy of management journal,* 50**,** 14-19.

Whittle, A., Suhomlinova, O., & Mueller, F. (2010). Dialogue and distributed agency in institutional transmission. *Journal of Management & Organization, 17*(4), 548–569.

Williams, I. & Kwofie, B. 2014. The Impact of Liberalisation on the Mobile Telephony Market in Africa: The Cases of Ghana, Nigeria and Kenya. *In:* Skouby, K. E. & Williams, I. (eds.) *The African Mobile Story* Aalborg: River Publishers.

World Bank 2016. World Development Report 2016: Digital Dividends. Washington DC: International Bank for Reconstruction and Development / The World Bank.

Xia, J., & Lu, T. J. (2008). Bridging the digital divide for rural communities: The case of China. Telecommunications Policy, 32(9-10), 686-696.

Table 1: Examples of secondary sources and insights gained

Type	Insights gained
Research on USF in Africa: (Arakpogun et al., 2017; Arakpogun et al., 2018; Gillwald, 2005) Consultancy based studies on USF in Africa: (Dorward, 2013; GSMA, 2014; Intelecon, 2009; ITU, 2013; Sepulveda, 2010; Stern & Townsend, 2007)	These sources were generated during the literature search process. The following key insights were provided: ▪ an understanding of the state of the telecoms market in general and the problem of digital divide in particular ▪ various UAS policies and the use of USF as a popular tool for closing the digital divide in over 30 African countries ▪ the process of establishing USF, funding USF, USF governance and USF performance, active and inactive funds ▪ why most African USF are largely inactive and how some countries such as Ghana, Nigeria and Uganda are setting relatively good examples compared to others
Social media and Web pages of institutional bodies such as telecoms regulators, International Telecommunication Union (ITU), World Bank and GSMA Intelligence	The archival records provided by these sources were useful in: ▪ the verification of the findings of the extant work on USF in Africa ▪ gathering historical and recent data on the state of telecoms industry, digital divide and USF in Africa ▪ identifying and contacting regulators responsible for the governance of USF in various African countries ▪ identifying and contacting public policy directors of mobile network operators who contribute to USF levies ▪ triangulating the primary information generated from the interview data
Online articles from sources such as Balancing Act, Financial Times, ITNews Africa, ITWeb Africa, Reuters, Telecompaper and TeleGeography	The information that was tracked, generated and documented from these online (news) sources was vital to: ▪ tracking the state of USF in Africa ▪ getting up-to-date information and relevant data on the phenomenon of digital divide in Africa ▪ tracking changes of UAS policies in Africa ▪ sourcing further information for more clarity on obscure UAS policies on regulatory websites ▪ identifying and contacting key respondents for interviews

Table 2: Sources of primary data

Category of interviewees	Mode of interviews	No. of respondents
Telecoms regulators and USF managers	Face-to-face and emails	5
Academics, researchers and UAS/USF consultants	Face-to-face, Skype, telephone and email	11
Pan-African and multinational mobile network operators	Face-to-face, Skype, telephone and email	5
Civil society and international lenders like world bank	Skype, telephone and email	3
Over-the-top players like Facebook and Google	Google Hangout	1
Total		25

Table 3: Description of interviewees

Labelling	Description
Interviewee1	A civil society representative and access specialist promoting the proliferation of low-cost telecommunications infrastructure across Africa and other developing countries
Interviewee2	A deputy director of a regulatory body in Africa
Interviewee3	A senior executive of multinational mobile operator with footprint across Africa
Interviewee4	A former regulator who is now the regional head of access policy for a multinational over-the-top player
Interviewee5	A UAS consultant and academic with over 20 years industry experience in Africa and other parts of the world
Interviewee6	An independent telecommunications policy analyst and researcher
Interviewee7	ICTs researcher and community network expert
Interviewee8	Access specialist and managing director of a niche (mobile network) provider
Interviewee9	A senior regulatory employee in charge of spectrum allocation
Interviewee10	A USF director
Interviewee11	A USF specialist and UAS researcher with over 15 years' experience across 17 African countries, who also consult for the International Telecommunication Union
Interviewee12	Access specialist and business director of a niche (mobile network) provider
Interviewee13	A senior executive responsible for public policy for a multinational mobile operator in Africa
Interviewee14	A UAS consultant with experience in African countries and other developing economies
Interviewee15	The Chief Information Officer for a pan-African mobile network operator
Interviewee16	A key civil society advocate and ICTs researcher
Interviewee17	A former public policy executive of a multinational mobile operator in Africa, who is now an independent public policy adviser
Interviewee18	A regulatory specialist with an international lending organisation who is working with countries in East Africa to improve coverage in disadvantaged areas
Interviewee19	An independent researcher with interest in developing digital inclusion in developing countries
Interviewee20	A former head of an intergovernmental ICTs body, now an independent consultant and researcher for the International Telecommunication Union and World Bank
Interviewee21	A former multinational mobile network operator employee responsible for public policy in Africa
Interviewee22	A long-term academic and UAS consultant
Interviewee23	A former USF CEO who now consult for the International Telecommunication Union and some countries in Africa
Interviewee24	An academic and UAS consultant with experience in African and European countries

Interviewee25	A UAS director in Africa

Table 4: Examples of active and inactive USF across Africa

	Active USF (Group 1)	Active USF (Group 2)	Inactive USF	Others
Countries	Egypt, Ghana, Lesotho, Morocco, Nigeria, Rwanda, Tanzania, Uganda	Cameroon, Chad, Cote d'Ivoire, Guinea, Madagascar, Mozambique, South Africa, Sudan, Togo, Zambia, Zimbabwe	Burkina Faso, DR Congo, Gabon, Kenya, Mali, Mauritania, Mauritius, Swaziland	Algeria, Benin Republic, Niger, Senegal, Sierra Leone, Tunisia
USF regulatory framework	One of the key drivers of the relative success of USF in these countries is the existence of clear USF regulatory framework. For example, group 1 countries tend to have a better UAS framework that signposts a clear direction and flexible targets for USF. For instance, the USF mandate in Egypt and Ghana does not only outline the specificity of technology and location targets, but it also allows for flexibility to enable USF to deploy new services (e.g. improving digital skills) and technologies (e.g. broadband). Such flexibility has allowed group 1 countries to establish a robust USF regulatory framework that paves the way for the execution of dynamic projects.	A common institutional void associated with group 2 countries is the lack of a robust USF framework. For example, a country like Cameroon is still using USF to deploy fixed services like telecentres. Operating with such USF framework is counterproductive not only because mobile telephony is preferable across Africa, but telecentres are also unsustainable due to the lack of electricity to power computers. Citizens in some communities also find it stressful to walk several kilometres just to have limited internet access. Accordingly, underlying UAS frameworks and USF mandates in group 2 countries should be amended to enable USF to deploy emerging services and technologies that are relevant to people.	Apart from Kenya and Gabon where USF was established relatively recently in 2015 and 2017 respectively, other countries in this category have long-established USF, yet there is little or no public data about their operations.	While the UAS frameworks in these countries point to the establishment of USF and percentage of levy collected, access to public information on how much has been collected and project executed is lacking.
Governance	Another enabling institutional arrangement that underpins the success of USF in group 1 countries is the transparency surrounding USF governance. This is accentuated with the case of Uganda where there is public availability of financial records (income and expenditure) and USF projects on their websites. We found that USF in Uganda generated around $38 million between 2002 and 2015 while disbursing about $37.5 million in the same period to execute over 7,000 projects. These	When it comes to the lack of transparency in USF governance, South Africa is an interesting case not only as the first USF in Africa, but one that despite the execution of a series projects, its USF operation is constantly disrupted by institutional weaknesses linked to corruption and undue political interference. For example, the entire Board of Universal Service and Access Agency of South Africa (USAASA) was suspended in 2011 while a long-serving senior official was suspended in 2014 following corruption allegations.		The lack of access to public information in these countries raises concern about institutional transparency because if such information is not available in the public space, it is impossible to assess USF performance on the one hand and hold public authorities accountable on the other hand

	include the deployment of over 2,400 public payphones, 880 GSM sites, 622 broadband sites, and 1,800 school connectivity across the country. Access to such information is not only useful to hold the regulator accountable, but it also allows the public to verify what projects have been executed. Such transparency further strengthens the trust between public institutions and citizens. Furthermore, USF regulators in group 1 countries, for example, Rwanda and Tanzania, have more independence when it comes to the administration and management of the funds. This helps to strengthen USF governance and curtail the opportunistic behaviour of politicians who tend to unduly influence USF in group 2 countries.	Further, there have been instances where former USAASA managers have alleged that the termination of their appointment is linked to their refusal to award USF contracts proposed by politicians. Such practices do not only destabilise the smooth running of USF, but it also undermines the independence of the regulator.		
USF personnel			A common practice among countries with inactive USF is that while funds are disbursed at the early stages, disbursement tend to stop as time progresses without discontinuing the collection of USF levy. For example, haven disbursed $6 million to MTN in 2009, there is no public record to suggest Swaziland has continued USF disbursement. This is indicative of the characteristic of inactive USF, which has resulted in a growing amount of idle funds. Section 2 highlighted that over $400 million, including over $20 million in Burkina Faso and $5 million in Mali, have been accumulated across USF in Africa. Insights from our analysis suggest that the growing amount of idle funds in Africa is partly linked to the organisational constraint of a lack of regulatory skills to quickly design projects and deploy funds. For example, while skills and competencies such as technical, economic, and legal are critical to the organisation of USF, regulatory bodies are typically faced with a lack of relevant	

			skills. The lack of regulatory skills may not necessarily be down to the shortages of talent but due to political interference that favours the recruitment personnel with political ties with the wrong skillsets. Further organisational constraints that propagate idle funds are time lag between the collection of levy and disbursement, and government bureaucracies, which delay decision making and implementation.	
Industry incentives	Robust USF regulatory framework and transparent USF governance have created the necessary institutional building blocks for USF to succeed in group 1 countries. This, in turn, has created an enabling institutional environment for industry actors like mobile network operators to support the digital inclusion agenda of group 1 countries. For example, a transparent USF governance will incentivise mobile network operators to continue paying USF levy, knowing that funds would be disbursed when they put in their bids to execute projects on disadvantaged communities.		Conversely, in countries with inactive funds where a series of institutional voids such as corruption, lack of transparency, and undue political interference could disincentivise mobile network operators. For example, operators in countries like Mauritius have discontinued the remittance of USF levy due to non-utilisation and mismanagement of funds. If the refusal of operators to pay USF levy becomes widespread, this could limit the financial resources of African countries and their ability to strengthen their institutional capacity (skills and financial resources) in closing digital divide. Accordingly, the digital inclusion agenda in such countries would lack the support of market participation and citizens engagement.	
Contextualising and implementing USF	▪ USF across Africa are typically established at a national level either through an act of parliament (e.g., the Electronic Commutations Act of 2005 established USF in South Africa) or decree (e.g., USF in Algeria was established by Decree No. 03-232 and amended by Law 55-01 of 2004) ▪ USF are largely funded through levies on the annual revenues of mobile network operators with a range of 1% in Mauritius to 5% in Tunisia ▪ USF are administered independently by a separate entity (e.g., the Ghana Investment Fund for Electronic Communications) or dependently by a unit within the designated ministry (e.g., the Universal Telecommunications Services Management Committee in Morocco) ▪ Project identification mainly follows a top-down approach where USF administrators decide target locations ▪ USF are then disbursed on a competitive basis via least subsidy tender where projects are awarded to operators with the minimum subsidy request			

Compiled by authors from a variety of sources including Arakpogun et al (2017), Arakpogun (2018), Arakpogun et al (2018), Regulatory websites, GSMA Intelligence, and International Telecommunication Union.