UNIVERSAL ACCESS AND SERVICE INTERVENTIONS IN SOUTH AFRICA: BEST PRACTICE, POOR IMPACT[1]

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ABSTRACT: Post-apartheid South Africa placed universal access and service at the forefront of its communications policy and regulatory interventions from 1996. It followed global best practice by imposing universal service obligations on licensees by establishing a universal service fund and a dedicated universal access regulatory body, as well as awarding targeted operator licences in areas of low teledensity. The effectiveness of these interventions is open to question, with fixed-line teledensity falling and prepaid customers in the mobile sector now accounting for the overwhelming majority of telephony users nationwide. Starting with an overview of South Africa's universal access and service imperative, this paper assesses the value and effectiveness of these universal access and service interventions. It shows how the burgeoning access to mobile has little to do with the impact of these interventions. Finally, the implications of this for universal access and service policy and regulation, and for its implementation, are considered.

KEYWORDS:
Universal access, universal service, UAS, USOs, USF

INTRODUCTION
Telecommunications reform in South Africa was accompanied by a strong policy commitment to achieving universal access and service (UAS). This resulted in a number of specific interventions designed to extend access to telecommunications services, largely informed by global best practice (Blackman & Srivastava, 2011; infoDev, 2009; Intven, 2000; ITU, 1998; SADC, 2011). Many of these, however, are regarded with scepticism, or are seen as having failed (Gillwald, 2006; Hodge, 2004; Perry, 2010). Yet at the same time, South Africa's mobile teledensity has soared to 67 million active SIM-cards in a population of 52 million (MTN, 2013; Tarrant, 2013; Telkom, 2013; Vodacom, 2013), which translates into 126% teledensity, though per capita user penetration is lower[2] . This increase is arguably despite, rather than because of, targeted UAS interventions, and is largely attributable to the runaway growth of prepaid mobile. The UAS concept has a lengthy pedigree (Mueller, 1997). Current usage distinguishes between widespread access at the individual/household level (universal service) versus widespread access via public facilities such as payphones (universal access), adopting 'universal access and service (UAS)' as a portmanteau policy term (Blackman & Srivastava, 2011, pp. 153-154).

A critical assessment of South Africa's UAS policy and practice in relation to global best practice, in order to identify impacts and to account for shortcomings, is therefore necessary. The lessons from such an analysis will be of value not only for developing countries still designing and implementing UAS interventions for telephony and Internet services, but also for those contemplating UAS interventions in relation to national broadband plans. South Africa is presently engaged in a full review of ICT sector policy and development of a new broadband policy, both of which include UAS interventions. Namibia has recently adopted a national UAS policy which foresees broadband interventions.

Firstly, this article shows why UAS has been a central pillar in South Africa's telecommunications reform. Secondly, it documents the key components of consequent UAS interventions: the imposition of universal service obligations on licensees, the establishment of a dedicated agency to deal with UAS issues and a universal service fund, and the awarding of licences in areas of low teledensity. Next, an assessment of each of these UAS interventions is undertaken leading to a conclusion.

BACKGROUND
South Africa's transition to democracy in 1994 and its subsequent engagement with telecommunications reform took place against the background of an increasing interest in UAS as a central sector reform issue (Hudson, 1994), and in the context of a racially discriminatory history of systematic denial of access to telecommunications services for the majority of the population. Hence, in the policy guideline on telecommunications, the Reconstruction and Development Programme (RDP) emphasises the racial distortions to access under apartheid:

> For black people it is estimated that less than 1 (fixed telephone) line per 100 persons is in place compared with about 60 (fixed telephone) lines per 100 white persons. Other countries with comparable per capita wealth have 30 lines per 100 persons. The situation is far worse in rural areas (ANC, 1994).

1 This article was developed from a 2010 paper presented at the International Telecommunications Society Conference 'Telecommunications: Ubiquity and equity in a broadband environment', Wellington, New Zealand.

2 The teledensity figure includes SIMs used for 3G data, machine-to-machine communications and telemetry, and does not account for multiple SIM ownership.

The RDP acknowledges the role of telecommunications as an "indispensable backbone for the development of all other socio-economic sectors", and commits the country to "provide universal affordable access for all as rapidly as possible within a sustainable and viable telecommunications system" (ANC, 1994).

This recognition of a deeply racialised communications divide finds further expression in the objectives of the White Paper on Telecommunications which emerged from the post-1994 telecoms reform process: "Our particular goal is to balance the provision of basic universal service in telecommunications to disadvantaged rural and urban communities with the delivery of advanced information services capable of meeting the needs of a growing South African economy" (RSA, 1996a, p. 1). The Telecommunications Act 1996 likewise lists the intent to "promote the universal and affordable provision of telecommunication services" (RSA, 1996b, 2(a)) foremost among its 17 objectives. With the passage of the Electronic Communications Act (RSA, 2005), by which time substantial strides had been made towards securing universal access to telecommunications services, this overarching goal of universal affordable access was modified to a less strongly formulated commitment to "promote the universal provision of electronic communications networks and electronic communications services and connectivity for all" (RSA 2005 2(c)). This vision of "universal affordable access for all" animated subsequent regulatory interventions (Hodge, 2004; Msimang, 2006) over the critical transition years post-democracy towards a reformed communications environment.

SOUTH AFRICA'S UNIVERSAL ACCESS AND SERVICE INTERVENTIONS

We now turn to a brief overview and assessment of each of the universal service and access interventions adopted in South Africa. The discussion reveals strengths and weaknesses with respect to each component of policy and its implementation.

UNIVERSAL SERVICE OBLIGATIONS (USOS)

The imposition of USOs is widely considered a standard best practice component of UAS implementation (Blackman & Srivastava, 2011; infoDev, 2009; Intven, 2000; ITU, 1998) and comprises "mandatory service obligations … imposed by licence conditions or other regulatory measures" (Intven, 2000, p. 6-3) either on individual operators or on a class of operators. USOs typically take the form of requirements to supply certain types of ICT services to defined classes of customers. Examples include: connecting additional fixed-line customers, installing more public payphones, or providing mobile network coverage to specified geographic areas or proportions of population (Intven, 2000, pp. 6-11), but they can also include other obligations such as the carriage of free emergency calls. In essence, USOs are an enforced internal cross-subsidy from more lucrative market segments to non-profitable services and areas.

In South Africa, the licence issued to the fixed line incumbent operator, Telkom, specified a number of USO rollout targets over the period 1997-2002. The focus was largely on additional access lines, mainly in "under-serviced areas" and to "priority customers" (defined as hospitals, libraries, local authorities or schools), but also dealt with the installation of public payphones (Table 1). The licence included an extensive list of under-serviced areas (RSA, 1997).

South Africa was relatively unusual in including USOs for its mobile operators, an approach the ITU still urges as best practice today (ITU, 2008, p. 36). Along with the imposition of network geographic and population coverage requirements, the USO requirements for mobile focused on "community service telephones" – essentially a public payphone on the mobile network "freely accessible" to the "general public" (ICASA, 2002a, p. 5) – with slightly differentiated requirements across the three licensees. Additional obligations were imposed on MTN and Vodacom in 2004 in return for access to additional spectrum (ICASA, 2004a; ICASA, 2004b). These took the form of requirements to distribute free SIM-cards and handsets, as well as provision of Internet access to public schools and to institutions for people with disabilities, and were later extended to Cell C (ICASA, 2009a; ICASA, 2009b) (see Table 1).

The licensing of South Africa's second PSTS operator, NeoTel, was accompanied by the imposition of a hybrid range of USOs. These included defined coverage rollout targets similar to those imposed on mobile operators, according to a "confidential" rollout timetable, as well as the provision of community access in the form of high-speed Internet access to schools and clinics, reflecting ongoing shifts in the communications landscape (Table 1).

TABLE 1: UNIVERSAL SERVICE OBLIGATIONS IMPOSED ON LICENSED OPERATORS IN SA

Operator	Access lines	Coverage	Payphones/community access points
Telkom (PSTS)	2 690 000 over five years - 1 676 000 in under-serviced areas - 20 246 to hospitals, libraries, local authorities, schools - 3 204 to under-serviced areas, villages	N/A	120 000 public payphones over five years
Vodacom (Mobile)	N/A	60% of population within two years 70% of population within four years Timetable for specified coverage areas	22 000 community service telephones in 70 specified areas over five years - 1 250 000 SIM-card connection packages - 125 000 handsets - 140 institutions for people with dis-abilities provided with Internet access (10 terminals each) over three years - 5 000 public schools provided with Internet access over eight years - (subject to approval of implementation plan)
MTN (Mobile)	N/A	60% of population within two years 70% of population within four years Timetable for specified coverage areas	7 500 community service telephones over five years - 1 250 000 SIM-card connection packages - 125 000 handsets - 140 institutions for people with dis-abilities provided with Internet access (10 terminals each) over three years - 5 000 public schools provided with Internet access over eight years - (subject to approval of implementation plan)
Cell C (Mobile)	N/A	40% of area within 1 year (roaming) 8% of area within five years (own network) 80% of population within one year (roaming) 60% of population within five years (own network)	52 000 community service telephones in under-serviced areas (with less than 10% fixed teledensity) - 1 250 000 SIM-card connection packages - 125 000 handsets - 140 institutions for people with dis-abilities provided with Internet access (10 terminals each) over three years - 5 000 public schools provided with Internet access over eight years - (subject to approval of implementation plan)
NeoTel (PSTS)	N/A	60% of population in defined metropolitan areas within five years 80% of population within 10 years Subject to "confidential" "Rollout Timetable"	Establish and maintain "high speed Internet connectivity" to: - 2 500 public schools / education institutions - 2 500 public rural clinics Subject to approved implementation plan

Compiled from: RSA, 1997; ICASA, 2001; ICASA, 2002a; ICASA, 2002b; ICASA, 2004a; ICASA, 2004b; ICASA, 2006; ICASA, 2009a; ICASA, 2009b

UNIVERSAL SERVICE AGENCY (USA)

The creation of a specialised agency in 1996, the Universal Service Agency (USA), with a mandate to focus on issues pertaining to UAS (RSA, 1996b, Ch. 8), reflects an early, ground-breaking structural intervention (Msimang, 2006, p. 225)[3]. It reflected the commitment to ensuring universal affordable access to telecommunications for all citizens, in particular the historically disadvantaged black majority.

The mandate of the Agency dealt with a variety of objectives, many of them rather vague:

(a) promote the goal of universal service;
(b) encourage, facilitate and offer guidance in respect of any scheme to provide … [UAS] …;
(c) foster the adoption and use of new methods of attaining [UAS];
(d) stimulate public awareness of the benefits of telecommunication services.
(RSA, 1996b, Section 59 (1)).

3 Intelecon (2009, p. 2) identifies three other similarly separate entities, all established several years after the USA.

The USA was further required to assist the Minister in formalising definitions for UAS, as well as undertake research, make investigations, issue information and table recommendations relating to UAS (RSA 1996b, Sections 59 (2) and (3)). Most importantly, the USA was put in charge of the administration of the Universal Service Fund (RSA, 1996b, Section 65 (4)). This is contrary to international best practice. A 2009 report notes the overwhelming majority of funds as placed under the control of the regulator (Intelecon, 2009).

UNIVERSAL SERVICE FUND (USF)

The creation of a dedicated fund (USF) to finance interventions to increase access to telecommunications services and to bridge the digital divide has for some time been considered best practice UAS policy (ITU, 1998, pp. 91, 2; Intven, 2000; ITU, 2003). Conventionally, such a fund aggregates monies to support the promotion of UAS. Funds are usually sourced by levying a tax on operators (and hence on users), requiring them to contribute a small, defined percentage of revenue. The fund is then applied by a variety of means towards interventions targeted at increasing access for disadvantaged groups and in under-serviced areas, thereby providing a more effective, targeted cross-subsidy from revenue-generating services to uneconomic ones (Intven, 2000, pp. 6-22ff; Msimang, 2006, p. 224, ITU, 2011, p. 8ff). In South Africa, the Telecommunications Act provided for the establishment of such a fund to be administered by the USA, a USF to be "utilised exclusively for the payment of subsidies … for the assistance of needy persons towards the cost … of telecommunication services" and, in certain circumstances, to subsidise the "extension of [the PSTS] to areas and communities which are not served or not adequately served" (RSA, 1996b, 66 (1) (a) & (b)). Contributions to the fund were initially set by Ministerial policy directive, and later regulated by ICASA (2008).

UNDER-SERVICED AREA LICENSEES (USALS)

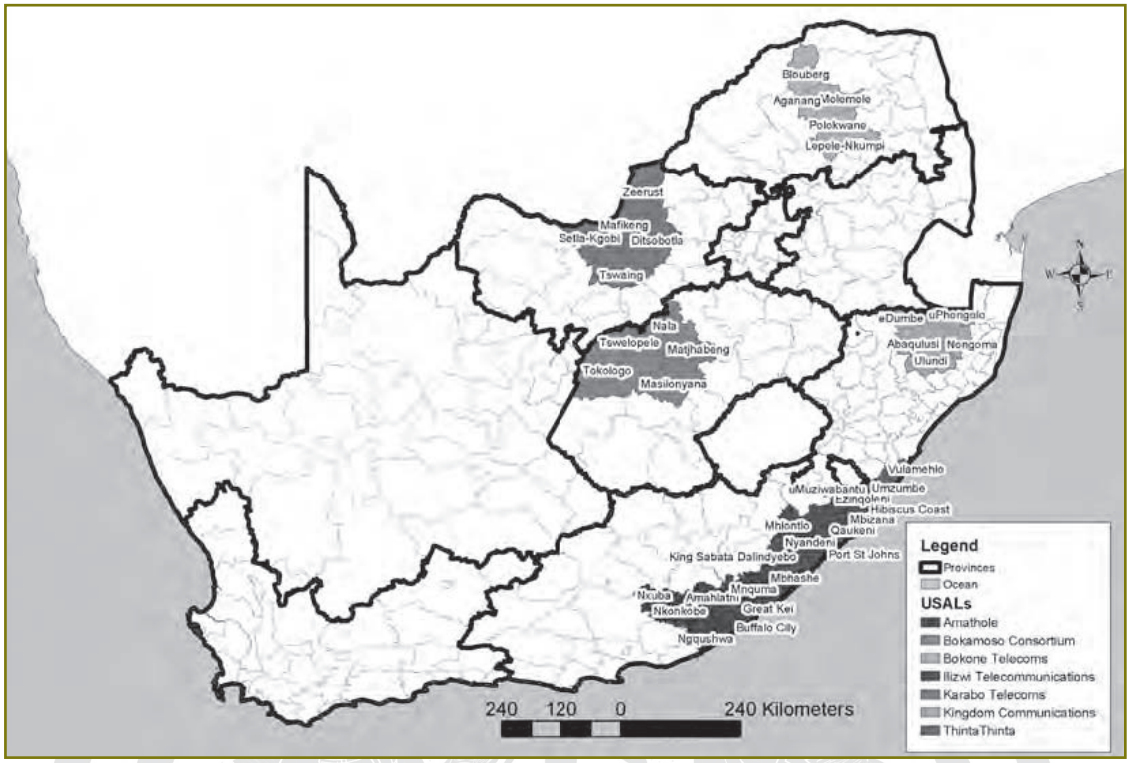
A fourth potentially innovative approach to the provision of access was introduced under the 2001 amendments to the Telecommunications Act. The amendments introduced a new category of under-serviced area licensees (USALs), designed to allow "small businesses" to provide a range of telecommunication services (including VoIP (Voice over Internet Protocol) and "fixed-mobile"[4]) in areas "where there is teledensity of less than 5%". It was further intended that "historically disadvantaged groups", including women, would benefit from the award of such licences (RSA, 1996b, Section 40A).

Msimang (2006, p. 241) and Thornton (2006, p. 4) have noted that participation of small business in providing telecommunications services was foreseen in the White Paper (RSA, 1996a), but the inspiration for this form of licensing may also have derived from the experience of telecommunications cooperatives in the United States, as the NTCA was a lobbyist in the process leading up to the 2001 amendment (NTCA, 2001). The model may also owe something to the experiments in rural payphone licensing undertaken in Chile and other jurisdictions in South America (Wellenius, 2002).

Subsequent to this amendment, the Minister specified 27 areas as under-serviced, based on fixed-line teledensity figures. The regulator then ran a series of licensing processes, leading to the initial award of seven USALs in 2004/5 (Figure 1), with an additional seven licences awarded in 2007, this time using the licensing categories of the new Act (Senne, 2008a). To support these new licensees, a contribution of R5 million per annum over three years was earmarked to be provided from the USF. There were also discussions around providing business development support and instituting regulatory measures, such as asymmetrical interconnection, to ensure a viable business case (Gillwald, 2006, p. 8ff).

4 Defined as call mobility that does "not permit call handover between cells" (RSA, 1996, (1)).

FIGURE 1: FIRST SEVEN UNDER-SERVICED AREA LICENSEES



Source: Human Sciences Research Council, no date

ASSESSING SOUTH AFRICA'S UAS INTERVENTIONS

Taken together, the provisions outlined above demonstrate South Africa's commitment to giving UAS a central place in policy and regulation, and to aligning implementation with global best practice. Given this commitment, it is important to consider the degree to which the various interventions have been successful in meeting their objectives. It is not only a question of whether the level of access has increased: undoubtedly it has. The assessment also needs to consider whether each of these interventions contributed towards that goal, the extent of that contribution, and its impact on access in practice.

Two of the interventions (USOs and the USF) constitute mainstream thinking, while the USA and the USALs were less conventional, but by no means far removed from similar interventions elsewhere. An examination of the effectiveness of each may shed light on the effectiveness of policy implementation, and provide guidance for policymakers and regulators elsewhere, serving to enrich an understanding of global best practice.

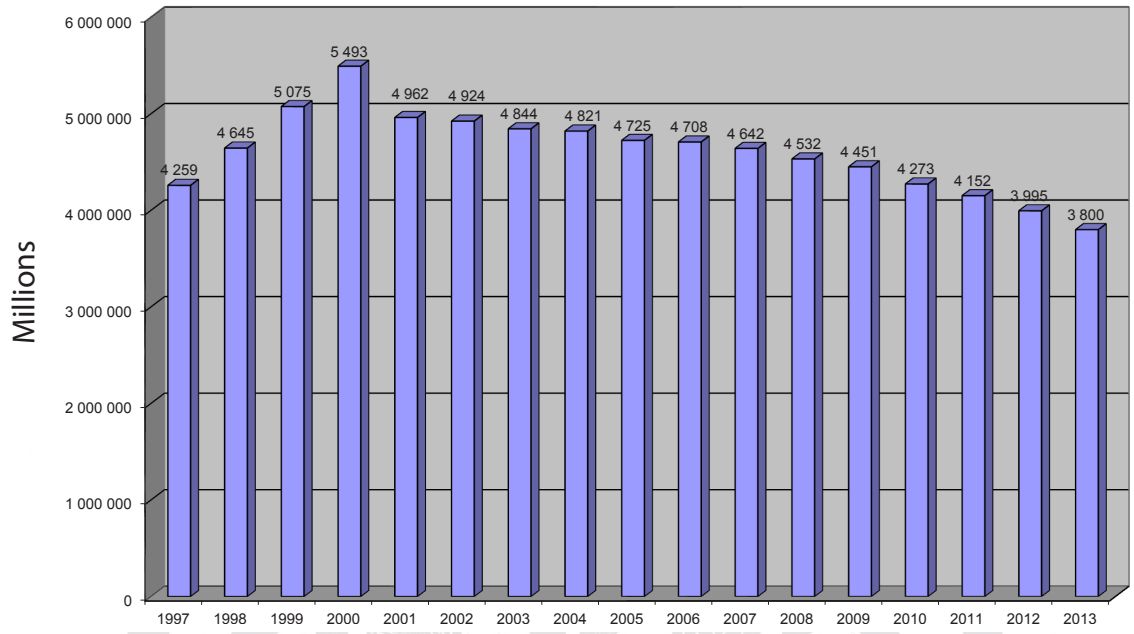
UNIVERSAL SERVICE OBLIGATIONS (USOS)

It seems clear from the pattern of obligations imposed on the incumbent, Telkom, and on the mobile licensees, Vodacom and MTN, that the expectation was for fixed-line operators to shoulder the greatest burden in providing access to under-serviced areas (Table 1). However, the imposition of targets on Telkom has had almost no net effect on fixed-line penetration (Figure 2), despite considerable cost and much wasted effort. In the words of one analyst, it has merely demonstrated the "failure of the universal service policy" (Hodge, 2004, p. 5). Telkom installed 2,67 million lines between 1998 and 2002, falling only marginally short of its rollout targets (ICASA, 2010, p. 5). However, most of these new connections – 2 003 million – were disconnected, with early indications that this was due to the inability of subscribers to pay for the services acquired under the USO rollout (Hodge, 2004). Migrating such customers to prepaid fixed-line, or simply cutting outgoing calls, seems never to have been considered.

Additional reasons for this decline in fixed line access includes fixed-mobile substitution as users migrated to prepaid mobile packages that were easier and cheaper to acquire, and more apposite for low-income users (Hodge, 2005). Nonetheless, the shift does suggest a failure of fixed-line USO policy.

The trends are clearly evident in the increase and decline in fixed lines over the period 1997 to 2013 (Figure 2). Despite an initial upsurge in the subscriber base as Telkom sought to meet its USO targets, the numbers steadily declined from a peak of 5,,5 million in 2000 to 3,8 million in 2013. The proportion of residential post-paid subscribers also declined, from 40,1% in 2002 to 30,8% in 2009.

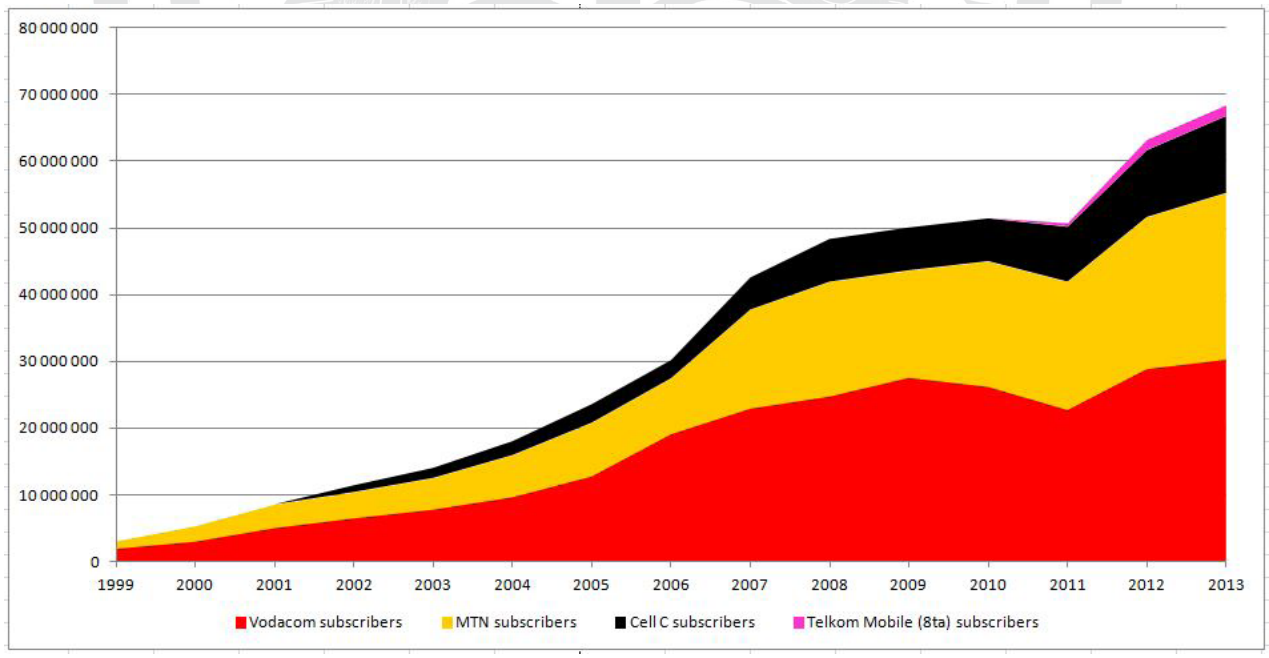
FIGURE 2: SA: FIXED LINES (1997-2013)



Source: Telkom, 1998-2013 Annual Reports

It is ironic that the mobile operators, on whom no specific subscriber rollout targets were imposed, exceeded all growth expectations, rendering USOs in respect of network coverage superfluous. By 2001 there were already more mobile subscribers than fixed lines in South Africa. The market share of mobile has continued to grow (Figure 3), reaching a total of 51,4 million in 2009, an order of magnitude greater than fixed-line penetration.

FIGURE 3: SA: MOBILE SUBSCRIBERS (1999-2013) [5]



Source: Author's own data, compiled from annual Reports of MTN and Vodacom, and Cell C press statements

Community access is a similarly mixed picture. Telkom easily met its payphone target, reaching 195 000 payphones in 2002, but the numbers steadily fell to 132 000 by 2009. This may be partly due to payphone vandalism and to increased competition from mobile community service telephones (CSTs). By contrast, the mobile operators all met the CST component of their USO rollout targets (Msimang, 2006, p. 235; ICASA, 2010), which were exceptionally low, based on an estimated total market of less than a million consumers.

5 The dip in numbers in 2011 is likely due to the introduction of compulsory registration of SIM ownership under RICA (Regulation of Interception of Communications and Provision of Communication-Related Information Act).

Indeed, these CST targets were substantially exceeded. Vodacom, the only operator to specify CST numbers in its annual results, lists 118 000 CSTs in 2009, with MTN reporting 22 000 to ICASA (2010, p. 7), and Cell C thought to have rolled out 100 000 (Jones, 2008). There has been considerable difficulty verifying and coordinating this rollout, with each operator proceeding in accordance with its own interpretation of its obligations (Msimang, 2006, p. 235). The legal wrangle between mobile operators over CSTs was partly over the location of the rollout, but also suggests that the ability to arbitrage the low termination rates applicable to call traffic from such phones incentivises operators to exceed their obligations and maximise CST rollout (Jones, 2008).

The effectiveness of South Africa's USOs is, therefore, open to question, with fixed-line teledensity continuing to fall, and with prepaid customers in the mobile sector now accounting for the overwhelming majority of telephony users and public access points nationwide. Rather than regulatory intervention, it is market forces that have undermined the fixed-line USOs and caused the mobile operators to exceed their USOs by several orders of magnitude.

UNIVERSAL SERVICE AGENCY (USA)

Despite its importance as an institutional intervention aimed at placing UAS at the forefront of telecommunications policy, the USA has struggled to make an impact.

This is partly due to structural issues created by complex lines of reporting and accountability between the Agency, the Minister, and the regulator (RSA 1996b, Sections 59 and 66). For example, until recently, several attempts by the USA to produce the required UAS definitions foundered because the Minister, rather than the Agency, is required to gazette them. Statutory appointment procedures place the USA under close control by the Minister, who also directs the Agency in the expenditure of the USF. As Limpitlaw comments:

> … from a regulatory point of view the Agency is very awkwardly positioned and it is not surprising that its track record of meeting its aims is extremely poor. It occupies a bizarre regulatory space, answerable to both ICASA and the Minister" (2004, p. 5255).

An internal report similarly describes the Agency as "weakly embedded in South Africa's regulatory space" (USA, 2005, p. 20) and points to a legal mandate that has consistently "undermined the independence of the Agency" (USA, 2005, p. 94).

The USA has been widely and consistently criticised for poor performance and ineffective management. The same report catalogues a damning litany of failures, including poor "management and accounting practices" coupled with lack of "human resource capacity", a "chronic lack of funding", engagement in "activities [not] consistent with the Agency's mandate", neglect of "core functions … to monitor and analyze the RSA telecom sector", failure to "prepare, submit or otherwise comply with statutory reporting requirements", undertaking project implementation without "mandate or authority" (USA, 2005, pp. 93-4). The organisation has been implicated in allegations of ongoing maladministration and corruption (see for example UDM, 2013).

Despite the structural contradictions and poor track record described above, and in the face of the initial vision of the Agency's mandate as transitional and temporary (Msimang, 2006, p. 231), the USA was not absorbed within the sector regulator, as some had recommended, in either the 2001 amendments to the Telecommunications Act or in the Electronic Communications Act 2005. In fact, there was little substantive change to the role and functions of the body, apart from increased adherence to the policy fiat and direction of the Minister, and a cosmetic title change to "Universal Service and Access Agency of South Africa" (RSA, 2005, Ch. 14). The oversight role of a board appointed by the Minister (introduced by the 2001 amendment to strengthen governance) was continued, and administration of the renamed "Universal Service and Access Fund" perpetuated, subject to many of the same accountability tensions between Agency, Minister and regulator (RSA, 2005, sections 87, 88) described above.

The Agency established in ground-breaking fashion to spearhead UAS interventions has thus ultimately proved ineffectual.

UNIVERSAL SERVICE FUND (USF)

The Universal Service Fund, closer to best practice, may be thought to have had a better track record. Certainly contributions were collected and funds were expended. Contribution levels were initially set at 0,16% of operator revenue, and later raised to 0.2%. The fund was initially capped at R20 million, with the contribution of the incumbent not to exceed 50% of this, but has been uncapped since 2001 (Msimang, 2006, pp. 225-6). Payments are collected by ICASA, but handed over to National Treasury and not accounted for to USAASA. No financial statement in respect of the fund seems ever to have been issued. A recent attempt to ascertain the current balance in the fund produced a speculated estimate of around R1 billion (Perry, 2010, p. 19). However, an earlier USAASA annual report suggests

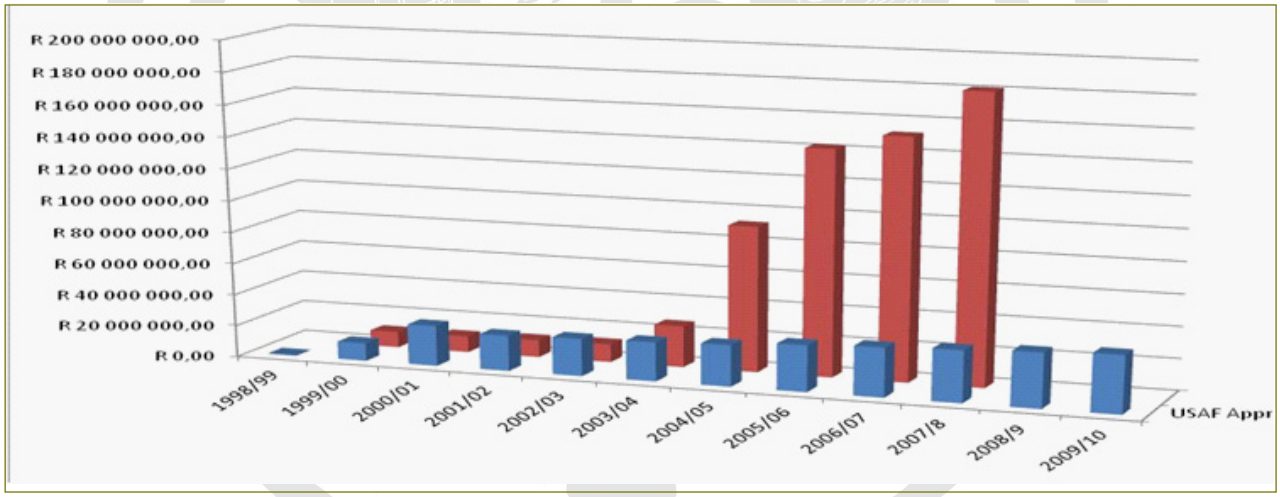
that the total contributions to the fund between 1999 and 2008 amounted to R636 million[6] (USAASA, 2008, p. 14) – suggesting that Perry's figure is likely to be an under-estimate. Substantial levels of funding towards UAS have thus clearly been available for a number of years.

The fund has been under-utilised, with reported expenditure by 2008 totalling a mere R227 million (USAASA, 2008, p. 14) – just over 35% of the amount available - leaving an unspent surplus of R409 million. Not only has expenditure been minimal, it has been ineffective. Initially the fund was used to fund a series of telecentres, in contravention of its formal legal mandate. The Agency's own consultants' report comments that the "Agency, which had not [sic] mandate or authority to undertake implementation projects, nonetheless made implementation its core function" (USA, 2005, p. 93).

The performance of these telecentres has been substandard. By 2000 only 65 telecentres had been established. Furthermore, 32% were found in 2001 to be no longer operational, with "less than half (47 per cent) … [having] both computers and phones working, though all had been provided with this equipment at the start" (Benjamin, 2003, p. 5). By 2005 the programme had been downscaled. With only 111 of the original target of 4 000 telecentres established, the focus then shifted to the rollout of "Cyberlabs[7]" and "Community Digital Hubs[8]" (USA, 2005, p. 77ff). A recent USAASA annual report suggests little change, with expenditure directed "to rehabilitate and equip Community Access Centres, Cyberlabs in schools and Digital Hubs; to enable internet connectivity in [further education and training institutions]; to subsidise USALS; to teach ICT skills to personnel who manage these centres; to conduct research that will inform USAF and for special projects such as Mindset Network and Square Kilometre Array" (USAASA, 2009, p. 17).

A summary of income and expenditure is shown in Figure 4 below. It appears that the fund's track record is less than illustrious, with expenditure being inappropriate, ineffective, and often wasteful, leaving a massive unspent surplus totalling nearly two thirds of contributions.

FIGURE 4: UNIVERSAL SERVICE FUND: INCOME & EXPENDITURE (1998-2010)[9]



Source: USAASA, 2008, updated with information from USAASA, 2010

UNDER-SERVICED AREA LICENSEES (USALS)

The final pillar of the UAS interventions discussed in this paper is the USALs. Essentially a rural operator model, it aimed to fulfil many of the criteria articulated by Dymond and Oestman (2003), including market orientation, technology neutrality and asymmetrical pricing. It seeks to leverage market forces, creating an incentivised licensing regime aimed at addressing the "market efficiency gap". Furthermore, the 27 designated under-serviced areas cover a substantial proportion (47%) of South Africa's population (Gillwald, 2006, p. 7), confirming the importance of the intervention. However, this intervention, too, has been problematic.

Several commentators recognised the need for the USALs to be supported by a range of policy and regulatory measures for their success. Gillwald put forward several critical success factors required to ensure viability and "sustainability" of the USALs, including a "funding framework … an asymmetrical interconnection regime … a flexible low-cost regulatory regime; and a licensing process that is kept as simple as possible" (Gillwald, 2002, p. 1).

6 2009/2010 compliance reports put the combined contribution for major telecoms licensees at ZAR 218 million.

7 Effectively computer laboratories in schools.

8 There is no definition of what Community Digital Hubs are or what distinguishes them from telecentres.

9 No official figure for contributions since 2008/9 is available, although a perusal of selected licensee compliance reports submitted to ICASA suggests that at least ZAR437 000 000 was collected in 2010.

However, only funding support for USALs was put in place, pegged at an unreasonably low ZAR5 million per annum over three years, subject to performance reporting. This compares unfavourably with estimated start-up capital requirements in the order of USD5 to USD20 million (Gillwald, 2006, p. 10)). A review of the first seven licensed USALs found this amount to be woefully inadequate, recommending that it be "increased substantially … and that operating expenditure and capital expenditure be availed and administered separately" (Thornton, 2006, p. 2). It is thus clear that the USALs received insufficient support to succeed, even though abundant financial resources were available for this purpose.

A complex range of other factors mitigated against the viability of the USALs. Consistent with Dymond and Oestman (2003), both Thornton (2006) and Gillwald (2006) argued in favour of cost-based termination rates, with the latter specifically arguing that without "cost-based asymmetrical termination charges … that [recognise] the asymmetrical cost of terminating calls in … low-density, high cost rural areas … a sustainable business case cannot be made for USALs" (Gillwald, 2006, pp. 11-12). No such interconnection regime was ever implemented.

There were also inbuilt structural disadvantages in the ownership requirements foisted on the USALs. They were required to be small business operations, with participation and ownership by historically-disadvantaged groups, putting them at a significant disadvantage in terms of technical expertise and managerial skills. The limitation on foreign ownership to a maximum of 25% further mitigated against their ability to attract investors (Gillwald, 2006). None of these requirements implies failure on its own – in fact, several align with important national policy objectives. However, in combination they created a set of structural constraints that guaranteed technical and commercial failure. Suggestions that a comprehensive capacity-building programme be put in place to address some of these deficiencies were never implemented.

The market structure and environment also undermined the viability of the USALs. For instance, the determination of the 27 under-serviced areas was based on outdated fixed-line teledensity data (Gillwald, 2006 p. 7) without reference to mobile penetration, which had surpassed fixed-line teledensity by the time the first licences were issued. This put the USALs in a position of competing for shares in a market of unknown saturation, rather than for the entire market as in the case of the analogous Chilean experiment (Wellenius, 2002). Furthermore, permitting only limited mobility for the USALs disadvantaged them in competition with fully mobile services. Finally, the subsequent Ministerial determinations liberalising the VoIP market, permitting resale and opening the door to self-provisioning (DoC, 2004), further cut the ground from under the USAL business case.

The eventual fate of the USALs is not clear. Several became mobile resellers (Lowman, 2005). Thornton concluded that "without significant intervention … most if not all of the USALs will not survive" (2006, pp. 1-2). By early 2008 USAASA noted that none of the original seven licensees was yet operational, opining that only three remained potentially viable (Senne, 2008b). Yet, barely four months earlier the Minister, while issuing a series of policy directions, had included a bizarre injunction to ICASA: "where there is more than one licence in a province, [to] merge the licences and issue one Provincial Under-Serviced Area Network Operator (PUSANO) licence" (DoC, 2007, p. 9). This would have forced the two remaining potentially viable operators each to merge with another, non-viable licensee. No subsequent progress seems to have been made with these enforced mergers. The final knell for USALs was sounded when the incoming Minister conceded that the "concept and the possible remedy had not worked" (Vecchiatto, 2009) and scrapped the decision to merge USALs into PUSANOs (DoC, 2009).

The USALs thus became an unfortunate historical footnote to UAS in South Africa. They were never provided with the necessary enabling regulatory and business environment, and were overtaken by events as policy moved on, vitiating the model. It is regrettable that an experiment so innovative was doomed to fail so dismally.

IMPACT OF UAS INTERVENTIONS

For South Africa it is now effectively 20 years from the RDP's clarion call to "provide universal affordable access for all as rapidly as possible" (ANC, 1994). To what extent can the country be said to have achieved universal access to telecommunications services?

The analysis set out above suggests that the main planks of South Africa's UAS policy have contributed little to the upsurge in access in a country where uptake has instead tilted dramatically towards mobile telephony, a clearly defined global trend. South Africa's fixed-line USOs have been ineffective in increasing access. The additional USOs imposed on the mobile operators in 2004 do not reflect recognition of the market shift towards mobile, but rather a requirement for a perfunctory quid pro quo. No evidence of such a shift in thinking exists and the lackadaisical enforcement of the additional USOs suggests their strategic importance was never recognised.

While it may be argued that the USOs in respect of signal coverage for mobile were an enabler, it is likely that the innovation of mobile prepaid services introduced by MTN in 1996, and emulated by Vodacom, enabled the market to mushroom on the mobile platform, with prepaid mobile subscribers making up 83.8% of South Africa's mobile users by 2007.[10] Other research (Hodge, 2005; Kalba, 2008) has similarly identified the impact of prepaid, along with other contextual factors, as a key driver of mobile diffusion.

The impact of this shift is illustrated by data from the 2011 Census (Stats SA, 2013) which shows that 88.9% of households have "access to" a cellphone, with provincial variations ranging from 93,8% in industrialised Gauteng to 81,9% in impoverished, mostly rural Northern Cape. Broken down by racial categorisation – with the racially-based chasm in access to telephony being one of the central justifications for South Africa's pre-eminent focus on UAS – the discrepancy ranges from 96,1% household penetration for "Whites" to 83,7% for "Coloureds". This suggests that despite remaining discrepancies, the mobile explosion has been a great leveller of the digital divide that impelled South Africa's commitment to UAS. By contrast, enormous discrepancies in fixed-line access remain, with household penetration ranging from a high of 18% in Gauteng to a low of 3,8% in impoverished, mostly rural Limpopo, and penetration by racial categorisation ranging from a high of 61,9% for "Indian / Asian" households to 5,9% for "Black" households.

This analysis implies the failure of fixed-line USOs and the success of market structure and dynamics as key drivers in dealing with the digital divide inherited from apartheid.

The Universal Service Agency and Universal Service Fund interventions did not contribute to the upsurge of mobile access. Likewise, the USAL experiment contributed only failure. The USA was largely ineffectual, while the USF engaged in ineffective attempts to fund a variety of forms of Internet rather than telephony access. The critique here is twofold. Firstly, telephony access including mobile access should have been prioritised in the early years of operation of the fund, laying the foundation for Internet access and broadband access. Secondly, the various Internet access projects, telecentres in particular, were poorly conceived and badly operationalised.

Though South Africa remains far from achieving universal service in respect of fixed-line telephony, a problem for extending fixed broadband; it has achieved universal service in mobile telecommunications, given mobile teledensity of 126%. Even if one treats the figures with caution, and applies qualifications and allowances for multiple SIM-card ownership (Sutherland, 2009; Goldstuck, 2009), these figures suggest around 42 million mobile users, a mobile per capita teledensity of 72%,[11] an impressive penetration rate for a middle-income developing country – and arguably close to universal mobile service.

CONCLUSION

The imperative towards achieving universal access and service for political, social and economic reasons is one that South Africa shares with many developing countries, one that remains widely applicable across sub-Saharan Africa. As we saw at the outset, South Africa was perhaps uniquely placed by virtue of its history to accord UAS pride of place in its ICT sector reform policies and interventions. To its credit the country did so, imposing universal service obligations upon all licensed operators, establishing a dedicated quasi-regulatory entity to drive UAS, creating a USF to fund UAS interventions, and licensing under-serviced area operators.

Each of these interventions is either derived from or consonant with international best practice in respect of UAS policy and regulation. Yet each seems to have been ineffective at best, making little if any impact on the dramatic upsurge of access to mobile telephony that has characterised South Africa's ICT sector. It would accordingly appear that sector dynamics and market forces were far more responsible for increased levels of UAS than specifically-targeted policy and regulation.

Such a failure of policy to make an impact could perhaps be accounted for by disjunctures in the domestic application of international best practice, due for example to the vicissitudes of policy transfer (Chulajata & Turner, 2009). It may also point to failures of institutional capacity in South Africa's regulatory institutions, such as skills constraints, poor policy co-ordination or lack of ongoing research to inform policy implementation. Alternatively, it may point to problems with international best practice itself, or suggest the need for implementation of UAS intervention that is dramatically more flexible, responsive and open to dynamic adjustment in the face of shifting technology and market trends than anything hitherto attempted, noting new trends in mobile access and mobile broadband.

The problems documented here in respect of South Africa's quest to achieve UAS have implications for other countries in sub-Saharan Africa, and for policymakers and regulators in other developing countries that face similar challenges and constraints, and who will need to think innovatively about the application of universal service funds and other

10 Source: Annual Reports of MTN and Vodacom and Cell C press statements.

11 The census figures cited above reflect access at a household level – arguably a less valid measure of UAS than per capita figures in the case of a highly personalised, reluctantly shared device like a cellphone, except, perhaps, in poorer communities.

UAS interventions. For most developing countries universal access to telephony services by means of mobile is the current and central preoccupation of UAS policy, and correctly so. But should they abandon the attempt to implement international best practice in respect of UAS policy and regulation, and turn their trust instead to market forces alone? Or does international best practice need to be adjusted in the light of the lessons of the South African experience? What are the implications of these lessons for the future of USOs and USFs?

Also, what are the implications of these lessons for countries moving on from a focus on mobile towards consideration of UAS in respect of broadband and the Internet? South Africa's latest draft broadband policy, for example, has universal access and service as a primary focus, and discusses in some detail the role of USAASA, the USAF and USOs in the rollout of broadband infrastructure and services. As this analysis has shown, broadband USOs that are formulated in the narrow, technology-specific manner of their predecessors would, in all likelihood, be doomed to failure. The track record of both the USAF and USAASA suggest that their intervention, unless carefully reconfigured, is likely to be ineffectual at best, and open to opportunities for corruption at worst. An approach is required that is more research-based, flexible, agile and responsive to changing circumstances.

Such considerations, and the questions that underpin them, point to the need for further research in the critically important area of universal access and service, and in respect of the interventions designed to achieve this key developmental goal.

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