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THEMATIC ISSUE:
ECONOMIC REGULATION AND REGULATORY PERFORMANCE IN THE ELECTRONIC COMMUNICATIONS SECTOR

Learning Information Networking Knowledge
(LINK) Centre
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EDITORIAL NOTE TO *AJIC* ISSUE 14

Lucienne Abrahams
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The electronic communications sector is now one of the most advanced infrastructure and services sectors on the African continent. However, it has had a propensity towards low levels of competition among telecoms operators. Advances in the sector include the opening up of the undersea cable markets to competition, the evolution of broadband markets, and high-speed broadband including Gigabit Internet. This gives rise to questions such as: To what extent is the electronic communications sector providing advanced infrastructures and services for communications that will impact well on transformation in other economic and social sectors – financial; real estate and business services; travel and tourism; business process outsourcing; the media; and audio-visual and entertainment sectors? And, to what extent is electronic communications infrastructure providing the networks for advanced research collaboration among African scholars and their American (North and South), Asian, Australian or European counterparts via dedicated national/regional research and education networks (NRENs and RRENs)?

So many challenges remain for policy-making and for regulators, including the urgent need for regulation of radio-frequency spectrum for mobile communications and mobile data access; digital migration in the broadcast sector; pricing of electronic communications services; regulation of mobile money transactions; consumer protection in mobile money environments; and broader challenges of regulating for the digital economy, including the appropriate regulation of environments that will promote e-health services and other initiatives in the transformation of economies and society.

Agricultural, industrial and services economies on the African continent could all become digital-based economies. Consideration of these change issues will require a significant amount of forward-looking and -thinking research from African scholars on subjects pertaining to economic and social policy and regulation with respect to telecommunications, broadcasting and audio-visual services, and advancement of e-commerce and e-government.

This research is needed to support the processes of policy-making and regulation, where innovation may otherwise continue to lag behind infrastructure deployment, as has been the case for much of the 21st century thus far.

There is currently limited scholarly publishing on the state of economic regulation in the electronic communications sector, in particular in African countries. One of the few is Rachel Alemu's conference paper titled Regulation of competition in the liberalised telecommunications sector in sub-Saharan Africa: Uganda's experience, available at http://www.compcom.co.za/wp-content/uploads/2014/09/south-africa-conference-on-competition-law.pdf

While useful and usable research is available from entities such as African Economic Outlook, BuddeComm, Genesis Analytics and Research ICT Africa, there is limited peer-reviewed material available. This issue of *The African Journal of Information and Communication (AJIC*) publishes a collection of articles on economic regulation in the electronic communications sector, developed from papers presented at the 2nd South African Economic Regulators Conference, 18-19 March, 2014. The articles provide some well-researched insights into topical issues in regulation, in particular the issue of regulatory performance. The journal seeks to solicit future contributions from African scholars writing on topics of competition matters and law, legislative change, pricing studies, regulatory performance, new business models such as those pioneered by over-the-top (OTT) services, issues in consumer protection and other topics. In particular, concurrent jurisdiction issues have become more important in the context of converged services, requiring new co-jurisdiction arrangements, for example, between the telecoms sector regulator and the banking and financial services regulator, in the case of mobile money transfers.

THEMATIC ISSUE:
ECONOMIC REGULATION AND REGULATORY PERFORMANCE IN THE ELECTRONIC COMMUNICATIONS SECTOR

ECONOMIC REGULATION AND REGULATORY PERFORMANCE IN THE ELECTRONIC COMMUNICATIONS SECTOR: KEY THEMES FOR AFRICAN REGULATORS

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The central theme of Issue 14 of *The African Journal of Information and Communication* is competition and economic regulation, with a range of articles addressing the need for reforms in these areas within the electronic communications sector. A key theme that runs across the articles deals with the role of state ownership of regulated entities and how this affects regulatory action (or inaction). The structural conflicts of interest inherent in state ownership of licensees and operators are seen as a key impediment, which results in under-funded regulators and government interference in regulatory activities. Another emerging theme is the important role played in regulating access, including in respect of call termination rates and infrastructure sharing. Call termination rate reductions in Namibia and South Africa, for example, have led to considerable reductions in retail prices and increases in usage, which have resulted in considerable benefits for consumers. Attempts to implement infrastructure sharing rules, however, have been less successful. The articles present a set of themes for the attention of African regulators.

REGULATORY EFFECTIVENESS

The first article, Regulatory effectiveness: *Stakeholder perceptions of Namibia's communications regulatory framework*, concerns a review of regulatory effectiveness in Namibia. It considers the effectiveness of the Communications Regulatory Authority of Namibia (CRAN) in the context of the institutional framework in Namibia and the government's shareholding in Telecom Namibia (TN). In terms of market outcomes, Namibia has relatively low retail voice prices, but the penetration of data services is also relatively low. Low retail voice prices have arisen at least in part from CRAN's intervention to reduce call termination rates. CRAN has been less successful, however, in implementing infrastructure sharing rules.

CRAN has sought to resolve state ownership in the telecoms operators, all of which are either part-owned or wholly owned by the state by, for example, requiring the partial privatisation of TN as a condition for the approval of its merger with Leo. However, this decision was overturned by the courts.

CRAN experiences interference from government in its decisions, including in the licensing of spectrum. Government is responsible for approving CRAN's budget and strategic plan, and government appoints CRAN's board members, which further reduces the Authority's independence. Dispute resolution in Namibia often takes place informally, which means that the regulator plays less of a role in adjudicating on these disputes. Dispute resolution in the telecommunications sector in Namibia is perceived as weak by stakeholders, as reported from a stakeholder perception survey.

While CRAN's call termination rate intervention has successfully resulted in reduced retail prices, it has yet to issue interconnection guidelines. Furthermore, rules regarding access to infrastructure are not practically implemented by CRAN. Spectrum assignment and rights of way are also not considered well regulated in Namibia by stakeholders. The universal service fund has not yet been established.

The article concludes by recommending a range of reforms to address each of these identified problems, starting with reducing government's shareholding in operators. Additional reforms include making the regulator more independent from government and ensuring that processes to assign rights of way are put in place. Another proposal is to conduct additional research to assess whether call termination rates should be further reduced. These reforms are remarkably similar to those suggested for the regulatory system in South Africa, discussed next.

The second article, *Economic regulation of the telecommunications sector in South Africa 2009-2014*, considers regulatory effectiveness in South Africa. Extracted from a wider body of work on the telecommunications sector in South Africa (reviewed later in this edition of AJIC), this article assesses the performance of the Independent Communications Authority of South Africa (ICASA) by analysing its two economic regulation interventions: the first in respect of setting call termination rates; the second in the implementation of local loop unbundling (LLU).

The formal regulatory governance framework is first evaluated. The framework is characterised by a lack of independence for the regulator, ICASA, who must, for example, wait for policy directions from the responsible line ministry prior to conducting certain of its activities. Furthermore, ICASA's budget must be approved by parliament rather than being raised by an industry levy.

Similar to the case of CRAN in Namibia, ICASA has been relatively successful in regulating call termination rates, prompting retail voice prices to fall. Also similar to the case in Namibia, ICASA has been less successful in regulating access to infrastructure, particularly as regards implementing LLU. It has also failed to assign radio frequency spectrum for broadband. The consequence of ICASA's call termination rate reductions has been retail voice price reductions of more than 30%, and prepaid prices that now fall into the lowest prices available in Southern African Development Community countries. At the same time, however, South Africa's broadband prices remain high, quality (speeds) are low relative to those in other developing countries, and access to broadband is limited.

This is at least partly due to the different informal institutional arrangements in the fixed and mobile sectors in South Africa, analysed through the lens of the "settlements" literature (following Khan, 2010, cited in the article). Political "settlements" are arrived at by different competing interests according to their "holding power" when entering into disputes and subject to a minimum viability constraint, so that the distribution of benefits does not cause revolt against the settlement. The viability of pro-growth reforms depends on this settlement, and on the entrepreneurial capabilities of the firms concerned: the weaker the entrepreneurial capabilities of the firms, the more likely they are to resist reform and seek protection against competition from the government.

In the telecommunications sector in South Africa, the fixed line incumbent, Telkom, has considerable "holding power", partly arising from the state's significant shareholding in it. Furthermore, it has weak entrepreneurial capabilities, and therefore has strong incentives to seek government protection from competition. This is in contrast to the mobile sector in South Africa, where there are two incumbents with low (or no) government shareholdings, and which have significant entrepreneurial capabilities (both MTN and Vodacom are internationally competitive businesses). This means that growth-enhancing reforms (reductions in call termination rates) are more consistent with the informal institutional framework for the mobile sector.

In order to bring about better access regulation of the fixed line incumbent and set South Africa on a higher growth path, the State needs to reduce or eliminate its shareholding in Telkom, preferably by selling this stake to a firm with strong entrepreneurial capabilities. Furthermore, ICASA's independence needs to be consolidated, by further limiting the line ministry's influence and funding being sourced through an industry levy rather than through a parliamentary appropriation.

Finally, ICASA's reforms in markets for voice services should be further extended, and consideration should be given to introducing a bill and keeping (zero call termination rate) regime, in order to further foster competition and reduce retail voice prices. And it should assign as much spectrum as quickly as possible for the use of broadband services.

FOCUS ON APPROACHES TO LICENSING AS A FORM OF REGULATION

The third article, *Licensing of communications networks and services: Case study of market liberalisation in South Africa and the United Kingdom*, relates to reforming the licensing regime in South Africa to make it more open. The article contrasts the licensing regimes in the United Kingdom (UK) and South Africa (SA), both with similar telecomms reform histories. The UK and SA both, for example, started the reform process in the 1990s by separating out their telecommunications businesses from the government, and allowing limited competition. Both countries licensed two mobile operators initially, and left the licensing regime open for Internet Service Providers (ISPs). More recently, the two countries' formal policy approaches have diverged: the UK has opened up its licensing framework considerably, while South Africa has taken a more sceptical approach to the markets' ability to deliver telecommunications services. As a result, SA's licensing regime as set out in law remains comparatively closed to competition. In practice, there is relatively greater openness to competition, but not under South African law. In terms of the relevant law, the Minister has to issue an invitation to apply (ITA), even though new entrants can and do simply buy a licence from an existing licence holder. For the purposes of effective policy and regulation that relates to the reality of electronic communications markets, the law needs to catch up with the push towards heightened competition.

Two frameworks for authorisation of telecommunications services are relevant to this discussion: licensing and concessionary frameworks. Concession frameworks usually involve a contract between the government and operator concerned, and were used extensively in South America, for example. The licensing framework provides for the authorisation by a relevant authority to an operator. Licensing frameworks in turn comprise three classes: individual licences granted on an individual basis by the regulator, class licences that do not require the granting of a licence but that do have terms and conditions attached to them, and licence exemption where no licence is required at all. Individual licensing is the most complex and costly system to administer, class licences are less so and licence exemptions have the least complexity and cost.

An important consideration is ensuring that licensing frameworks are not discriminatory. State aid laws in the European Union (EU), for example, prohibit states from providing aid to firms in a way that would distort competition. In South Africa, by contrast, the State does discriminate in favour of certain licensees. Sentech, for example, was able to bypass the onerous licensing regime that existed in the 1990s. Licence exemption, at least in respect of spectrum licensing, has more recently found favour in South Africa, allowing for the unlicensed use of the Industrial, Scientific and Medical (ISM) band for WiFi services.

The EU licensing framework provides for authorisation of class licences to communications providers (CPs), which precludes any individual licence authorisation system. Indeed, in the EU, national regulatory authorities (NRAs) are not required to acknowledge receipt of the licence notification from CPs, for the licence to be valid. The licensing framework in the EU bears no relation to service type (such as local or international) or technology (such as fixed or mobile). It allows for two licence types: networks and services. Conditions may nonetheless be imposed on CP licensees, including obligations relating to significant market power, universal access and universal service.

When the UK adopted the EU licensing framework in 2003 and converted existing licences under the new framework, it sought undertakings from incumbent operators, including British Telecom, the fixed line incumbent. This led to

a number of behavioural and structural undertakings made by BT within the frame of competition law in 2005; for example, organisational separation of upstream and downstream divisions of BT and publication of a Code of Practice. This regulatory approach was a missed opportunity in South Africa when ICASA converted licences under the Electronic Communications Act in 2009: ICASA did not seek undertakings from licensees undergoing the licence conversion process. BT's undertakings also saved the regulator, Ofcom, considerable time and expense by avoiding a market enquiry.

In South Africa, the policy environment does not clearly encourage new entry by private sector participants, and indeed periodically favours the State, such as when Broadband Infraco was created instead of incorporating the assets owned by this entity into the new fixed line entrant, Neotel. This conflicting policy environment has led to less private sector investment and ultimately less competition: the fixed line sector continues to be dominated by Telkom and the mobile sector by MTN and Vodacom.

The history of telecommunications sector reform in South Africa starts with separating Telkom from the Department of Posts and Telecommunications in the early 1990s. Initially, regulatory functions such as licensing were transferred to Telkom. This structure gave way to the Telecommunications Act in 1996, which resulted in regulatory powers being transferred away from Telkom and to an independent regulatory agency, which later became ICASA. However, this regulatory authority's decisions could be reversed by the Minister of Communications, who was responsible for the State's considerable (approximately 40%) shareholding in Telkom. The Electronic Communications Act was introduced in 2005 with the aim of introducing a technology neutral licensing framework (replacing, for example, separate licences for using fixed and mobile technologies), consolidating the powers of the regulator, ICASA, and harmonising broadcasting legislation (which was duplicated in a number of areas).

Two licensing categories were created in South Africa (similar to the EU): electronic communications services (ECS) for services, and electronic communications network services (ECNS) for infrastructure. "Class" licences are provided for and they require only notification by the operator or firm, not approval by ICASA, which makes them dissimilar to individual licences. However, the ECA creates barriers to the use of these class licences: for example, a class licensee may provide an ECNS, but only if it is municipal in scope: a national or provincial scope operator must apply for an individual licence. Furthermore, if an operator wishes to use numbers from the national numbering plan, it needs an individual ECNS licence. Individual ECNS licences may be issued by ICASA, but only after receiving a policy directive from the Minister, and then only after a lengthy notice and comment procedure. The ECA also provides for licence exempt services but still requires that operators notify ICASA before providing such a service.

During the course of the licence conversion process under the ECA, ICASA was put under pressure from the Minister of Communications to limit the number of Value Added Network Services (VANS) licensees that received individual ECNS licences. The licence conversion process required that ICASA issue licences no less favourable than the licences already in licensees' possession under the Telecommunications Act. Since VANS licensees were, from February 2005, allowed to build or buy their own network infrastructure (despite a last minute attempt by the Minister to retract this), this meant that all VANS licensees were entitled to be issued with individual ECNS as well as ECS licences. As a result of the Ministerial pressure to limit the number of iECNS licences, ICASA published a limited list of operators that would receive these licences, which excluded Altech, a VANS licensee. Altech sued ICASA on the basis that this flouted the requirements of the ECA, and won.

ICASA subsequently granted and issued 288 iECNS licences, and granted (but did not issue) a further 288 licences. This liberalised the market considerably. Nonetheless, South Africa still does not have a class licensing framework for national networks, and therefore regulatory barriers to entry continue to exist. These remaining regulatory barriers to entry ought to be removed.

THE VALUE OF COMPARING REGULATORY APPROACHES ACROSS SECTORS

The fourth article, *The impact of regulation on competition in telecommunications and piped gas*, concerns the exercise of regulatory powers by the Independent Communications Authority of South Africa (ICASA) and the National Energy Regulator of South Africa (NERSA) in setting prices for call termination rates and piped gas prices respectively. ICASA's intervention, first put in place in October 2010, was intended to remedy the network effects generated by high call termination rates, low on-net prices and the incumbency advantages of the two dominant operators in South Africa, namely MTN and Vodacom. The combination of high call termination rates, low on-net prices by the incumbents and their considerable scale relative to the new entrants, Cell C and Telkom Mobile, may have resulted in the failure of the new entrants without this regulatory intervention. ICASA awarded Cell C and Telkom Mobile asymmetrically high call termination rates, using market share as the key metric to determine whether an operator could benefit from asymmetry. This was akin to Vodacom and MTN being awarded an asymmetrically high call termination rate in the mid-1990s relative to Telkom, who was the incumbent at the time. Asymmetry, according to ICASA, would result in "a more efficient and effective access regime; a more dynamic retail pricing environment; and, continued access and investment in electronic communications networks in SA".

ICASA followed a lengthy public inquiry process in order to achieve lower call termination rates, starting in 2006/2007 with the publication of a "Notice of intention to define relevant wholesale call termination markets". This was followed in November 2007 with a findings document, which explained that a series of regulations were required prior to implementing regulations in terms of section 67(4) of the Electronic Communications Act (ECA).

In October 2009, ICASA published a request for information regarding call termination, and in March 2010 published market review "guidelines" (rather than a full set of regulations). The call termination regulations were finally published in October 2010.

The call termination rate reductions facilitated competition and allowed Cell C, for example, to reduce prices. Asymmetry did not, however, result in Cell C and Telkom Mobile becoming fully competitive. In July 2013, ICASA began the process of reviewing its 2010 call termination regulations. Final regulations were published in February 2014. The incumbent operators, MTN and Vodacom, took ICASA's decision on review to the High Court. The latter found that ICASA's decision was arbitrary, since it was not based on the operators' actual costs, and set ICASA's decision aside. This decision was suspended for six months in order to give ICASA time to remedy its failure to use costs and to publish new regulations. These were published in September 2014. ICASA's call termination rate intervention remains today its only intervention in respect of the market enquiry provisions set out in Section 67(4) of the ECA.

The approach of the National Energy Regulator of SA (NERSA) was quite different to that of ICASA. NERSA regulates the market for piped gas in terms of sections 21 and 22 of the Gas Act, No. 48 of 2001. The piped gas provisions of the Gas Act were not implemented for the first 10 years of the Mozambique Gas Pipeline Agreement (MGPA), entered into between the Minister of Minerals and Energy, the Minister of Trade and Industry and Sasol Limited. The latter allowed Sasol to price discriminate between customers in terms of the Market Value Pricing (MVP) formula.

NERSA published a consultation document on the regulation of piped gas in October 2010, a draft methodology document in June 2011 and a final methodology document in October 2011. Before regulating prices for piped gas, NERSA must determine that there is "inadequate competition" in this market. Accordingly, in September 2011 NERSA published a discussion document on inadequate competition in the market, and in February 2012, approved the determination of inadequate competition in markets for piped gas, rejecting the notion that all sources of energy are alternatives to natural gas. NERSA's approved tariff-setting methodology was based on "energy price indicators". Sasol applied for maximum gas prices, a trading margin and a transmission tariff in early 2013. These applications were published for comment, and ultimately approved by the NERSA board in in March 2013.

Large industrial customers for gas applied to have NERSA's decision set aside in October 2013 on the basis that NERSA's decision had the effect of allowing Sasol to continue to charge monopoly prices for natural gas on the grounds that NERSA ought to have determined that there was ineffective competition prior to deciding on its methodology. Other concerns raised include that the market definition exercise was not undertaken carefully in that, for example, the various levels of the supply chain were not separately analysed. This is in contrast to the careful market definition and price regulation approach implemented by ICASA.

ICASA's careful regulatory approach follows the prescriptive requirements of the ECA, which set out the factors that ICASA must take into account when intervening in markets. The Gas Act, on the other hand, is less prescriptive and provides NERSA with considerable discretion.

The article includes a range of recommendations, including that the Gas Act ought to be amended to allow NERSA to revise its methodologies when market conditions change (already allowed for in the ECA). A set of prescribed steps ought to be set out in the Gas Act for NERSA to follow before it intervenes. NERSA's interventions ought to take into account the factors considered by competition authorities when arriving at a decision, including factors such as barriers to entry, industry concentration and history of collusion in the market. Rather than "approve" prices and tariffs, NERSA ought to be allowed to "set" prices and tariffs.

There are planned amendments to the Gas Act that remove the requirement that NERSA first determines that the market is characterised by "inadequate competition"; the ECA was recently amended to remove some of the guidance to ICASA on how it should intervene. Rather than becoming clearer, the ECA and Gas Act are likely to provide less guidance to regulators and less certainty to market participants in future. The article further recommends mandatory consultation between sector specific regulators and the competition authorities in order to allow for greater knowledge sharing, as well as adequate provisions for appeal. The latter in particular would provide for decisions to be appealed on legal and substantive technical grounds on an expedited basis to a single body. Such an appellate body could hear appeals of the decisions of various regulated sectors, since competition principles and economic regulation principles are consistent across sectors.

THE CRITICAL IMPORTANCE OF SPECTRUM REGULATION FOR FUTURE SECTOR DEVELOPMENT

A work in progress contribution, titled *Considering possible regulatory approaches to television white spaces (TVWS): A view from South Africa*, deals with radio frequency spectrum regulation. These case notes address the issue of reducing barriers to entry in markets for broadband services by opening up access to TV white spaces (TVWS) spectrum to broadband service providers. TVWS are the radio frequency spectrum channels between TV channels that are left open so as not to cause interference between TV transmissions. TVWS can be used, under certain circumstances, for broadband services without causing interference with TV transmissions. A TVWS trial in Cape Town - a joint project between Google, TENET and the CSIR - was concluded in September 2013. The project provided

broadband services to 10 schools, and proved that TVWS can be used for broadband access without interfering with TV transmissions. The trial also helped to create regulatory support for the use of TVWS. A further trial is planned, with sponsorship from Microsoft, in Limpopo. The aim of this trial is to connect five rural schools at a distance of up to 10 km. The key challenge faced by regulators in making TVWS available for broadband is shifting from a dedicated spectrum assignment approach to a "dynamic spectrum assignment" (DSA).

There is a considerable amount of spectrum that could be shared through DSA. The "digital dividend" will yield 126 MHz, which can be used for broadband services. The rest of the UHF band, approximately 224 MHz, is reserved for broadcasting use. Approximately 75% of this spectrum, or 168 MHz, could be used for TVWS. The regulatory approach in the US and the UK has been to assign "licence-free" spectrum, which led to the dramatic growth of Wi-Fi devices. However, this approach also results in interference and no ability to manage quality of service. A further possible approach is the defined use services regime, such as walkie-talkies and ski-boat radios, where there is no protection for licensed users, who are only able to communicate when the spectrum is unused.

The licence exempt approach requires that all devices be registered in a geo-location database. Each device is assigned a channel in a licence-exempt spectrum, which assignment must be renewed at regular intervals. In a co-ordinated usage regime, in which devices also register on a geo-location database, devices are assigned spectrum so that they do not cause interference with higher priority devices. Again, the device is required to renew its use of spectrum regularly. Dynamic spectrum assignment (DSA) relies on regular calculation of whether spectrum can be used for a particular purpose without interference between users. This requires precise Global Positioning System (GPS) coordinates for devices as well as a radio propagation model (a model that predicts signal strength in different locations). When spectrum use changes, spectrum assignments are re-calculated and devices may be instructed to switch off. The dynamic spectrum assignment approach therefore requires intelligent devices that have software definable radios (SDRs). A Protocol for Accessing White Spaces (PAWS) has been defined by the Internet Engineering Task Force (IETF), which sets out how white spaces devices interact with geo-location white spaces databases.

A key question is how the Administered Incentive Pricing (AIP) approach to the regulation of spectrum in South Africa would be applied to dynamic spectrum assignment. The AIP system includes seven parameters, including area sterilised and type of spectrum, which are intended to ensure that spectrum is used to its highest value. The AIP system could equally be applied to the assignment of TVWS spectrum using the DSA approach.

The use of TVWS could have a considerable impact on broadband coverage: the UHF band (where TVWS resides) has excellent properties for increased coverage and in-building signal penetration. It is therefore particularly well suited for increasing broadband coverage in rural areas. Greater broadband coverage, in turn, has been linked to higher economic growth.

This set of case notes shows the potential for regulatory innovations that could reduce barriers to entry, increase competition and stimulate economic growth.

UNIFYING THEMES IN COMMUNICATIONS REGULATORY REFORM

The first unifying theme across several of these articles is reducing barriers to entry, whether by reducing access prices (including call termination rates), providing for infrastructure sharing, eliminating regulatory barriers to entry such as the onerous licensing process in South Africa, or assigning TV white spaces spectrum for shared use by small-scale new entrants. The second theme relates to a call for reform of state ownership in operators and consolidating regulatory independence, to bring about greater competitiveness among operators and reduce conflicts of interest inherent in governments owning and regulating operators. The third theme is the need for the efficient use of resources in the telecommunications sector, including in relation to the rapid assignment of spectrum and sharing of existing infrastructure.

Taken together, these reforms, if implemented, have the potential to unlock considerable gains for consumers of electronic communications services in Africa.

REGULATORY EFFECTIVENESS: STAKEHOLDER PERCEPTIONS OF NAMIBIA'S COMMUNICATIONS REGULATORY FRAMEWORK[1]

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ABSTRACT
Communications regulatory frameworks are established to achieve myriad regulatory objectives. These may include affordable pricing, consumer welfare and competition. A regulatory framework is therefore endowed with regulatory governance measures and regulatory incentives to enable it to achieve these purposes. In applying these measures and incentives, the framework becomes effective, or ineffective, depending on whether the regulatory purpose is met. The purpose of this qualitative exploratory study was to assess the perceptions of the stakeholders, as active participants in the evolution of the framework, regarding the effectiveness of the types of measures and incentives implemented within the Namibian institutional context. Perception studies can be valuable because they offer insight on how the policies, laws and regulations that are implemented are viewed by the stakeholders for whom they are designed and implemented. While these are not the only inputs, knowledge of stakeholder views informs the future redesign of these measures and incentives to make the regulatory framework increasingly more effective. One of the main findings of the research was that the perceived conflict of interests between the ICT policy role of the Ministry of ICT and its shareholder role over Telecom Namibia negatively impacts competition. Its policy support for the dominant role of Telecom Namibia is in conflict with the regulatory purpose of encouraging private investment. The conclusion was that this regulatory governance design measure conflicts with the regulatory framework and requires legislative amendment and a re-design of the framework in an effort to improve competitiveness in Namibia's electronic communications market.

KEYWORDS
communications regulatory framework, regulatory effectiveness, institutional endowment, regulatory governance, regulatory incentives, regulatory purpose, competitiveness, regulatory independence, perception studies, Namibia

INTRODUCTION
Namibia enjoys a wide range of telecommunications services, including 3G and 4G mobile services and low prepaid voice tariffs, indicating relatively affordable pricing. However, the telecommunications sector performance is weak because of the poor penetration of a basket of communications services, in particular data services (Stork, 2011; ITU, 2012). It is therefore important to understand the regulatory environment that affects market development. The sector regulator is the Communications Regulatory Authority of Namibia (CRAN), established under the Communications Act No.8 of 2009, which replaced the National Communications Commission (NCC) in 2011.

The electronic communications market structure is atypical, as the government of the Republic of Namibia directly and indirectly owns all the competing dominant telecommunications companies, namely Telecom Namibia Limited (TN) and Mobile Telecommunications Limited Namibia (MTC) (TN, 2011; MTC, 2011). The Namibian Broadcasting Corporation (NBC) is wholly government owned and is not regulated by the Communications Regulatory Authority of Namibia (CRAN). Furthermore, the Executive is yet to decide to commence Part 4 of the Communications Act, 2009, which creates the universal service fund (USF) (MICT, 2011; MICT, 2012). The universal service policy guidelines were published in April 2013 (MICT, 2013).

In the period prior to 2011, reduction of interconnection rates for mobile traffic termination to NAD0.30[3] and the on-net and off-net price ruling, whereby off-net call prices should be restricted to the level of on-net calls, were some of the key regulatory interventions by the National Communications Commission (NCC, 2011). Contrary to the claims by the Mobile Telecommunications Company Ltd (MTC), its EBITDA[4] margin rose from 50.9% in 2008 to 53.8% in 2009 as a result of the cut in termination rates (Stork, 2010). Service licences, spectrum licences and licence conditions are issued by CRAN in terms of its regulatory powers and functions under the Communications Act (Republic of Namibia, 2009). CRAN converted the telecommunications licences and issued service and technology neutral ECNS and ECS[5] ECNS – electronic communications network service; ECS – electronic communications service. licences from 2012 based on the regulations adopted in 2011 (CRAN, 2011a; CRAN 2012a).

In 2012, CRAN proposed carrier dispute resolution regulations (CRAN, 2012b) in order to address any disputes arising within the provisions of the Communications Act, including access disputes. Also in 2012, it preliminarily classified three operators, PowerCom (Pty) Ltd trading as Leo, MTC and TN as dominant (CRAN, 2012c; CRAN, 2012d).

In January 2012, Guinea Fowl Investments Two Ltd, the shareholder of Leo, had applied to CRAN to transfer Leo to TN (CRAN, 2012e). In June 2012, CRAN approved the transfer subject to the suspensive condition that TN be privatised with a minimum of 25% private shareholding and that the establishment Act of TN be amended to enable

1 This article is based on the research report completed for the Master of Management in ICT Policy and Regulation, University of the Witwatersrand, Johannesburg.
2 The author was previously the CEO of the Communications Regulatory Authority of Namibia (CRAN).
3 NAD – Namibian dollars.
4 EBITDA – company earnings before interest, tax, depreciation and amortisation.
5 ECNS – electronic communications network service; ECS – electronic communications service.

the privatisation (CRAN, 2012f). In a subsequent challenge to that regulatory decision, the High Court ruled that the parties were not given a right to be heard prior to the issuing of the condition, and that the decision was ultra vires and violated the separation of powers principle, as the decision sought to order parliament to amend a piece of its legislation (*Guinea Fowl Investments Two v. Communications Regulatory Authority of Namibia and others).*

The series of regulatory interventions, as outlined above, raised stakeholder interest in the effect of the regulatory decisions on the market structure and in the effectiveness of regulation. In conducting the analysis, a perception study was undertaken because at the time of conducting the research it was too soon after the regulatory decisions had occurred to undertake a full-scale market review. This study aimed to gauge how stakeholders perceived regulatory effectiveness by exploring the promotion of competition through new and converted licences; incentives for new entrants, such as rights of way, infrastructure sharing and interconnection; and spectrum management.

IDENTIFYING THE RESEARCH GAP FOR REGULATORY PERFORMANCE AND EFFECTIVENESS

In 2007, the Namibian Economic Policy Research Unit (NEPRU) stated that due to its institutional weaknesses (NEPRU, 2007), Namibia was lagging behind Botswana and South Africa in telecommunications sector reform and performance. A study of Namibia's telecommunications sector performance for the period 2008 to 2009 included a telecoms regulatory environment (TRE) perception survey, which reported that Namibia's regulatory framework required improvement in order to be evaluated as efficient (Sherbourne & Stork, 2010). The study reported here sought to extend the review to regulatory effectiveness post the 2009 TRE survey, by means of a study to better understand the performance of Namibia's regulatory environment with respect to regulatory purpose, institutional endowment, regulatory governance and regulatory incentives pertaining to the communications sector. The events set out in the introduction above indicate how Namibia's communications regulatory framework is changing and suggest that these changes present fertile ground for generating diverse perceptions about the effectiveness of the communications regulatory framework. This study was conducted during 2012 and represents the conditions at that time.

A NOTE ON THE VALUE OF PERCEPTION STUDIES

A perception study can be criticised for simply reporting opinions. However, noting and understanding the perceptions of stakeholders in a regulatory process can lead to establishing credibility and legitimacy for the regulatory framework in which the stakeholders have buy-in and are willing to cooperate. In explaining the utilisation of perception studies, Galpaya and Samarajiva (2009) argue that the "goal of the TRE is to measure perception among informed stakeholders, those who have expert, in-depth knowledge about (or first-hand experience in dealing with and navigating) the various aspects of the regulatory and policy environment in a given country" and limit the population for participation to senior level decision-makers. The study confirmed that this analytical approach can assist in clarifying the best and worst practices, and in tracking progress in regulation and advances in regulatory performance. In studying sector performance in Namibia, Sherbourne and Stork (2010, p. 21) collected data from three sets of stakeholders, (i) those directly affected by regulation; (ii) sector analysts; and (iii) those with an interest in sector development for public benefit. The study reported here focused on regulatory purpose, the institutional endowment, regulatory governance and regulatory incentives to understand regulatory effectiveness.

REGULATORY PURPOSE AND REGULATORY EFFECTIVENESS

Various authors argue that regulatory intervention is required for competition, through the issuance of licences; removal of barriers to entry; prevention of market failure; protection of consumer interest including increasing access to technology and services; and meeting of public interest objectives as outlined in national policies (Blackman & Srivastava, 2011, p. 10; Intven & McCarthy, 2000; OECD, 2014, pp. 13 and 15). Reasonable services must be provided at reasonable prices and this necessitates regulation (Melody, 2001, p. 159). CRAN was established to achieve these typical aims, as set out in its enabling legislation and the national policy provisions (Republic of Namibia, 2009).

In emphasising the regulatory imperative, Melody (2001) argues that interconnection with dominant licensees on reasonable terms is crucial for new entrants, but will only occur if regulation enforces it. Levy and Spiller (1996, p. 14) state that "… successful regulatory policy encourages both private investment and efficient operation …" These elements all refer to the regulatory purpose, the attainment of which may lead to regulatory effectiveness.

A communications regulatory framework can therefore be argued to be effective when all its various components function in such a manner that its overall purpose is seen to be met. The study considered to what extent this statement could be said to be true for Namibia's framework, with due attention to regulatory purpose, the institutional endowment, regulatory governance and regulatory incentives.

THE INSTITUTIONAL ENDOWMENT

Levy and Spiller (1996) argue that a communications regulatory framework may not be effective and its purposes may not be met because of the way in which the aforementioned regulatory processes interrelate with political and social institutions. They state that effective regulation "… rests on the development of a regulatory governance structure that constrains arbitrary administrative action and thereby encourages private investment, and on regulatory incentives that promote efficiency as well as investment" (Levy & Spiller, 1996, p. 14). In terms of the OECD's regulatory policy and governance framework, all necessary and complementary regulatory mechanisms and structures should be intact to meet the regulatory purpose (OECD, 2014, pg. 14).

Levy and Spiller (1996) identify five non-static elements for any country's institutional endowment. These ideal elements are: legislative and executive bodies, the Judiciary, customs and norms, the character of the competing interests and the country's administrative capabilities. And included therein are the administrative capabilities of the regulator. It is within this institutional endowment that regulatory governance and regulatory incentive principles are implemented.

THE INSTITUTIONAL ENDOWMENT AND REGULATORY GOVERNANCE

In order to assess the perceptions of effectiveness regarding the communications regulatory framework, it is necessary to explore what the normative communications regulatory framework entails. The regulatory governance concept refers to the rules that influence the power of the regulator, i.e., structural independence; financial independence; budgetary independence; role clarity; functionality; power for allocatation of licences, administration of universal service, relationship with government, appointment of the regulator Board and management; accountability; transparency; and predictability. These principles are extracted from Levy and Spiller (1996), Smith (1997), Stern and Holder (1999), Intven and McCarthy (2000), Mustafa (2002), Lodge (cited in Jordana & Levi-Faur, 2004), NERA (2004), Brown, Stern, Tenebaum and Gencer (2006), Montoya and Trillas (2007), Galpaya and Samarajiva (2009), Sherbourne and Stork (2010), ITU (2011b). Furthermore, ideas and elements to design the conceptual framework were adopted from the General Agreement on Trade in Services (GATS) (WTO, 1995), the Telecommunications Regulatory Governance Index (TRGI) (Waverman & Koutrompis, 2011), the Telecommunications Regulatory Environment (TRE) survey approach (Galpaya & Samarajiva, 2009), and the ECTA scorecard design (ECTA, 2009). The approach to regulatory governance in the Communications Act (2009) and national ICT policies also informed the design of the conceptual framework.

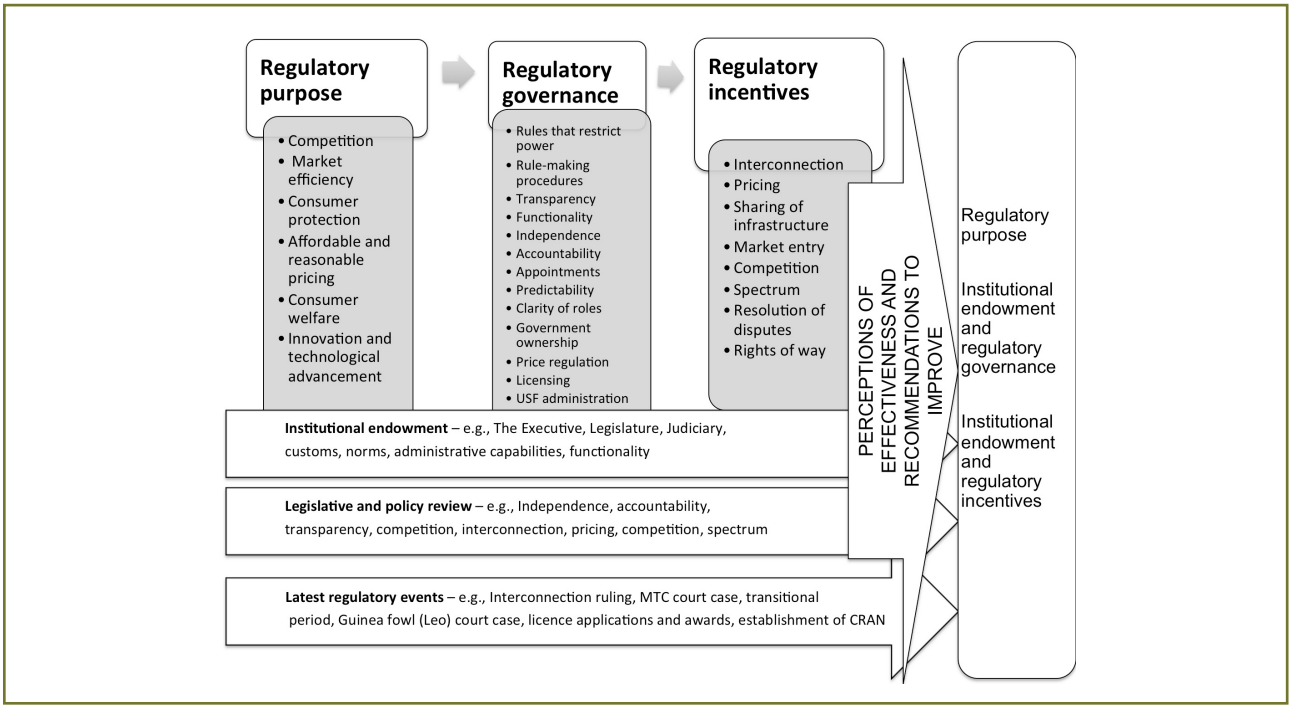
THE INSTITUTIONAL ENDOWMENT AND REGULATORY INCENTIVES

The concept of regulatory incentives refers to the incentives granted to relevant stakeholders in order to encourage compliance with regulation. These incentives apply with respect to price regulation; competition; private ownership; market entry; interconnection; infrastructure sharing; rights of way; spectrum administration; and dispute resolution. The parameters of this concept were extracted from Levy and Spiller (1996); Montoya and Trillas (2007); Tenbücken and Schneider (2004); Galpaya and Samarajiva (2009); Namibia's TRE as reported on by Sherbourne and Stork (2010); as well as the GATS, TRGI and TRE surveys and ECTA scorecard. These perspectives were further informed by a review of the Communications Act (2009) and the national ICT policies.

THE CONCEPTUAL FRAMEWORK: THE "IDEAL TYPE" DESIGN AND ACTUALISATION OF AN EFFECTIVE REGULATORY FRAMEWORK

The common elements, dimensions and indices of effective regulatory frameworks, as mentioned above, are the much-needed dimensions and principles for assessing the communications regulatory framework in a given country. These elements are necessary in order to interpretate how effective the framework is perceived to be on the basis of how it is addressing the regulatory aims. These elements were therefore considered to be the appropriate ones to construct the conceptual framework as the basis for assessing stakeholder perceptions, using widely accepted regulatory objectives, illustrated in Figure 1 below. The five main units of analysis are: (i) regulatory purpose; (ii) institutional endowment; (iii) regulatory governance in relation to the institutional endowment; (iv) regulatory incentives in relation to the institutional endowment; and (v) perceptions of effectiveness of Namibia's communications regulatory framework.

FIGURE 1: CONCEPTUAL FRAMEWORK FOR ASSESSING PERCEPTIONS OF STAKEHOLDERS



This conceptual framework has the academic value of providing a well-defined model that comprises various factors used to assess the perceptions of effectiveness of regulatory frameworks by stakeholders. The study goes beyond simply recording the subjective opinions of the stakeholders. It proposes a well-defined approach for utilising perceptions to construct a view of the phenomenon of regulator effectiveness, by recording the views of stakeholders and the reasons for such views, with concrete examples, based on factual developments, validating those views with a legal and theoretical analysis, and obtaining material recommendations for improvement.

RESEARCH APPROACH – DOCTRINAL ANALYSIS OF LAWS AND INTERVIEWS

Qualitative research methods can reveal the subjective views of participants, in particular contexts based on their experiences. Interpretivism denotes that there are various realities and various perspectives (Neuman, 2011, p. 94; Clarke & Dawson, 2000, pp. 54-56), and in-depth studies are needed to explore the inherent complexities in phenomena. For this study, doctrinal analysis was used to review and interpret the applicable policy and legislation (Clarke & Dawson, 2000), while semi-structured interviews were used to explore stakeholder perceptions. The participants were selected based on their experience of the regulatory environment (Thompson & Walker, 1998). Triangulation of the data was conducted by critically assessing the perceptions held, through comparing and contrasting this data with data obtained from the review of policy and law, not simply accepting the perceptions at face value (Neuman, 2011). This approach enhances the validity of the data. This article reports on the perceptions of senior decision-makers from industry, government, regulators and advocacy groups, of whom the majority of respondents were from industry, thus presenting a strong industry focus in this particular article. The article presents selected findings, and translates the key analytical points into a simple diagnostic chart, using the "traffic light" analogy (Government Digital Services, 2012), indicating perceptions of effectiveness (green), partial effectiveness (amber) or ineffectiveness (red).

FINDINGS AND ANALYSIS

FRAMING THE REGULATORY PURPOSE: INSTITUTIONAL ENDOWMENT, POLICY AND LEGISLATION AND KEY REGULATORY EVENTS

The Communications Act (2009) establishes the independent regulatory authority for the Namibian communications sector, the Communications Regulatory Authority of Namibia (CRAN). The state-owned Enterprise Governance Council (SOEGC) Act (2006) recognises CRAN as a state-owned enterprise (SOE), limiting its financial and structural independence. In terms of the Communications Act, the regulator may award service and spectrum licences, and must set up and administer the universal service fund (USF). CRAN exercises the regulatory role and the MICT exercises the policy role. The CRAN Board is appointed by the MICT, and CRAN must submit its annual report to both the MICT and the SOEGC, not to Parliament. CRAN is required to disclose its decisions, the reasons for its decisions and interpretations of such decisions, and to keep public registers of proceedings, registers of licences and allow for public inspections. CRAN may not change its decisions without following due process in terms of the SOEGC Act (Republic of Namibia, 2006).

In terms of the applicable laws, the Executive plays a major shareholder role in respect of regulated SOEs such as Telecom Namibia, as well as SOEs not regulated by CRAN, such as the National Broadcasting Corporation (NBC) (Republic of Namibia, 1991), while the Executive also executes a policy role via the Ministry of ICT, raising many opportunities for conflict of interest. Parliament does not play any oversight role as a multi-party democratic institution.

In recording the data from key industry informants, the enactment of the Communications Act (2009) by Parliament and the adoption of the Overarching ICT Policy (MICT, 2009a), the Telecommunications Policy (MICT, 2009b) and the Broadcasting Policy (MICT, 2009c) by the Executive were perceived as a positive development by industry stakeholders, consumer advocacy groups, academics, government respondents, the regulator and expert respondents. The study revealed that the Namibian communications policies, laws and regulations contain many of the best practice elements, generally regarded as requisite for an effective communications regulatory framework. However, these policies are either not implemented efficiently or not implemented at all. In certain instances, the legislation contradicts the provisions of the policies.

The following examples are cited in support of this finding: (1) The Overarching ICT Policy of 2009 includes a statement to the effect that government will divest shareholding in ICT SOEs (MICT, 2009a). However, by the end of 2012 no action had been taken in this regard and government still retained complete control over such shareholdings, including ownership of Telecom Namibia. (2) With respect to rights of way, industry stakeholders believed that their complaints to CRAN about failure to get servitudes from the City of Windhoek were taking too long to be responded to and were not being adequately addressed. In their view, this was because CRAN's role was as mediator with the City of Windhoek and the limitations placed on it in legislation prevented it from being more proactive on rights of way. (3) The time-consuming licence applications process for spectrum licences (the time taken for application, publication of notice for public comment in the *Government Gazette*, comments process, review of comments, final decision) added to the perception of the limited effectiveness of the regulator, noting the importance of spectrum licensing for the introduction of new mobile and broadband technologies.

These weaknesses negatively affect the regulatory purpose of promoting competition, technological innovation and sector development, thereby negatively affecting consumer welfare in the long term.

The High Court of Namibia reviews the decisions of the regulator in terms of the Communications Act (2009), and the stakeholders perceive this as a partially effective mechanism for advancing the regulatory framework. The regulator must give reasons for its decisions and in this manner accountability is instilled with respect to the regulated entities and consumers, in line with the guidance of the OECD (2014). The High Court reviews decisions of the regulatory authority. Although the Act grants CRAN relatively wide discretionary power, this avenue for review provides industry with an opportunity to challenge CRAN's decisions. The review mechanism of the High Court is seen to have the power to curtail the wide powers of the regulator. Thus, with respect to the role of the Judiciary, the High Court of Namibia exercises its crucial checks and balances role. However, it requires the necessary training in ICT policy and regulatory matters, in order to be able to review the decisions of the regulator appropriately. Industry and expert stakeholders perceived this dimension as only partially effective, noting their criticism of the High Court decision on the transfer of Leo from Guinea Fowl Investments to TN. Their criticism was that the High Court erred in its decision, by upholding the review and setting aside the decision of CRAN to conditionally approve the application for transfer of a telecommunication licence. Moreover, the stakeholders were dissatisfied by the effect of the courts decision. The effect was that CRAN could not impose the type of condition it wanted to, therefore the merger transaction was approved without any conditions. The concerns that were expressed were that the decision resulted in reducing competition in the market and concentrating market power in a public telecommunications company, resulting in government controlling the sector. This discourages private investment, as the private company is replaced with a public company. However, the broad independence and credibility of the judicial system and the relative independence of the regulator allows for sufficient credibility of the Judiciary with respect to the telecommunications sector, as propounded by Stern and Holder (1999), hence the perception of partial effectiveness.

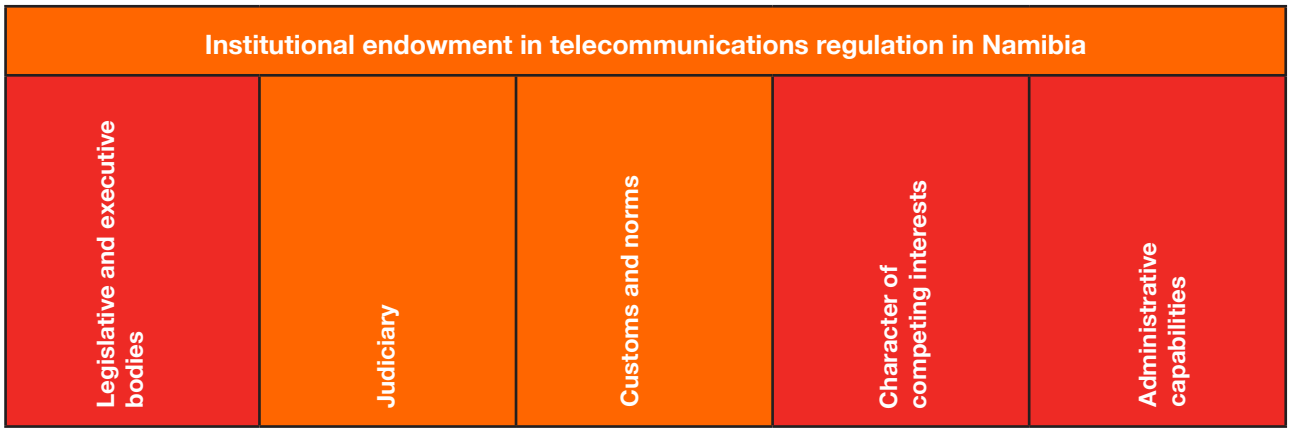
With respect to customs and norms, Namibia has a culture of informal settlement of disputes, which may compromise the integrity of CRAN if followed. Industry stakeholders perceived this dimension to be only partially effective, because the custom of informal meetings, in particular attempts at political engagement by the Executive with respect to the MTC 4G spectrum application (New Era, 2012), does not constitute governance best practice. Stakeholders need to participate in formal procedures to have matters addressed and resolved, because conduct that appears improper will bring the regulator's integrity into question (Brown et al., 2006, p. 63).

Stakeholders perceived the administrative capabilities of the institutions with respect to the regulatory processes of CRAN and the policymaking processes of the MICT as weak, inefficient and bureaucratic. Stakeholders believe that the institutional endowment is undermined by the lack of consistent application of the relevant policies and legislative provisions. In particular, there are competing social and economic interests between the consumer welfare role of the regulator and the profit motives of the licensees that have not been addressed. There are also competing interests among the licensees, as competitors, that require regulation by CRAN. For example, the NBC is largely unregulated except for licensing and licence conditions; the USF legal provisions are not operational; and dominant operators charge inequitable rates for infrastructure sharing. These competing interests have for the most part remained unresolved and have created the perception of an ineffective regulatory system.

Indeed, Namibia's communications regulatory framework operates in an environment that is dominated by political involvement in regulatory matters and government shareholding in dominant ICT SOEs. This creates the risk of regulatory capture for the partially independent regulator, as it is structured in such a fashion that it can be unduly influenced by the Executive in terms of its financial plans and strategic activities, as this requires approval from the Executive branch of government. Furthermore, the Minister makes CRAN Board appointments. In terms of the OECD governance principles for regulators, the funding source, or in this case the approving authority, should not influence regulatory decisions (OECD, 2014, pp. 99-98).

In summation, the conservative role of the legislative and Executive bodies, the difficulty in successfully addressing competing interests through regulation and the weaknesses identified in administrative capabilities across the policy and regulatory institutions lead to perceptions of ineffectiveness in promoting sector development. The Judiciary and customs and norms are considered to be only partially effective, resulting in an institutional endowment that can only be considered to be partially effective, as indicated in Figure 2 below.

FIGURE 2: PERCEPTIONS OF EFFECTIVENESS OF THE INSTITUTIONAL ENDOWMENT



REVIEW OF REGULATORY GOVERNANCE IN RELATION TO THE INSTITUTIONAL ENDOWMENT, POLICY AND LEGISLATION, AND KEY REGULATORY EVENTS

This section discusses issues of regulatory independence from industry and government, regulatory accountability, as well as the process of regulatory decision-making. The key analytical points are highlighted in Figure 3 below.

CRAN is not a structurally independent regulator because of its classification as an SOE, despite the provisions of the Communications Act (2009) concerning the establishment of an independent regulatory Authority and organisational separation from the MICT. The dual classification creates a governance conflict of interest for the Minister of ICT as the line shareholding Minister for these SOEs, as against its ICT policy role. This conflict of interest may compromise CRAN in its role as sector regulator. Even where it has demonstrated the ability to take independent decisions, such as in the *Guinea Fowl–Leo* transfer decision cited above, this does not make the regulator structurally independent. CRAN has taken independent decisions in handling licence applications and awarding such licences for service and spectrum licences (CRAN, 2011b), despite attempted political interference from the then Prime Minister regarding MTC's 4G-spectrum application (New Era, 2012). Considering this, the dimension of decision-making was analysed as effective.

The Minister of ICT has approval powers over the budget and strategic plan of the regulator (Republic of Namibia, 2009). This creates the potential for political interference and regulatory capture. Even where the regulator may not allow political interference, this does not make the regulator financially independent, especially if government approves the budget, but does not fund the regulator sufficiently. Government approval of the budget is not needed to promote accountability, as the accountability and transparency provisions contained in the Communications Act (2009) already deal with this matter. This dimension of financial independence was analysed as ineffective.

The separation of roles and responsibilities between the regulator and the Minister are clearly defined by the Communications Act (2009) and the national ICT policies. The MICT makes policy and CRAN regulates it, except where indicated otherwise. Industry stakeholders, however, have the perception that the roles are not clearly and correctly defined, because the Ministry could have an indirect say, using the budget as a back door, to either support or deny particular projects of the regulator. Ministerial approval of the budget can impede progress of certain regulatory projects and thus affect regulatory processes and decisions. In terms of the OECD guidance on governance principles, an effective regulator must have clear objectives and these must be clear to the stakeholders (OECD, 2014, p. 31). NERA (2004, p. 2) reported that in South Africa, the functional ambiguity between regulator and policy-maker impacted negatively on the regulator's effectiveness and integrity. Despite stakeholder perceptions, the fact that the MICT makes policies requiring CRAN to take certain regulatory steps in terms of government policy does not make CRAN an extension of the Ministry or lacking in independence, as long as (i) there is no interference in CRAN's implementation of the policy (Melody, 2001); and (ii) CRAN does not receive instructions in this regard (Montoya & Trillas, 2007). Given the perceived lack of role clarity, this dimension was perceived as only partially effective.

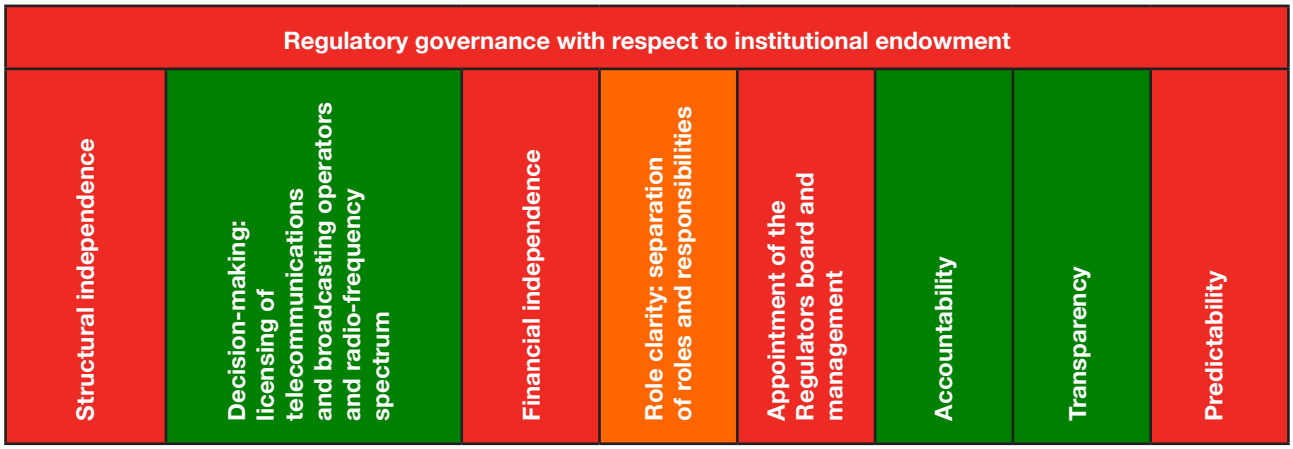
The management of the regulator is appointed by the Board and the Board is appointed in turn by the Executive, not by Parliament (MICT, 2010). Despite appointment following a credible, transparent recruitment process, subject to the SOEGC guidelines (Republic of Namibia, 2006), the role of the Executive creates the perception that the regulator's independence is compromised. Therefore, this dimension is classified as ineffective, based on the strong negative perceptions of the industry and expert stakeholders and advocacy groups.

The regulatory framework is perceived to be transparent as the regulator is required to, and does, publish notices of proposed regulations for consultation. All notices and all decisions are published in the *Government Gazette* of the Republic of Namibia. This dimension is considered to be effective.

According to Stern and Holder (1999), a regulatory framework may be regarded as predictable based on its transparent manner of communicating proposed regulations. This is applicable to the Communications Act (2009) that outlines a clear process to promote predictability in the exercise of regulatory decisions. However, despite the rule-making regulations that prescribe how changes to regulations must be made, stakeholders perceive regulatory governance as unpredictable. Industry stakeholders claim that the final decisions are uncertain. There are so many stakeholders that have a say in the licence-application and rule-making processes, as there is wide public consultation. Hence the outcomes are unpredictable as the regulator attempts to find the appropriate balance. While considering all views is an important part of regulatory decision-making, predictability is necessary for industry to ensure that it can strategise and plan with reasonable certainty. Considering the perceptions of the stakeholders that the system does not provide reasonable certainty (Stern & Holder, 1999; Brown, et al, 2006, p. 60), this element is classified as ineffective.

A regulatory framework needs to be properly governed in order to effectively restrain the arbitrary use of power. The governance of Namibia's communications regulatory framework does not effectively prevent potential abuse of power. For example, the lack of structural independence of the regulator and the ministerial appointments of the Board of the regulator create opportunities for potential political interference. This does not align with best practice for regulatory governance and effectiveness. Overall, the regulatory governance dimension is perceived as ineffective, as the majority of its constituent elements are perceived as ineffective.

FIGURE 3: PERCEPTIONS OF EFFECTIVENESS OF REGULATORY GOVERNANCE



REVIEW OF REGULATORY INCENTIVES IN RELATION TO THE INSTITUTIONAL ENDOWMENT, POLICY AND LEGISLATION, AND KEY REGULATORY EVENTS

In terms of the Communications Act (2009) the regulator must promote competition; licensees must share telecommunications infrastructure; and the Authority may prescribe prices and approve interconnection agreements and must intervene and resolve disputes. In terms of the policy provisions, the Authority's roles include the responsibility to promote efficient competition (MICT, 2009a); prevent any abuse of a dominant position; and encourage the sharing of networks between operators at non-discriminatory rates (Republic of Namibia, 2009). From a policy perspective, competition is potentially addressed by proposing to dilute government shareholding in ICT SOEs (MICT, 2009a), which would benefit Namibia through the ability to attract international investors and technology partners with possible market efficiencies to be gained. Government policy states (MICT, 2009a, p. 19):

> So long as Government continues with shareholding participation in ICT SOEs, Government will separate its policy development and regulatory roles from its role to maximise shareholder value. Commercialised state-owned enterprises in the ICT sector are managed separately from its policy and regulatory responsibilities.

However, in terms of the Post and Telecommunications Companies Establishment Act (Republic of Namibia, 1992), only the state may hold shares in TN. Namibia is not implementing the national policies that advocate divestment of government shareholding in ICT SOEs (MICT, 2009a). The NBC is not regulated by CRAN and is not legally obliged to share infrastructure (Republic of Namibia, 1991). Thus, the policy and regulatory environment for competition provides few, if any, real incentives to foster competitive markets in this sector. The competition segment is perceived as ineffectively regulated as government controls the major part of the sector.

Market entry is only addressed by the existence of consistent licensing rules and various new service and technology-neutral licences issued by CRAN to spur competition. This is, however, perceived as a bureaucratic process. The limitation on mergers and acquisitions of foreign-owned companies does not incentivise market entry to encourage competition. Coupled with majority or sole government ownership, the transfer of ownership of Leo to TN places the last of the major telecommunications companies under the indirect sole shareholding of government, thereby concentrating ownership in public hands.

As represented in Figure 4 below, pricing regulation has been enforced, to a limited degree, in respect of mobile voice service, through the pricing regulation interventions with respect to the mobile termination rates (MTRs) and the on-net and off-net rates (Stork, 2011). As indicated by Stork (2011), fixed and mobile broadband is, however, an area that would require future regulatory intervention. The dimension of price regulation is therefore perceived as partially effective.

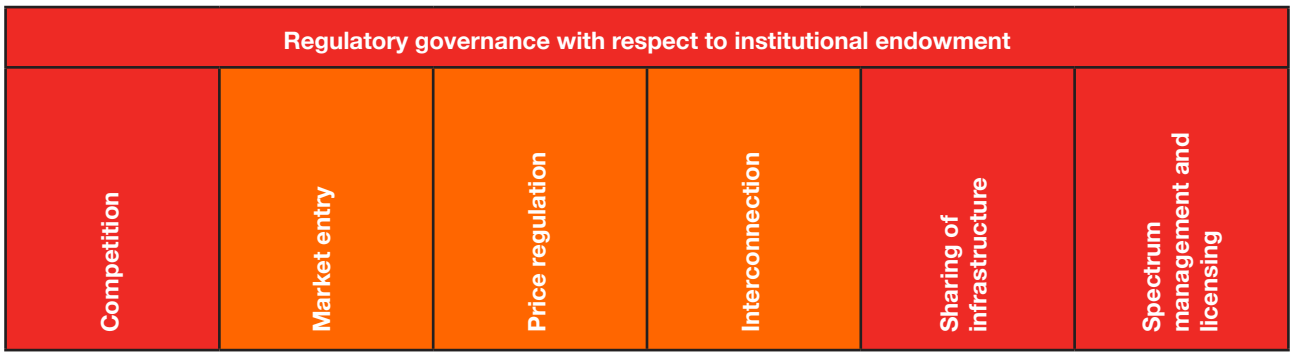
Interconnection rate regulation is also generally lacking. The MTR's rate ruling by the NCC allowed for greater competition amongst licensees and had a positive impact on the regulatory framework by allowing cheaper consumer voice services (Stork, 2010). However, issuing interconnection guidelines and addressing complaints by licensees about possible further rate reductions require further regulatory intervention. This is, however, a moot point where there is a shift to fixed and mobile monopoly provision.

The sharing of infrastructure is encouraged but not practically enforced. The pricing to share infrastructure, contrary to legislative provisions of the Communications Act (2009), is deemed too high, discriminatory, and requires regulatory intervention. The regulatory failure to address these complaints has left this aspect of the regulatory framework ineffective.

Spectrum is managed by CRAN, but the licensing process is perceived as inefficient, despite the fact that it allows for public consultation. The licensing period can be expedited and complaints of illegal spectrum use must be investigated and addressed fully.

The institutional implementation of the communications regulatory framework does not encourage liberalisation. This is contrary to the policies and the laws promoting it, as evidenced by government domination of the sector, contrary to its regulatory purpose. Overall, the regulatory incentives dimension is not perceived as effective by industry stakeholders, as demonstrated in Figure 4 below.

FIGURE 4: PERCEPTIONS OF EFFECTIVENESS OF REGULATORY INCENTIVES



IMPROVEMENTS REQUIRED: GEARING TOWARDS AN EFFECTIVE COMMUNICATIONS REGULATORY FRAMEWORK

IMPROVING THE INSTITUTIONAL ENDOWMENT

To improve the administrative capability, the MICT and CRAN alike should develop clear business, policy and regulatory processes, to be communicated to stakeholders. These processes should contain clear timelines. CRAN should make and practically enforce regulations outlining dispute resolution regarding the sharing of infrastructure, pricing and interconnection. CRAN should also recommend to the Judicial Service Commission, the MICT and the Parliamentary Standing Committee on ICT the need to facilitate training in ICT policy and regulation for judges, civil servants and parliamentarians, to ensure the competent and independent review of regulatory actions and the correct application of ICT policies. CRAN should invite stakeholders to open and transparent consultations procedures and not follow informal dispute settlement processes. There are conflicting provisions in the Communications Act (2009) and national ICT policies, with respect to government ownership of ICT SOEs and the independence of CRAN. To cure this disharmony, the Communications Act (2009) should be amended to ensure that it is in line with the ICT policies.

IMPROVING REGULATORY GOVERNANCE

CRAN is not structurally independent and should be de-classified as an SOE. It should report annually directly to Parliament and the Board should be appointed by Parliament. The MICT should relinquish its conflicting roles, as per its ICT policies, and divest some of its shares in MTC and TN. To ensure predictability, transparency and accountability, CRAN should advise on, and publish a schedule of, planned regulatory engagements for the information of its stakeholders. If CRAN is to remain an SOE accountable to the MICT, the Executive branch of government should delegate the shareholder powers over TN, MTC and NBC to the Ministry of Trade and Industry. Legislative amendments should be made to the establishment statutes of TN, MTC and NBC in this regard. The MICT should, however, still execute the national policy role over the telecommunications industry, whose policies are binding on CRAN to make regulations. The USF provisions in the Communications Act (2009) should be put into operation and the regulations should be made to enable the implementation of the regulatory objectives of socio-economic welfare. CRAN should not obtain budgetary approval from the MICT. The Board should approve the budget of CRAN and the Board must be held accountable to Parliament in terms of its performance agreements and annual report.

The proposed separation of roles to attain improved regulatory governance, independence and incentives should ideally be structured as presented in Table 1 below. In terms of this structure, CRAN would be structurally and financially independent in terms of the regulatory governance dimension. The Judiciary would ensure the checks and balances and Parliament would hold the regulator accountable. This role can be delegated to a standing committee of Parliament.

CRAN would also be independent in its regulatory decision-making, in terms of its powers regarding the regulatory incentives such as competition, because the conflicting role of the MICT would have been removed. With this structure, CRAN stands a better chance to minimise or avoid regulatory capture and political interference to achieve the regulatory purpose. This approach would provide clearer role definition to the stakeholders.

TABLE 1: PROPOSED ROLE SEPARATION

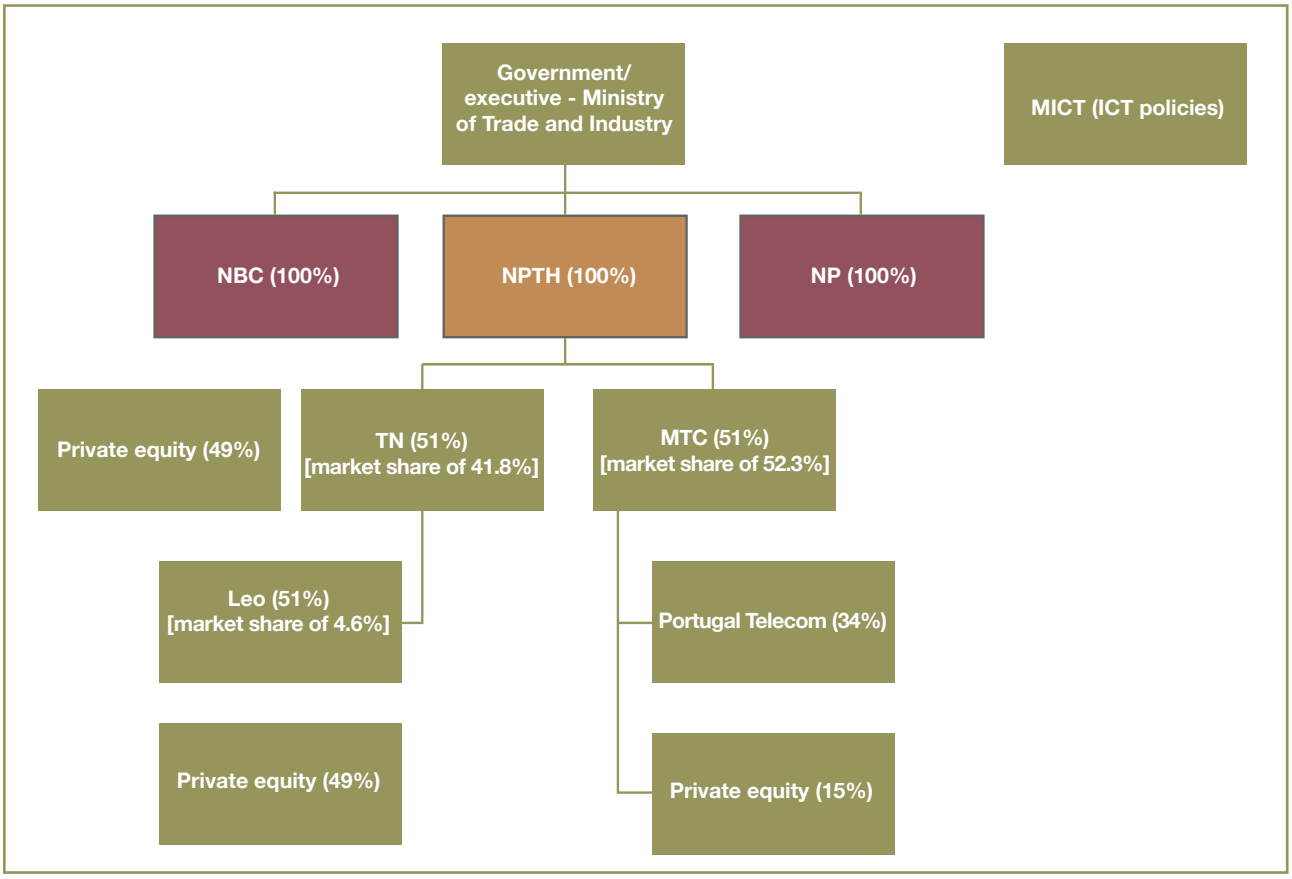
CRAN (regulatory independence and incentives	Parliament (regulatory governance)	Judiciary (regulatory governance)
Budget Financial investments Business plan Management appointment Price regulation Competition Licensing Spectrum management Interconnection Sharing of infrastructure Resolution of conflict Administration of USF	Receipt of CRAN Annual Report Receipt of USF Annual Report Board appointment and remuneration	Judicial review

Figure 5 below depicts the proposed government shareholding structure. This structure demonstrates that the ICT policy role could remain the domain of the MICT. There would be only limited conflict of interest, if the Ministry of Trade and Industry would exercise the shareholding powers over the ICT SOEs. This structure emphasises that policy and shareholding roles can be distinct and mutually exclusive.

Furthermore, the proposed structure indicates that TN could be 51% owned by government and 49% privately owned. This proposed structure is likely to enable an effective regulatory framework by introducing a better regulatory governance framework and allowing for better regulatory incentives. Competition would also be addressed if government dominance of the ICT sector were to be reduced through the introduction of private ownership.

For these purposes, in Figure 5 below green indicates shareholding that is favourable for competition and private investment; amber indicates that the sole shareholding is likely to be risky for private investment and competition, but not as risky as the shareholding that is coded red; while red indicates shareholding that is not favourable for an effective communications regulatory framework.

FIGURE 5: PROPOSED GOVERNMENT OWNERSHIP STRUCTURE AND ROLE SEPARATION OF MICT



IMPROVING THE LANDSCAPE FOR REGULATORY INCENTIVES

CRAN should consider introducing regulations for cost-based tariffing and cost accounting procedures to ensure fair and equitable pricing. To encourage greater market entry, the 51% Namibian ownership requirement should be reduced. The Communications Act (2009) should be amended in that regard, so that potential investors would not require political exemptions from the Minister of ICT for higher foreign shareholding. The Ministry of Local Government and MICT are to jointly draft and publish a national policy and legislation, to set a national standard for servitudes.

CONCLUSION

Namibia is perceived as having achieved lower pricing for mobile voice services for consumers, due to its mobile termination rate caps and the off-net and on-net tariff reductions. Affordable pricing of mobile services partially addresses consumer welfare. However, particular consumer welfare objectives such as universal service cannot be achieved, because the universal service fund has not yet been established, one of the primary aims of creating an independent regulator. The overall perception is that no competition exists in Namibia's communications regulatory environment, because of the government's dominance of the sector and no protection is being afforded to smaller licensees by the regulator. In other words, the institutional design, the regulatory governance and the regulatory incentives have not led to the perception that Namibia's communications regulatory framework has achieved its purpose. The assessment of actual regulatory effectiveness still remains an area for future research.

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ECONOMIC REGULATION OF THE TELECOMMUNICATIONS SECTOR IN SOUTH AFRICA 2009-2014

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ABSTRACT
South Africa's electronic communications sector regulator, the Independent Communications Authority of South Africa (ICASA), has a mixed track record in carrying out its mandate. ICASA is part of a regulatory system for the telecommunications sector, that may be characterised as dysfunctional for the following reason: ICASA is not sufficiently independent from government. While regulated entities are generally partially state owned, this does create a conflict of interest for government. Nonetheless, ICASA has had some successes, where the interests of state-owned enterprises coincide with those of consumers. Its interventions in markets for voice services during the course of Telkom Mobile's entry into the market, for example, have resulted in retail voice price reductions of more than 30%. Now that problems relating to voice services markets have largely been resolved through the call termination rate intervention, ICASA needs to shift its focus to markets for broadband services in order to ensure that South Africa becomes more competitive relative to its peers through unbundling the local loop and assigning spectrum for broadband. In order to achieve this, Telkom needs to be fully privatised in order to reduce government pressure to delay local loop unbundling (LLU) and Telkom's wholesale and retail fixed-line operations should be functionally separated. ICASA needs to be further insulated from political interference and be properly resourced through industry levies and fees. Furthermore, a single appellate body for economic regulators ought to be established in order to improve accountability of the regulators and improve outcomes in the sector.

KEYWORDS
telecommunications, spectrum, LLU, local loop unbundling, regulator performance, economic regulation

INTRODUCTION
The telecommunications sector in South Africa is regulated by the Independent Communications Authority of South Africa (ICASA). Historically, the Department of Communications (DoC) established policy for the sector. It has recently been replaced in this role by the Department of Telecommunications and Postal Services (DTPS). ICASA has been criticised for, among other things, ineffective monitoring of network operators (MyBroadband, 2014), incompetence in carrying out its duties (Masote, 2013) and repeated qualified audits (McLeod, 2012). These problems have been attributed to a range of factors, including overlapping regulatory mandates, that lead to a lack of role clarity (Sibinda, 2008), a lack of independence from government and a lack of funding (Moyo & Hlongwane, 2009).

There has been relatively little work, however, measuring ICASA's effectiveness in carrying out its mandate in respect of economic regulation of the telecommunications sector, including regulation of access to facilities, interconnection and prices. This paper addresses this gap and contributes towards answering the following questions: How effective is ICASA in fulfilling its role as an economic regulator? How has the wider regulatory system influenced ICASA's performance?

ICASA's effectiveness will be evaluated by assessing market outcomes (including pricing, quality and access to services) in respect of voice and broadband services. These two services have been chosen because ICASA's economic regulation activities have focused on them over the period 2009-2014, through its call termination rate and local loop unbundling (LLU) interventions. While this contribution does not amount to a full performance assessment of ICASA, it measures an important aspect of performance, namely market outcomes.

First, the methodology is presented. Next, the performance assessment evaluates the regulatory governance framework in South Africa (rules and institutions). Finally, there is a discussion of the impact of ICASA's interventions on voice and broadband services. In each of these sections, regulator interventions and instances of lack of intervention are described, and reference is made to the outcomes predicted by economic theory pertaining to these actions or inactions. This is followed by an evaluation of outcomes in terms of price, quality and access.

METHODOLOGY FOR THE ASSESSMENT OF REGULATOR PERFORMANCE AND MARKET OUTCOMES
There are a number of methodologies that can be used for the assessment of regulator performance. These include frameworks designed for the telecommunications sector, such as the NERA framework for evaluating the effectiveness of telecommunications regulators in sub-Saharan Africa (NERA, 2004), the LIRNEAsia telecommunications regulatory environment survey-based methodology (LIRNEAsia, 2008) and the European Competitive Telecommunications Association (ECTA) scorecard (ECTA, n.d.). There are also regulator performance assessment frameworks that are widely applicable to a number of sectors, including the World Bank's handbook for evaluating infrastructure regulatory systems (Brown, Stern, Tenenbaum & Gencer, 2006).

While these methodologies include the assessment of a range of dimensions of regulator performance, an important feature is the assessment of market outcomes in terms of price, quality and access (Brown et al., 2006). These are the key dimensions of performance assessed in this paper.

Brown et al. (2006, p.5) emphasise the evaluation of the wider regulatory system, not just the regulatory authority, and see the regulatory system as '… the combination of institutions, laws, and processes that, taken together, enable a government to exercise formal and informal control over the operating and investment decisions of enterprises that supply infrastructure services'. They stress the importance of assessing both regulatory governance and regulatory substance. The governance questions relate to regulatory processes (formal and informal), independence, transparency, accountability and predictability of decisions. Governance also concerns the relationship between the regulator and policymaker in decision-making and the resources and institutional structure of the regulator. The evaluation of the substance of the regulatory system involves assessing decisions made by the regulator, including decisions on tariff setting and market access. The evaluation of regulatory substance in this paper is confined to the evaluation of market outcomes in two areas, namely broadband and voice services.

Brown et al. (2006) further propose that assessing outcomes in the sector against goals set by the government, and the regulator's role in helping or hindering the achievement of those goals, are key to evaluating the regulatory environment. The detailed set of standards proposed by Brown et al. (2006) are: legal framework, legal powers, property and contract rights, clarity of roles in regulation and policy, clarity and comprehensiveness of regulatory decisions, predictability and flexibility, consumer rights and obligations, proportionality, regulatory independence, and financing of regulatory agencies.

The regulatory governance framework impacts on the substance of regulatory decisions. The governance framework constitutes the formal institutions (rules) that govern the sector. There are also informal institutions (rules) that govern the sector, which are influenced by the range of interests that compete for distribution of benefits across the sector (Khan 2010). These give rise to 'settlements', which ensure the distribution of benefits matches the 'holding power' of interested parties, subject to a minimum viability constraint, which is that consumers (those without 'holding power') benefit sufficiently from the settlement such that they are willing to participate in it. These settlements have an important role to play in the telecommunications sector in South Africa and explain ICASA's performance to a significant degree.

REVIEW OF INSTITUTIONAL FRAMEWORK

Various flaws observed in the telecommunications sector regulatory framework provide a partial explanation for ICASA's relatively poor performance against the Brown et al. (2006) criteria, summarised in Table 1 below (Hawthorne, Bonakele & Cull, 2014). Key among these are the ownership of regulated entities by the state and the policymaker (formerly the Department of Communications, now the Department of Telecommunications and Postal Services) having shareholding responsibility for these regulated entities. This undermines the independence of the regulator. ICASA's independence is also undermined in other ways, including through performance monitoring of councillors by the Minister and the absence of power of ICASA to appoint experts without ministerial approval, where experts are not in ICASA's accepted budget. While the competition authorities, which are not directly linked to regulated entities, have intervened in the sector, they have done so only in relation to specific products and markets where ex post evaluation of conduct has been possible.

There are also significant problems with the independence of ICASA in respect of funding and appointments by the line ministry. ICASA relies on approval of its budget by Parliament; the line minister plays an important role in the appointment of councillors. However, ICASA is not able to appoint foreign consultants without ministerial approval. Best practice is for head of state to appoint regulatory decision-makers, economic regulators to be funded through industry levies and regulated entities to pay for the necessary consultants to provide expertise on regulatory decisions (Brown et al., 2006). It may also be appropriate for Parliament to make such appointments as an arms length institution.

Furthermore, there is no common appeal authority for economic regulators in South Africa. While the competition authorities have dedicated appellate bodies, ICASA's decisions are appealed to the High Court, which means fewer appeals (because outcomes are uncertain), and therefore less accountability for ICASA. There are other gaps in the regulatory framework, or regulatory 'governance' regime, including a lack of regulation of the quality of broadband services, ICASA's lack of information-gathering powers and the unwieldy size of the ICASA Council, which makes decision-making difficult. The open access regime and other aspects of regulation employed in the ECA disproportionately impose onerous regulatory obligations for small new entrants relative to the likely harm that these entrants could cause.

A summary of the assessment of regulatory governance against the Brown et al. (2006) governance criteria is shown in Table 1 below:

TABLE 1: SUMMARY OF ASSESSMENT OF REGULATORY GOVERNANCE FOR THE ECONOMIC REGULATION OF THE TELECOMMUNICATIONS SECTOR IN SOUTH AFRICA

Standard	Comply with standard?	Key problems identified	Do the amendment acts remedy the problem?
1. Legal framework	Yes		
2. Legal powers	Partially	ICASA does not have sufficient legal powers to obtain information.	No
3. Property and contract rights	Yes		
4. Clarity of roles in regulation and policy	Partially	The MOU between ICASA and the competition authorities has not been updated since the ECA was put in place. ICASA must consider ministerial policies and policy directions.	No
5. Clarity and comprehensiveness of regulatory decisions	No	The ECA is not clear as to whether ICASA must conduct a market enquiry before setting tariffs for interconnection and facilities leasing matters.	No
6. Predictability and flexibility	Partially	ICASA often does not follow through with regulation making processes and reversed its decision after political pressure in respect of the Vodafone / Vodacom transaction. See also discussion under Proportionality.	No
7. Consumer rights and obligations	Partially	ICASA's consumer protection rules do not set out what consumers are responsible for. And while quality of voice services is dealt with, quality of broadband services is not. ICASA has not established a consumer advisory panel.	No
8. Proportionality	No	ICASA has fixed maximum fines that are not linked to the magnitude of the contravention. The ECA's 'open access' principles for interconnection and facilities leasing are too wide and catch all licensees, which is disproportionate for small licensees relative to the harm they could cause.	Partly: ICASA may exempt licensees from facilities leasing and interconnection regulations.
9. Regulatory independence	No	There is no independent investigation required prior to removal of decision makers. Brown et al. (2006) recommend three to five comissioners; ICASA has nine. ICASA Council members and the Competition Commissioner and Deputy Commissioners are appointed by line Ministers, not the President or Parliament, and their terms of service may be changed while they are in office. While staff are offered reasonable means of career progression, there is no track for specialists to progress outside of management structures. ICASA may not employ experts outside of its approved budget without ministerial approval. ICASA may not issue i-ECNS licences without a Ministerial policy direction. State ownership of Telkom limits ICASA's independence. ICASA councillors are accountable to the Minister of Communications (in addition to Parliament) for their performance.	Partly: ICASA may employ foreign experts but must seek funding approval from the Minister if additional funds are required. Best practice is to allow ICASA to fund experts. ICASA councillors will be collectively measured on their performance

Standard	Comply with standard?	Key problems identified	Do the amendment acts remedy the problem?
10. Financing of regulatory agencies	No	Funding is generally not raised through special levies from regulated entities. There is no rule that prohibits government cuts in spending unless they apply consistently to all agencies. There is no allowance for authority to have the regulated entity fund the costs of consultants. State ownership of Telkom reduces government's incentives to fund ICASA.	No
11. Regulatory accountability	No Partial	Both ICASA and the competition authorities' processes can be very slow, taking years (and in some cases more than a decade) to finalise. These authorities also do not seek outside expert advice on their performance. Regulated entities do not regularly appeal ICASA's decisions. See discussion above under 'proportionality' regarding the inability for ICASA to intervene in a proportionate and targeted manner.	Partly: ICASA Amendment Act reduces time periods in which ICASA must publish findings
12. Regulatory processes and transparency	Partial	ICASA does not have a case management system to preserve confidential information and facilitate provision of access to documents that are public in terms of the ECA. ICASA in some instances enters into private negotiations with regulated entities instead of conducting transparent proceedings.	No
13. Public participation	Yes		
14. Appellate review of regulatory decisions	No	There is no dedicated appellate body for ICASA's decisions to be appealed to.	No
15. Ethics	No	There are no prohibitions on a variety of ethical problems set down in legislation and there are no requirements for most regulatory personnel to disclose their financial interests.	Partially. An ICASA Code of Ethics to be developed.

Informal institutions also play an important role in the regulatory system for telecommunications in South Africa. These are best explained in the context of actual decisions by ICASA, as discussed below.

The significant problems with the regulatory framework led to the prediction that ICASA's performance, measured in terms of market outcomes, is likely to be poor. This is evaluated in the sections that follow by means of evaluating outcomes in markets for voice and broadband services.

CASE STUDY I: REGULATORY INTERVENTIONS IN MARKETS FOR VOICE SERVICES

REGULATORY INTERVENTIONS (2009-2014) AND THEIR POSSIBLE CONSEQUENCES

REGULATORY INTERVENTIONS

ICASA has intervened in several areas in markets for voice services. First, ICASA introduced number portability (ICASA, 2005) and prohibited network locked handsets, which enables easier switching between operators. Subsequently, ICASA reduced maximum call termination rates by 68% between March 2011 and March 2013, from ZAR1.25 (during peak hours) to ZAR0.40 (for peak and off-peak calls) (ICASA, 2010a). ICASA allowed new entrants and smaller operators, including Cell C and Telkom Mobile, to charge 10% more than this, a form of asymmetrical rate regulation. More recently, it attempted to further reduce these rates, setting ZAR0.10 as the maximum that

THEORETICAL AND EMPIRICAL RESEARCH ON THE IMPACT OF CALL TERMINATION RATE REDUCTIONS

The theoretical impact of call termination rate reductions is ambiguous. Laffont, Rey and Tirole model competition between networks and suggest that the call termination rate that operators would choose collusively and the optimal rate that a regulator should set depends on the competitive setting and regulatory context (Laffont, Rey & Tirole, 1998a, 1998b). The key insight from their model is that operators that compete on retail voice usage prices choose a high call termination rate in order to limit competition by making retail price reductions costly. Where the call termination rate is high and an operator reduces its retail prices, customers on that operator's network would make more outbound calls relative to inbound calls. This would result in greater interconnection expenses for the operator, reducing its retail prices. Foreseeing this outcome, operators do not reduce their retail prices where call termination rates are high. Operators would thus choose a high call termination rate in order to generate and sustain this collusive outcome.

Operators will likely choose a relatively benign low call termination rate where they compete using fixed monthly rental fees (two-part tariffs) rather than usage prices. This is because reducing fixed fees does not encourage more outbound calls, which means that operators cannot use the call termination rate to limit retail price competition. Operators are also more likely to privately choose a more benign call termination rate where their networks are symmetrical in size. This is because if there was a new entrant (ie networks were not symmetric in size) then incumbent operators would choose a high call termination rate and offer low on-net voice usage prices (if this were allowed) in order to make it attractive to belong to a large network (ie generate network effects) and thus exclude the new entrant. Networks will also tend to choose a lower call termination rate where their fixed costs are high, which makes attracting new customers expensive, and where the substitutability between networks is low, which means that lowering retail voice usage prices does not result in more customers.[1]

Kongaut and Bohlin (2012) provide a useful summary of the empirical research into the impact of mobile call termination rates on retail prices and access to services largely in developed countries (2012).[2] The results of these studies are contradictory. For example, Genakos and Valletti (2011) found that call termination rate reductions increased retail prices as a result of a 'waterbed effect'. The same authors more recently found that this 'waterbed effect' had disappeared over time (Genakos & Valletti, 2014). However, Kongaut and Bohlin (2012) found that call termination rate reductions have led to decreases in retail prices, while Veronese and Pensendorfer (2009) found no relationship between MTR reductions and retail prices.

In summary, where there are new entrants, where pricing is based on usage fees (linear pricing), fixed costs are low. Where substitutability is high, which more closely characterises the South African market, operators select a high call termination rate in order to maintain high retail prices and exclude new entrants.[3] This suggests that, theoretically at least, call termination rates may have been set too high prior to ICASA's intervention. This means that ICASA's call termination rate reductions should result in lower prices for consumers, discussed next.

MARKET OUTCOMES: VOICE PRICES, QUALITY AND ACCESS

VOICE PRICES

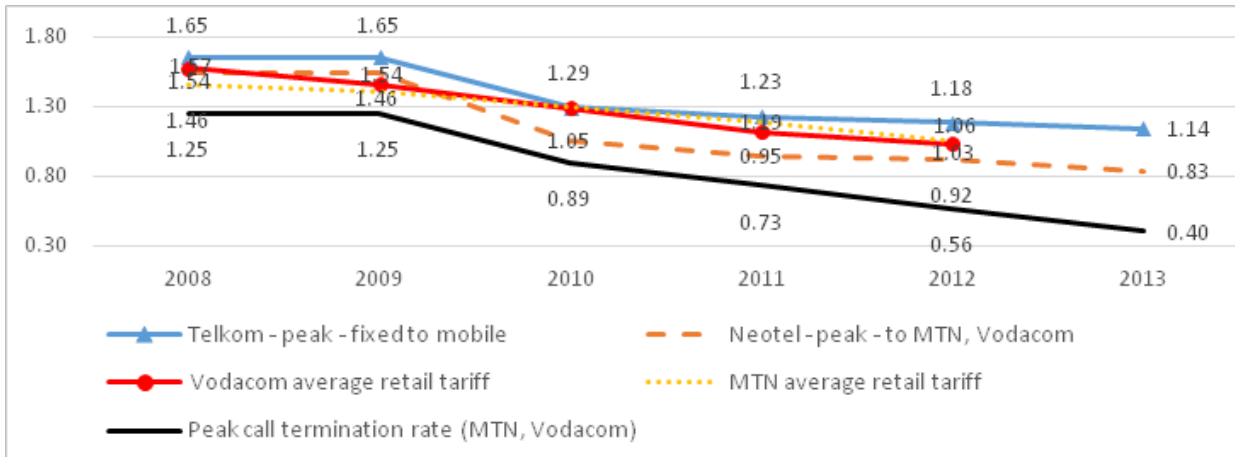
Over the same period that the call termination rate reductions were implemented (2008-2013), retail prices for voice services on average fell significantly, although they did not fall by as much as call termination rates did. While the peak call termination rate for MTN and Vodacom fell by 68% between 2008 and 2013, Vodacom's retail prices fell by 34% between 2008 and 2012, and MTN's prices fell by 27% between 2008 and 2012 (see Figure 1 below). The effect on fixed to mobile prices was similar: Telkom's retail fixed to mobile prices fell by 31% between 2008 and 2013 and Neotel's prices fell by 46% over the same period. While retail prices did not decline by as much as the call termination rates did, they nonetheless declined significantly. ICASA's call termination rate intervention can therefore be argued to have been a success.

1 In general, there is less incentive to choose a high call termination rate where operators do not compete using retail voice usage prices.

2 Many of these studies tend to focus on retail prices for mobile voice services. Mobile call termination rates also impact on retail pricing for fixed-line voice services, however. It stands to reason that, whatever the 'waterbed effect' in markets for mobile services, whereby prices for other retail mobile services increase after an MTR reduction (at least according to some evidence), prices for fixed-line voice usage services in all likelihood declined as a consequence of the MTR reductions. This is because the fixed operators' input costs declined and fixed operators did not experience the same magnitude of call termination rate reductions for their own networks that mobile operators experienced.

3 An important departure from the Laffont, Rey and Tirole models (1998a, 1998b) is that many people in South Africa own more than one SIM card (Hawthorne et al., 2014), which means that operators compete for call volumes rather than for customers. This means that the call termination rate should have less of an impact on competition. Nonetheless, in the face of new entry, incumbents have an incentive to choose a high call termination rate and charge low prices for on-net calls, in order to make it unattractive to join the new network. Furthermore, asymmetry between fixed and mobile call termination rates means that operators were able to disadvantage the fixed-line networks significantly through setting high mobile call termination rates and earned substantial call termination revenues. Telkom's initial fixed to mobile rate cut was particularly pronounced due to the terms of its interconnection agreement with Vodacom at the time, which required that Telkom had to reduce its retail prices if interconnection prices fell (Vodacom, 2009).

FIGURE 1: MOBILE CALL TERMINATION RATES (PEAK), AVERAGE MOBILE RETAIL PRICES AND PEAK FIXED TO MOBILE PRICES (ZAR / MINUTE)

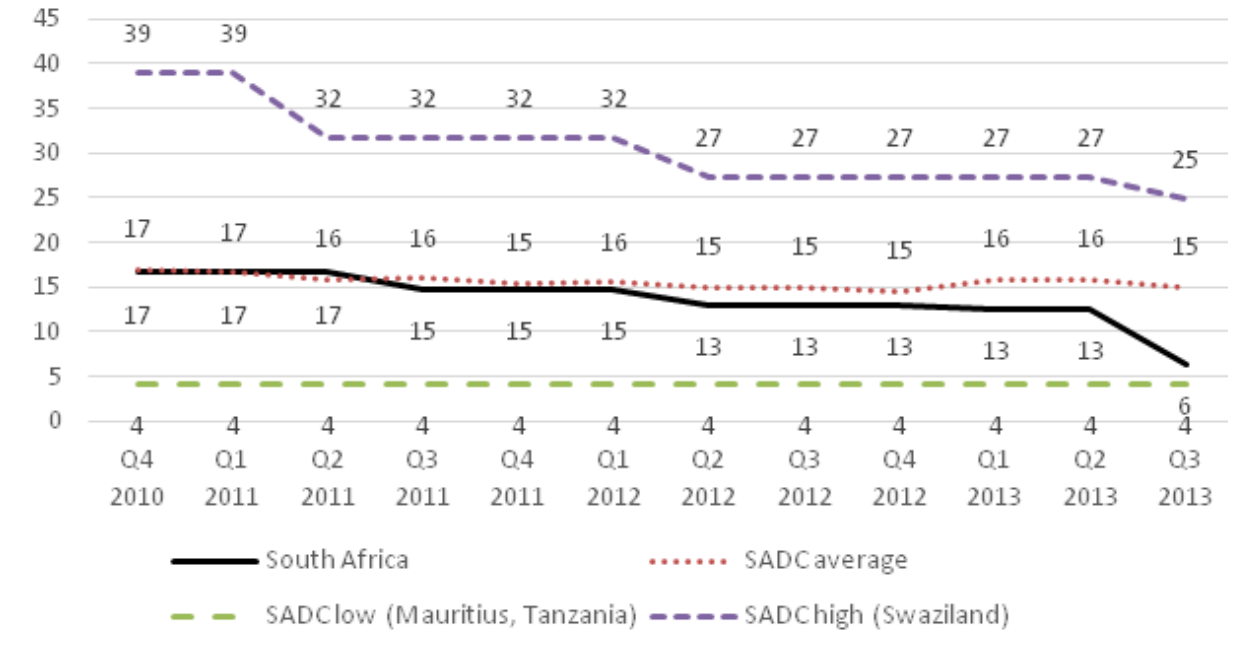


Source: Analysis of data from MTN (2005-2013) and Vodacom (2005-2013).

Note: Vodacom financial data corresponds to the calendar year prior to the year in which the financial results were reported, due to Vodacom's financial year ending in March (their data therefore reflects the previous calendar year more than it does the calendar year in which results are reported).

As a consequence of reduced retail prices, South Africa now ranks among the countries with the lowest retail prepaid rates in the Southern African Development Community (SADC) region (see Figure 2 below).

FIGURE 2: LOWEST AVAILABLE SADC PREPAID PRICES (USD), OECD USAGE BASKET (2010-2013)

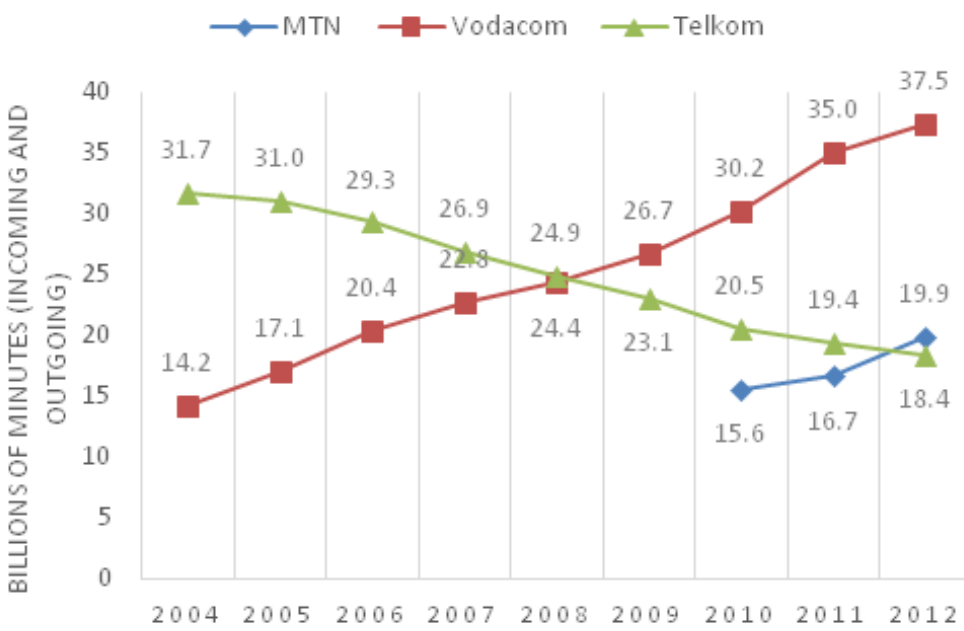


Source: Analysis based on data prepared by Research ICT Africa (2013).

Note: that the relative purchasing power of the USD in each of these countries could be adjusted for as an alternative means of comparison.

Furthermore, the usage of mobile networks grew significantly after the call termination rate reductions (see Figure 3 below). This has arisen partly due to subscriber growth. Both increased usage and subscriber growth are due at least in part to lower retail prices for voice services.

FIGURE 3:MTN, VODACOM AND TELKOM MINUTES OF USE (BILLIONS, 2004-2012)



Source: Analysis of data from MTN (2005-2013) and Vodacom (2005-2013).

Note: Vodacom financial data corresponds to the calendar year prior to the year in which the financial results were reported, due to Vodacom's financial year ending in March (their data therefore reflects the previous calendar year more than it does the calendar year in which results are reported).

These gains for consumers were not at the expense of reduced operator investment in networks (Hawthorne et al., 2014). They were also not at the expense of reduced quality, discussed next.

VOICE QUALITY

It is important to assess whether lower voice prices (and higher usage) have been achieved at the expense of quality. ICASA issued regulations 'setting out the minimum standards for end user and subscriber service charters' in 2009 (ICASA, 2008). These regulations require that service availability is 95% over a six-month period and that dropped calls must not exceed 3% over the same period. An initial quality of service report was prepared by ICASA in 2011 on the basis of drive test results (ICASA, 2011b). This report revealed that dropped call rates in particular were very high and exceeded the 3% target for MTN, Vodacom and Cell C. The report carried disclaimers that the tests conducted were not representative and were 'merely indicative', and the results were contested by the mobile operators (Mawson, 2011). Whatever the validity of the 2011 report, by 2013 the dropped call rate had improved significantly, at least on the Vodacom network for Johannesburg and Pretoria; and the MTN and Cell C networks were compliant in Pretoria (ICASA, 2013). The call setup success ratio measure met or exceeded ICASA's target for most operators in most regions over both periods. This suggests that voice call quality has improved (or at least has not declined) in the Gauteng region over time.

The data shows that voice prices have decreased, usage has increased and quality (at least in Gauteng) has improved as a result of ICASA's call termination rate intervention. The impact of lower prices and higher quality on access to voice services is discussed next.

ACCESS TO VOICE SERVICES

Access to voice services and coverage also increased over the period of the call termination rate reductions. All of the mobile networks increased their subscriber bases over this period: between 2009 and 2012, the number of MTN subscribers grew from 18.8m to 25.4m (MTN, 2005-2013), while the number of Vodacom subscribers grew from 19.7m to 28.9m between 2010 and 2012 (Vodacom, 2005-2013). Cell C grew its subscriber base from 6.9m to 10m subscribers between 2009 and 2012 (Cell C, 2005-2013), while Telkom Mobile grew its subscriber base from 0.5m in 2010 (when it entered the market) to 1.5m in 2012 (Telkom, 2005-2013). While some of this growth is due to subscriptions for machine to machine communications (such as vehicle tracking), overall subscriber growth has been significant.

Growth in access to mobile services is confirmed by survey evidence. Statistics South Africa (StatsSA) reports that household access to cellphones was 88.9% in 2011 (StatsSA, 2012a), compared to 72.9% in 2007 and 32.3% in 2001 (StatsSA, 2007). There is very little variability in access to a cellphone between provinces: the lowest availability is 81.1% in the Northern Cape and the highest is 93.8% in Gauteng. Note however, that the Statistics South Africa questionnaire was structured such that if any one person in a household owned a cellphone, the household was deemed to own a cellphone. This means that while household access to cellphones was almost 90%, access to cellphones by the

Gillwald, Moyo and Stork (2013) arrived at similar results from a survey of households for access to cellphones (84.2%). World Wide Worx (2012) estimates that there are approximately 40m unique users of cellphones in South Africa, and cellphone penetration is therefore approximately 80%. This is less than what StatSA (2012a) and Gillwald et al. (2013) estimate. This is because, for example, StatsSA (2012a) suggests that 88.9% of households own a cellphone but not that each person within those households has a cellphone. The AMPS surveys (SAARF, 2005-2013) confirm the relatively high rate of cellphone penetration shown in the census (StatsSA, 2012a) and in Gillwald et al. (2013): cellphone penetration has grown from 67% of the adult population in 2007 to 86% in 2013.[1]

The significant growth in cellphone penetration in South Africa during a period in which call termination rates declined is in contrast to the findings of Veronese and Pensendorfer (2009) and Cunningham, Alexander and Candeub (2010), who found that higher call termination rates result in a greater number of subscriptions, theorising that higher termination rates encourage investment and therefore more connections. This outcome is also in contrast to Dewenter and Kruse (2010) who found no relationship between mobile diffusion and call termination rates.

Lower voice prices and higher usage have therefore not come at the expense of reduced access to voice services; indeed, access has increased. Measured in terms of market outcomes for voice services, it can therefore be argued that ICASA has been ast least partly successful in regulating voice prices. Possible reasons for this success emanating from the institutional framework in South Africa are discussed next.

ICASA'S CALL TERMINATION RATE INTERVENTIONS IN THE CONTEXT OF THE INSTITUTIONAL FRAMEWORK IN SOUTH AFRICA

Informal institutions may have played an important role in ICASA's success in markets for voice services. The new 'settlement', in terms of lower call termination rates and lower voice prices was made possible by a range of factors reflecting the holding power and the relatively high entrepreneurial ability of the incumbents, which means that they would need to rely less on government protection as proposed by Khan (2010).

The mobile sector is fragmented in that there are four different operators, each of which has relatively little holding power (at least relative to the fixed-line incumbent). Furthermore, two of the mobile operators are relatively smaller than the dominant operators, benefit from low call termination rates, and were 'bought off' with asymmetrically higher call termination rates. The transition to lower call termination rates was also staggered over time with a glide path, which reduced the potential negative impact of the intervention and opposition to it. Finally, the entrepreneurial capabilities within the mobile sector are strong and globally competitive, which reduces their incentive to seek government protection from competition.

This institutional setting therefore facilitated pro-competitive reform, which resulted in lower prices, greater usage and greater access to voice services for consumers. ICASA has been less successful in regulating broadband services, discussed next.

CASE STUDY 2: ON REGULATORY SUBSTANCE: INTERNET SERVICES

LOCAL LOOP UNBUNDLING (LLU)

LLU IN SOUTH AFRICA

ICASA has not intervened as actively in the supply of Internet services as in voice services. LLU has not been implemented, and ICASA has not assigned spectrum available for broadband (discussed below). LLU entails a fixed-line incumbent providing open access to its network for third parties to provide services over it. This intervention is implemented in order to foster competition, allow for greater innovation, lower prices and encourage better quality broadband services.

LLU has not been implemented despite the Minister of Communications having made a policy decision to implement LLU (DoC, 2007). The deadline for this implementation was the end of 2011. Subsequent to the 2007 Ministerial policy decision to implement LLU, the regulator (ICASA), the Parliamentary Portfolio Committee on Communications (PPCC),[2] and the Department of Communications (DoC) appear to have been focused on voice services and call termination rates in particular where economic regulation of the sector is concerned. In 2010, the then Minister of Communications, Roy Padayachie, announced that LLU would be implemented by November that year (McLeod, 2010). ICASA did indeed publish a draft framework document for LLU, followed by a findings note, after hearings held late in 2011.

The Parliamentary Portfolio Committee on Communications (PPCC), however, opposed the rapid implementation of LLU in a budget review of the Department of Communications and, while finding that the regulator should implement LLU, the PPCC found that the Minister should review its policy direction[3] and ICASA should complete a regulatory impact assessment (RIA) before implementing LLU (PPCC, 2011).

1 This does suggest though that cellphone penetration is not 100%, and that more than five million adult South Africans still do not have access to a cellphone.

2 PPCC in this article refers to the portfolio committee for communications prior to establishment of two separate committees for the telecoms and postal, and the broadcast and communications mandates.

3 Although it was in fact a policy decision, and not a policy direction.

Minister Padayachie's successor, Minister Dina Pule, seems to have left the matter there. Her adviser, Roy Kruger, believed that LLU would harm Telkom and would not benefit South Africans (Wilson, 2013a). Minister Pule's successor, Minister Yunus Carrim, also appears to have been in favour of delaying LLU and appears to have intervened with ICASA to delay the publication of LLU regulations (MyBroadband, 2013). Minister Carrim's spokesperson, Siya Qoza, explained that an RIA should be undertaken before LLU is implemented (Wilson, 2013b). The PPCC has not debated LLU in at least the previous 18 months (interviews with PPCC MPs), suggesting that it was not a priority for the PPCC.

ICASA has not implemented LLU despite a dispute successfully brought by Neotel against Telkom (Neotel v. Telkom) and numerous false starts in the implementation of LLU regulations (Hawthorne et al., 2014). This inactivity is contrary to the activist stance of the competition authorities. For example, the competition authorities limited Telkom's ability to extend its market power in markets for fixed-line data services by prohibiting the Telkom / BCX merger (Hawthorne et al., 2014). The competition authorities also implemented a limited form of functional separation of Telkom's upstream (wholesale) and downstream (retail) activities through a settlement agreement with Telkom (Hawthorne et al., 2014). This settlement agreement, however, has not been sufficient to give rise to LLU. Unbundled local loops were not available from Telkom at the time of writing. The desirability of implementing LLU in light of international experience is discussed next.

THE IMPACT OF LLU IN OTHER COUNTRIES

LLU has been challenged theoretically and empirically. Economic theories associated with the Chicago School suggest that input foreclosure of an upstream input (fixed access lines in this case) in order to favour the downstream operations (Internet services) of a vertically integrated upstream monopoly is unlikely (see Carlton, 2008 and Town of Concord, Mass v. Boston Edison Company): Why could a monopolist not simply extract its monopoly profit upstream and leave downstream firms to compete as fiercely as possible in the resale of the upstream monopoly input? Furthermore, where input foreclosure does occur it would be good for consumers, due to the elimination of double-marginalisation (one monopoly profit is earned by the vertically integrated monopolist instead of two: one margin earned on the monopoly input and further margins earned by downstream firms).

Nevertheless, there are a number of reasons why the Chicago School theories about input foreclosure might not hold (Motta, 2004). The first is that the vertically integrated upstream monopolist might avoid regulation upstream, where the price of the monopoly input is regulated and the monopoly profit therefore cannot be extracted upstream. A further anti-competitive incentive for input foreclosure is the credibility problem faced by a monopolist facing multiple downstream buyers reselling the monopolist's product with whom the monopolist interacts sequentially: each buyer refuses to accept the monopoly price because the monopolist has an incentive to offer a discount to the next buyer, which will undercut the first buyer's resale price. A further theory of harm to competition is that downstream firms may in the medium to long term enter the monopoly upstream market, or will provide custom for new upstream entrants. Foreclosing downstream rivals from the market therefore prevents entry upstream. Monopolists therefore do have incentives under these circumstances to foreclose downstream rivals, which can result in harm to consumers.

The empirical evidence on the impact of LLU is also unclear. While a full literature review of the impact of LLU is beyond the scope of this article, the arguments for and against LLU are worth illustrating briefly. Hausman and Sidak (2005) found that LLU did not significantly improve competition and broadband penetration in a number of developed countries where it was implemented, largely due to the presence of inter-modal competition between cable and copper networks. Other studies, including the Berkman Centre (2010) report and Nardoto, Valletti and Verboven (2013), found that LLU and open access policies generally (in the case of the Berkman Centre report) led to better outcomes for consumers, including lower prices and better quality, even where inter-modal competition exists. LLU is still in place in most EU countries and is likely to be in place for the foreseeable future (Ecorys, 2013).

South Africa does not have inter-modal competition to the fixed-line incumbent from cable networks, and rival fixed-line networks built by new entrants have a limited reach. This means that Hausman and Sidak's (2005) findings may not be applicable to South Africa. Furthermore, the Berkman Centre (2010) report and Nardoto et al. (2013) suggest that the lack of implementation of LLU may result in higher broadband prices and lower quality in South Africa. It is difficult, however, to separate out the effects of regulatory inaction on LLU in terms of market outcomes (prices, quality and access) from regulatory inaction on spectrum, discussed next.

SPECTRUM ASSIGNMENT

In 2010, ICASA (2010b, 2010c) issued invitations to apply (ITA) for spectrum in high demand bands, which are bands that can be used for access networks to provide broadband services to large numbers of customers for the 2.6 GHz and 3.5 GHz bands.[1] These ITAs were subsequently withdrawn by ICASA in order to allow it to re-evaluate the design of the bands in light of developments in technology and in order to obtain expert advice on auctions (ICASA, 2010d).

Subsequently, in 2011 the Department of Communications (DoC) released draft policy directions for electronic communications services in high demand spectrum (DoC, 2011), which proposed combining the licensing of the 800 MHz (digital dividend) band and the 2.6 GHz bands. The reason for this is that the 800 MHz band is suited to providing wider coverage and therefore facilitates deeper penetration of broadband into rural and other under-

1 These ITAs were issued in terms of the high demand radio frequency spectrum licensing regulations (ICASA, 2010b).

serviced areas. The 2.6 GHz band is better suited to providing greater bandwidth in densely populated areas that have high demand. The two bands therefore complement each other and should be licensed together. The policy also called for a wholesale open access network, new entrants, universal service and the promotion of broad-based black economic empowerment (BBBEE)[2].

At the end of 2011, ICASA released its draft 800 MHz and 2.6 GHz spectrum assignment plan for assignment of combinations of spectrum in these two bands, as well as the relevant ITAs (ICASA, 2011a). This draft plan included some of the DoC's recommendations, including the construction of an 'open access network'. The draft ITAs included a proposal for a spectrum park, where spectrum would be available on a shared basis and would be self-managed by users of the spectrum. Wholesalers in this model would not have been allowed to offer retail services. This assignment plan and set of ITAs were subsequently withdrawn by ICASA, pending a ministerial policy direction on spectrum assignment (Ellipsis, 2012). As at the time of the publication of this article, spectrum in high demand bands had not been assigned by ICASA. Similarly to LLU, therefore, ministerial interference in ICASA's processes to assign spectrum has contributed to a delay of more than three years and has compromised broadband quality in South Africa.

There is no theoretical or empirical debate on the assignment of spectrum: the more spectrum assigned for broadband, the better the outcome for consumers. The impact of ICASA's inaction on spectrum assignment and LLU are discussed next.

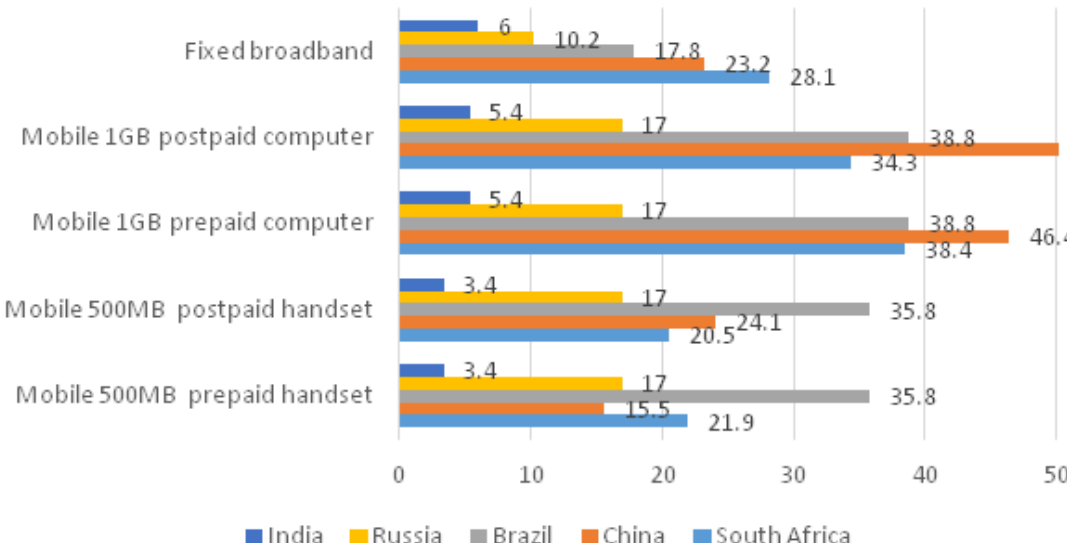
OUTCOMES OF REGULATORY INACTION IN MARKETS FOR INTERNET SERVICES

BROADBAND PRICES

South Africa's broadband prices are high by international standards, and this is particularly the case for fixed broadband (see Figure 4 below). South Africa's fixed broadband prices are significantly higher than prices in Brazil, Russia, India and China, which, including South Africa, form the BRICS group of countries. South Africa's mobile broadband prices are significantly higher than prices in Russia and India but they are in line with or lower than prices in Brazil and China.

This suggests that there are problems in markets for broadband services, with respect to fixed-line broadband in particular. This suggests that ICASA's inaction regarding LLU and spectrum is harming consumers.

FIGURE 4: BROADBAND PRICE COMPARISONS (USD, MONTHLY BASKET) (ITU, 2012)



Source: Analysis of data from ITU (2009-2013).

Note: The price of 1GB of mobile, postpaid computer data is in fact USD181.1 in China. The scale of the graph was limited to USD50 to preserve the scale of differences between broadband prices.

BROADBAND QUALITY

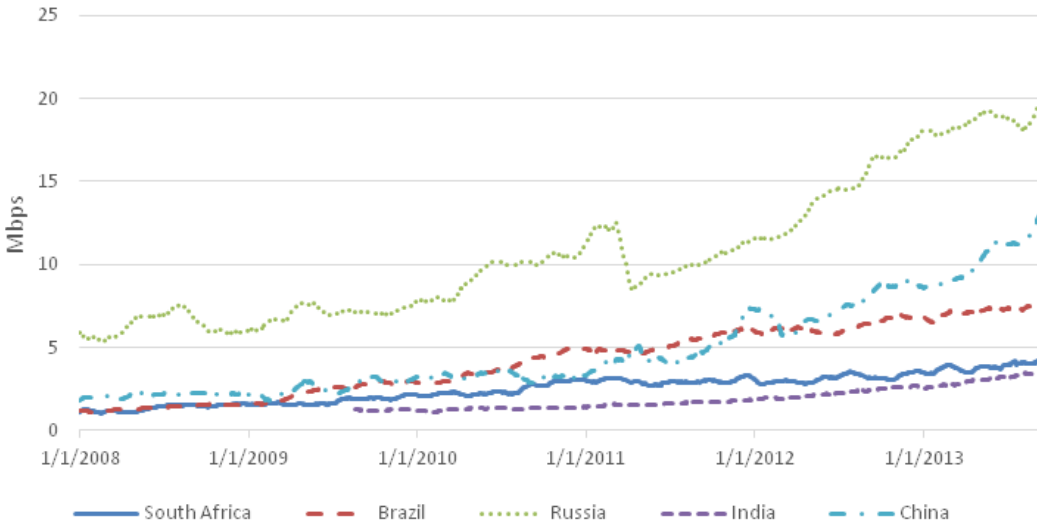
South Africa is far behind Brazil, Russia and China in terms of available broadband speeds and this divergence is growing wider over time. Russia has always had significantly higher speeds than South Africa. Brazil and China had roughly similar speeds to South Africa in 2008 but have significantly higher speeds than South Africa in 2013, according to data collected by Ookla (2013) (see Figure 5 below).

2 Together with this draft policy direction, the DoC released draft policy directions on exploiting the digital dividend, which included among other things a proposal for ICASA to investigate the use of television white space technologies (DoC, 2011).

While South Africa has consistently had higher average broadband speeds than India, India is catching up to South Africa. South Africa's average download speed is 4.54 Mbps, and South Africa ranks at number 119 in terms of download speeds globally. South Africa's speeds are significantly lower than the EU (21.34 Mbps), G8 (19.58 Mbps), OECD (19.57 Mbps) and APEC (15.75 Mbps) averages (Ookla, 2013).

South Africa therefore ranks among the highest priced BRICS countries for broadband and has extremely slow speeds when compared to other countries, including developing countries. This is a negative outcome of ICASA's inaction regarding LLU and assigning spectrum for broadband.

FIGURE 5: BROADBAND SPEEDS IN BRAZIL, RUSSIA, INDIA, CHINA AND SOUTH AFRICA (2008-2013)



Source: Analysis of Ookla Netindex (Ookla, 2013).

ACCESS TO THE INTERNET

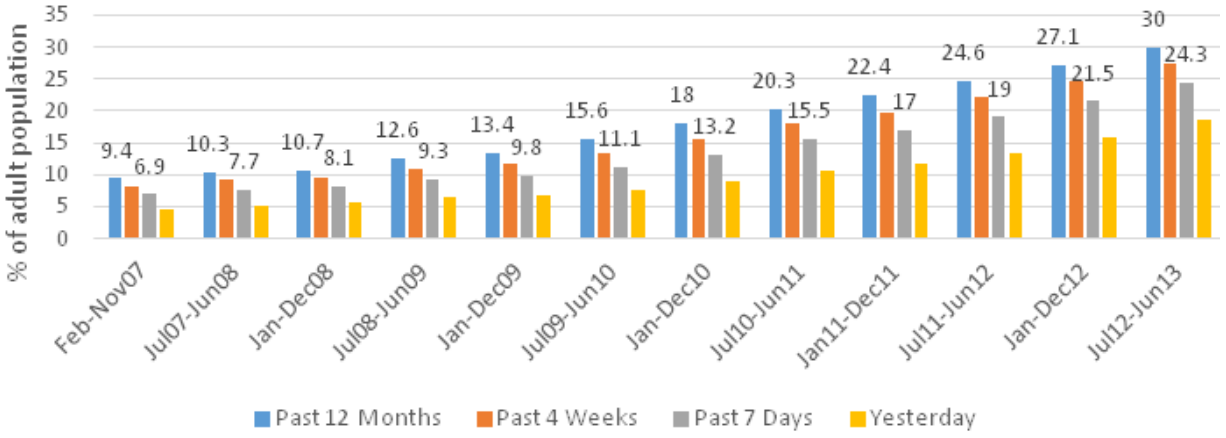
Internet access in South Africa is limited, at least partly due to high prices for Internet access and poor quality. According to the Census 2011, 35.2% of households had access to the Internet and 64.8% of households did not have access to the Internet in 2011 (StatsSA, 2012a).[3] This is an improvement from the 2007 Community Survey, which found that only 7.2% of households had access to the internet (StatsSA, 2007). In 2011, 8.6% of households accessed the Internet from home, 16.3% used a cellphone, 4.7% of households accessed the Internet from work and 5.6% from elsewhere (StatsSA, 2012a).

Access to the Internet is likely to be overstated in the Census data, however. For example, Gillwald et al. (2013) find significantly lower Internet penetration among households (19.7%) than the Census does (35.2%). Gillwald et al. (2013) do find nonetheless that Internet penetration among individuals is 33.7%. The key problem with the Census data is that the fact that one person in a household has a Wireless Application Protocol (WAP) enabled feature phone (ie very limited Internet access) does not mean that the entire household has access to the Internet. World Wide Worx (2012), for example, estimates that there were 8.5 million Internet users in South Africa in 2011, and that Internet penetration was therefore approximately 17% in 2011. The World Wide Worx methodology counts the number of active subscriptions, rather than shared access to the Internet (though World Wide Worx does account for shared Internet access at work).

The South African Audience Research Foundation's All Media Products Survey (AMPS) shows similar results to those of World Wide Worx, which suggests lower Internet penetration than that suggested by the census results (SAARF, 2005-2013) (see Figure 6 below). While 30% of survey respondents said that they had accessed the Internet in the last 12 months, only 24.3% had accessed the Internet in the past seven days, which suggests a significant degree of intermittent Internet access (see Figure 6 below). This is significantly lower than the 35.2% household Internet penetration shown in the Census. Nonetheless, the significant growth in Internet access is consistent with Gillwald et al. (2013), World Wide Worx (2012) and StatsSA (2012a).

3 Households were asked the following (Question H13A): 'How does this household mainly access the Internet? The possible responses were: From home, cellphone, work, elsewhere or no access to the Internet.

FIGURE 6: INTERNET USE BY SOUTH AFRICAN ADULTS (AMPS, 2007-2013)

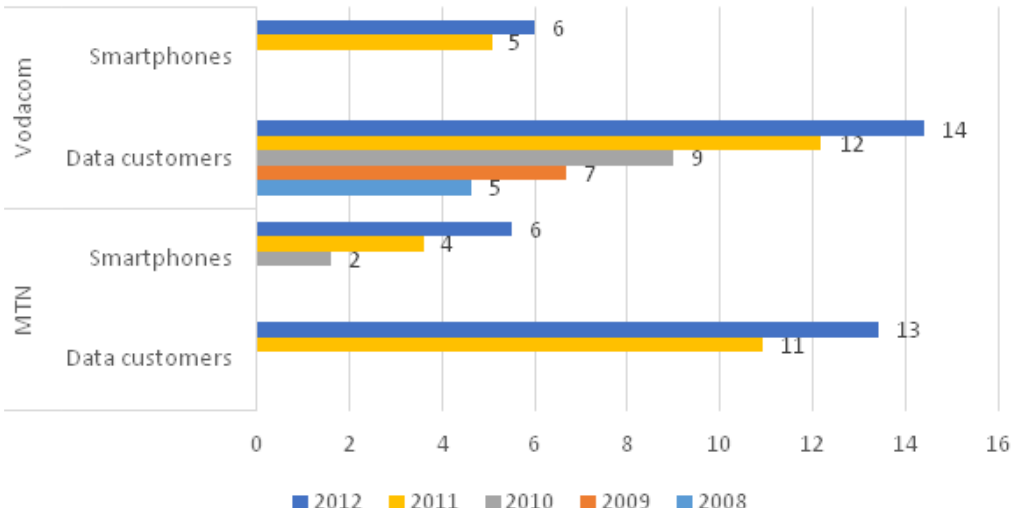


Source: All Media Products Survey (SAARF, 2005-2013)

It is noted that there is considerable variance in Internet access and coverage among provinces. While 46.4% and 43.7% of households in Gauteng and the Western Cape respectively have Internet access, only 24.1% and 24.3% of households in the Eastern Cape and Limpopo respectively have access to the Internet (StatsSA, 2012b).

The overall number of data customers and smartphones in the market increased rapidly between 2008 and 2012 (see Figure 7 below). While a significant number of data subscriptions are used for machine to machine applications, such as for vehicle tracking, the number of data connections suggests that the Internet penetration reported by the Census 2011 and World Wide Worx (2012) might be understated significantly. For example, Vodacom and MTN between them had 23 million data subscriptions in 2011, which increased to over 27 million data subscriptions in 2012.

FIGURE 7: DATA CUSTOMERS, 3G DEVICES AND SMARTPHONE PENETRATION (MILLIONS)



Source: Analysis of data from MTN (2005-2013) and Vodacom (2005-2013).

Note: Vodacom financial data corresponds to the calendar year prior to the year in which the financial results were reported, due to Vodacom's financial year ending in March. Their data therefore reflects the previous calendar year more than it does the calendar year in which results are reported.

The available data suggests that while Internet access has grown significantly over the last decade, actual Internet penetration and use among South Africans is still limited. This is likely to be at least partly due to high prices for Internet access, as well as poor quality. Measured by these outcomes, ICASA has not performed well where broadband services are concerned.

LLU AND THE INSTITUTIONAL FRAMEWORK FOR TELECOMMUNICATIONS REGULATION IN SOUTH AFRICA

The poor outcomes for Internet access in South Africa are at least partly due to the institutional framework for regulation of the telecommunications sector, in respect of both formal and informal institutions (rules). Problems with the formal institutions are described above, and include a lack of regulatory independence for ICASA (including funding, decision-making and performance monitoring) and state ownership of operators. This creates a conflict of interest for the policymaker, the Department of Post and Telecommunications Services, which owns the operators and sets policies to regulate them.

Informal institutions in the telecommunications sector serve to further undermine reforms that would set South Africa on a higher growth path. The considerable political interference with ICASA's decision in respect of LLU reflects the role played by the informal institutional framework governing the telecommunications sector in South Africa. The implementation of LLU has been delayed by more than seven years as a consequence of these informal rules. Such a lack of implemention reflects Telkom's holding power in respect of resistance to reform, derived at least in part from government's significant shareholding. Telkom's entrepreneurial capabilities, which are an important determinant of the extent to which it would seek government protection (Khan 2010), are also weak. This means that ICASA would have to expend considerable effort to implement pro-competitive reforms in the fixed-line sector in South Africa. The Competition Commission has been similarly constrained by Telkom's holding power, particularly in respect of transitioning towards an open access fixed-line network, in that it has delayed by eight years the final settlement regarding anti-competitive conduct relating to a refusal to supply access to its network (The Competition Commission v. Telkom SA).

The successful implementation of LLU therefore relies strongly on weakening Telkom's holding power, while at the same time increasing its entrepreneurial capabilities so that it does not have to seek protection from competition. One means of achieving this would be the sale of the government's stake in Telkom to a strategic investor with strong entrepreneurial capabilities. Such an opportunity presented itself with the potential sale of government's stake in Telkom to KT-Corp of South Africa, ultimately blocked by government (Gedye, 2012).

CONCLUSION AND RECOMMENDATIONS: ICASA HAS SUCCEEDED IN REGULATING VOICE BUT NOW NEEDS TO FIX BROADBAND

The regulatory system for telecommunications in South Africa is characterised by a poor formal institutional framework, including ICASA's lack of independence from the government. The informal institutions (rules) that govern the sector also limit its competitiveness. The fixed-line sector in particular is characterised by Telkom's considerable holding power (derived in part from state ownership) and poor entrepreneurial capabilities. The combination of these two factors results in Telkom seeking protection from competition, which ultimately results in a poorer growth path for South Africa, given the linkages between broadband expansion and economic growth.

As a result of this institutional framework, ICASA's performance in regulating the telecommunications sector can be assessed as mixed. It has successfully intervened in the voice services sector and has caused retail prices to fall significantly. This is at least partly due to the government's interests in bringing down call termination rates during the course of Telkom Mobile's entry into the market, and the comparatively strong entrepreneurial capabilities of the mobile incumbents, Vodacom and MTN, which operate on a global scale. Vodacom and MTN did not have sufficient holding power to stymie reform (they are not state owned like Telkom), and did not have as large an incentive to seek protection due to their considerable entrepreneurial capabilities. As a result of ICASA's call termination rate intervention, South Africa has among the lowest prepaid voice prices available in the Southern African Development Community (SADC) region. This has resulted in (or at least facilitated) significant expansion in access to voice services and increased voice service usage.

ICASA's track record in respect of Internet services is significantly weaker. ICASA has failed to implement local loop unbundling (LLU) and has failed to assign spectrum for broadband. The failure to implement LLU is due to Telkom's holding power, strengthened by state ownership, and Telkom's weak entrepreneurial capabilities, that cause it to seek protection from competition. While there is a debate as to whether LLU is good for consumers, assigning spectrum for broadband unambiguously facilitates greater broadband access, lower prices and better quality. The consequence of ICASA's inaction on spectrum is that South Africa has high prices for broadband services and slow speeds, when compared to its developing country peers.

Measured in terms of market outcomes, therefore, ICASA has performed well for voice services but has largely failed in performing its role where broadband services are concerned. ICASA therefore needs to shift its focus beyond voice services, where its work is largely complete, towards assigning spectrum and implementing LLU in order to improve broadband services so that South Africa can become more competitive relative to its peers, promoting broadband access and services across the economy and society.

In order to achieve this, the following actions are recommended:

a) In relation to market access and lowering barriers to entry:
   i. There should be greater access to spectrum for smaller operators on a local or community basis, particularly in respect of television white spaces.
   ii. LLU should be implemented in order to provide for a 'ladder of investment' for new market entrants. In order to bring about LLU, consideration should be given to selling government's stake in Telkom to a successful fixed-line operator from outside South Africa. Failing this, the government's stake in Telkom should be housed in a separate legal entity falling under the Department of Public Enterprises, rather than the Department of Telecommunications and Postal Services.
   iii. Telkom's copper local loop assets as well as its co-location facilities and related infrastructure should be separated from its downstream retail activities.

b) ICASA should make available as much spectrum as possible for broadband purposes. ICASA has previously identified 450 MHz of spectrum that could be used for broadband. ICASA should issue this spectrum in a period of six to 12 months.

c) In relation to ICASA's independence:
   i. ICASA should be allowed to employ experts outside of its approved budget without ministerial approval. ICASA should be given the authority to have the regulated entity fund the costs of consultants.
   ii. The requirement for ICASA to consider ministerial policies and policy directions should be removed as this undermines ICASA's independence and results in considerable delays.
   iii. ICASA's funding should generally be raised through special levies from regulated entities rather than through appropriations from Parliament, in order to make it more independent from government and political priorities.
   iv. A rule should be put in place that prohibits government cuts in ICASA's spending unless they apply consistently to all government-funded agencies.

d) In relation to the decision-makers at ICASA:
   i. The ECA should be further amended to ensure that an independent investigation is required prior to removal of decision-makers.
   ii. ICASA's nine Council members should be reduced to the number recommended by Brown et al. (2006), namely three to five Council members.
   iii. ICASA council members should be appointed by the President or Parliament, and their terms of service should not be changed while they are in office.
   iv. ICASA councillors should not be accountable to the Minister of Telecommunications and Postal Services and should instead be accountable to Parliament for their performance.

e) In relation to transparency and accountability of ICASA:
   i. ICASA should seek outside expert advice on its performance.
   ii. There should be a dedicated appellate body for ICASA's decisions to enable regulated entities to regularly appeal ICASA's decisions.

f) Consideration should be given to moving towards a bill and keep regime for call termination rates in South Africa. The mobile operators are focusing their investments on the rollout of data networks, which, to some degree, are at least, independent of markets for voice services. The introduction of bill and keep will facilitate competition and will result in lower costs of compliance for regulated entities and reduced complexity for the regulator.

Further research is needed on the extent and nature of fixed to mobile substitution in particular in South Africa, which would inform how LLU should be implemented. Further research is also required as to the economic impact of moving towards a bill and keeping regime in SA.

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THE IMPACT OF REGULATION ON COMPETITION IN TELECOMMUNICATIONS AND PIPED GAS

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ABSTRACT
This article examines the ex ante powers to regulate competition bestowed on the Independent Communications Authority of South Africa (ICASA) in terms of the Electronic Communications Act, Act No 36 of 2005 (ECA) and on the National Energy Regulator of South Africa (NERSA) in terms of the Gas Act, Act No 48 of 2001 (Gas Act) and the regulators' recent exercise of these powers to regulate prices in the mobile telecommunications and piped gas industries. Since 1999, the South African competition law authorities have focused on the reactive or ex post exercise of their statutory powers in terms of competition legislation, in order to detect and prosecute anti-competitive behaviour. This includes industries regulated by another sector regulator such as in the electronic communications sector (ICASA) and in the piped gas sector (NERSA). Several complaints against dominant suppliers in these industries have been successfully prosecuted in terms of the Competition Act, Act No 89 of 1998 (Competition Act). There have been far fewer efforts by the sector regulators to proactively exercise their ex ante regulatory powers in order to create a market structure and conditions that facilitate competition in the sectors that they regulate.

In this article, we examine the recent exercise of powers by ICASA and NERSA in the mobile and piped gas industries. We conclude that the provisions of the ECA have facilitated (i) the identification and analysis of relevant markets lacking in adequate competition and (ii) the promulgation of regulation that is needed to develop a more competitive environment in due course. However, ICASA's process in exercising its statutory powers has been slow and has suffered from various deficiencies. On the other hand, the analysis indicates that the legislation governing NERSA's ex ante powers, and the way in which NERSA has enforced that legislation, has led to counter-productive regulation, which has hindered competition in the sector. Accordingly amendments to the Gas Act are required. Amendments effected to the ECA retain guidance to the regulator on how to conduct a market review, but the regulator should exercise these powers more often.

KEYWORDS
competition analysis, competition regulation, market reviews, *ex ante* regulation, *ex post* regulation, telecommunications sector, piped gas sector, South Africa

INTRODUCTION
In South Africa, as in many African countries, certain sectors of the economy suffer from market failure as a result of the existence of monopolies, or because of state-sanctioned market structures. As governments aim to liberalise these sectors, regulators are often granted powers to ensure that such industries become competitive. The telecommunications and gas sectors (and the energy sectors generally) are two such industries that typically require *ex ante* regulatory intervention to create the conditions for competitiveness to thrive. The facilitation of competition in the telecommunications industry is fundamental to decreasing the costs of communication, with fundamental knock-on impacts on the economy as whole. In the piped gas sector, dominated by a previously state-owned enterprise, lessons from *ex ante* regulation should be applied to the energy sector as a whole, where there is increasing introduction of private sector participation, as well as competitive energy sources.

Therefore, this analysis of the extent to which two regulatory authorities utilise recognised competition techniques holds lessons for future *ex ante* regulation of infrastructure sectors in South Africa and in Africa generally. Furthermore, it is interesting to contrast the ICASA mobile termination rate (MTR) regulation with the exercise of NERSA's *ex ante* regulatory powers in the piped gas sector, because the legislative guidance provided in the Gas Act is far less prescriptive than that in the ECA regarding the approach to *ex ante* regulation to be followed. The outcome of the comparison between the authorities' regulatory approaches illustrates that legislative guidance is necessary to ensure appropriate regulation.

REGULATING TO FOSTER COMPETITION – *EX ANTE* VERSUS *EX POST*
Ex ante regulation refers to explicit market intervention by the regulator 'before the fact', in other words regulation in order to establish conditions within the industry so as to ensure that the relevant market functions optimally. *Ex post* regulation refers to the opposite situation, where no explicit market intervention is performed, but the regulator will detect and investigate alleged prohibited practices within any industry or sector and, if necessary, punish or remedy any identified unlawful conduct (De Streel, 2008).

Competition policy generally involves determining the principles that should govern the *ex ante* regulation of markets. In addition, there is a significant amount of *ex ante* regulatory power often granted to competition authorities, for instance in the case of assessing mergers or the power to conduct market enquiries, that involves identifying market failures rather than the wrongdoing of any particular player in a market (Theron & Binge, 2014). Motta (2004, p.xviii) explains that the term competition policy 'applies to sectors where structural conditions are compatible with a normal functioning of competition (whether the market functions well in practice or not is

another matter).' In markets where competition is evident or able to develop, competition policy can be applied to address the anti-competitive behaviour of firms.

Economic regulation has to be applied as a regulatory response to inappropriate use of monopoly power and other phenomena that result in outright market failure (Joskow, 2007). Economic regulation is applied *ex ante* and requires long-run, continuous involvement on the part of the regulator for purposes of conducting monitoring and ensuring compliance (Moodaliyar & Weeks, 2009). On the other hand, competition regulatory interventions are meant to address anti-competitive conduct in markets that would otherwise tend towards effective competition and are applied *ex post* (Buiges, 2006).

In instances where there is already a general competition law applicable to all sectors, there is sometimes still a justifiable basis for sectoral regulation designed to promote competition. This is the case in sectors that are just being exposed to competition, where competition cannot yet work and where there is a need to monitor the gradual development of competitive forces. Accordingly, *ex ante* regulation may be required in instances where there are substantial barriers to market entry, no visible trends towards the development of competition, or the *ex post* interventions provided for in general competition law are unable to guarantee competitive structures.

In South Africa, certain sector regulators are explicitly granted the power to examine the state of competition in markets within their sector and, where they find that competition is weak, to address this through appropriate regulation. For instance, in terms of the Gas Act, 2001, NERSA is required to regulate pricing in the industry '*where there is inadequate competition'* (RSA, 2001, Section 21(1)(p)). Similarly, Chapter 10 of the Electronic Communications Act, 2005 (RSA, 2005), provides that the Authority (ICASA) must, following an inquiry, prescribe regulations defining the relevant markets and market segments and impose appropriate and sufficient pro-competitive licence conditions on licensees where there is ineffective competition, and if any licensee has significant market power in such markets or market segments.

These provisions raise a key issue, also highlighted by Moodaliyar and Weeks (2009, p.4) that 'an important area of convergence between economic regulation and competition policy is in the application of competition analysis for purposes of diagnosing the market power problem and identifying appropriate remedies'. In other words, where sector regulators are given powers to intervene in the market, and the goal of such intervention is to facilitate a competitive environment, it is important that those regulators apply competition analysis to assess their markets and to identify the interventions that are necessary.

In the telecommunications industry, the costs of investing in networks to provide telecommunications services are substantial. As a result, late or new entrants into the industry can face years of operation without covering the costs of these investments. Such disadvantage tends to create a vicious cycle of lack of profitability and investment, and therefore an inability to grow and offer real competition to incumbent network operators. Such an industry is therefore one where *ex ante* regulation is required to provide new entrants a 'leg-up' so that they can eventually sustain a competitive environment. Similarly, the piped gas sector also requires such intensive investment. The existing monopoly structure, combined with limited available supply, make it an industry where competition is unlikely to break out naturally without the intervention of regulation. Moreover, in both the telecommunications and piped gas industries, access to infrastructure is necessary to enable other operators to act as competitors, which makes these sectors ripe for *ex ante* regulation. *Ex ante* competition regulation is broadly applicable to the telecoms and piped gas sectors across the African continent, as countries aim to increase their infrastructure and service capacity to underpin future economic development.

THE ROLE OF THE INDEPENDENT COMMUNICATIONS REGULATOR IN PROMOTING COMPETITION

The legislation governing the telecommunications sector was initially the Telecommunications Act 103 of 1996. A significant development, when the Telecommunications Act was replaced by the ECA, was the introduction of the regulatory powers in section 67(4) to section 67(8) of the ECA. These sections adopted the approach to economic regulation introduced in Europe a few years previously, that advised the use of competition analysis when engaging in economic regulation (Moodaliyar & Weeks, 2009). Guidance adopted by the European Parliament noted that economic regulation of electronic communications sectors should consider three concepts (ICN, 2004, p.37): (1) The proportionality of the regulatory intervention to the competition problem (stronger intervention where markets are not competitive, lighter intervention or withdrawal of regulation where markets are becoming competitive); (2) application of competition analysis principles to defining the market, assessing market power and formulating remedies; (3) analysis of products and markets on the basis of economic value rather than on their physical, technological or regulatory characteristics.

Adopting this approach, section 67(4) requires ICASA to apply competition law principles to identify market power problems. In terms of this section, ICASA must define relevant markets and market segments. It must then determine whether there is effective competition in those relevant markets and market segments. It must determine which, if any, licensees have significant market power (SMP) and then impose appropriate pro-competitive licence conditions on those licensees having SMP in order to remedy the identified market failure. The section also requires ICASA to undertake periodic review of the relevant markets.

The provisions set out next reflect the ECA subsequent to amendment in 2014. Section 67(4A) provides guidance on how to evaluate whether there is ineffective competition. It requires that ICASA must consider, among other things, barriers to entry, relative market shares of the various licensees, and the relative market power of the licensees. Section 67(4) and section 67(4)(d) note that the pro-competitive conditions applied after this assessment must be 'appropriate','sufficient' and must 'remedy' the market failures in the markets found to have ineffective competition. Section 67(8) then provides for a review of the pro-competitive conditions, which requires a review of the market determinations made and a determination of whether the licensees to whom pro-competitive conditions apply, still possess SMP. It also requires an assessment of whether the pro-competitive conditions previously applied are proportional, or whether they need to be modified to ensure proportionality.

The key components of the new section 67 namely, the need to define the market, determine SMP, determine the effectiveness of competition (regulating where necessary to address ineffective competition), are essentially the same as prior to the amendment. It is, however, notable that the amendments have removed some of the more prescriptive guidance provided to ICASA when undertaking these assessments. In particular, section 67, prior to amendment, had provided that when assessing whether a market has effective competition or not, ICASA's 'forward looking assessment of the market power of each of the market participants' must take into account not only barriers to entry and relative market shares and market power, but also (RSA, 2005, Section 67(6)(b)(ii)(aa-kk)): existence of competitors; concentration and collusion; control of essential facilities; technological advantages or superiority; the degree of countervailing power; access to capital markets and financial resources; characteristics of the market, including growth, innovation, and diversification; economies of scale and scope; and vertical integration.

The above components of a competition law analysis were in place when ICASA first reviewed and regulated interconnection rates.

MOBILE INTERCONNECTION RATE REGULATION BY ICASA

'Interconnection' in electronic communication sectors is the linking of fixed and mobile networks to one another. In the case of voice calls, for example, when a subscriber of one network (MTN) calls a subscriber of another network (Cell C), it will be necessary for MTN and Cell C to interconnect their networks. It is common practice for the network that receives ('terminates') the call to charge a fee to the network that sends ('originates') the call. In mobile electronic communications, the fee is referred to as the mobile termination rate (MTR) and in fixed electronic communications, the fixed termination rate (FTR).

Interconnection is a critical part of the operation of the electronic communications sector, whereby operators enable their subscribers to call other subscribers on other networks. However, in instances where there is market failure, incumbent operators can use interconnection to aggravate the effects of such market failure (Vogelsang, 2003). In particular, incumbents can charge new or late entrants high interconnection rates in order to entrench existing market power and ward off competition. High interconnection rates is a strategy that can be employed by the incumbent operators to exacerbate this effect, because a new entrant will inevitably have to pay more for termination than it receives (Tye & Lapuerta, 1996). It works because scale is such an important requirement to enable a player to compete in the telecommunications space – new entrants must provide national coverage at a high quality and reasonable price, together with other value-added services. Thus a new entrant's total investment and operator costs will be almost as high as those of existing operators. They also earn less revenue and therefore have smaller economies of scale, because their ability to attract and retain new subscribers is limited. Incumbents tend to have easier access to capital markets, large subscriber communities, on-going subscriber contractual commitments and sunk costs advantages. This can eliminate the likelihood of an entrant gaining sufficient scale to compete effectively. Without regulatory intervention, a smaller operator on its own is unable to achieve reasonable scale in this environment.

For these reasons, several jurisdictions, including New Zealand, the European Union, Botswana and India have empowered their regulators to regulate interconnection rates (OECD, 2012; Dewenter & Jörn, 2010; Lazauskaite, 2009; ITU, 2003). In some instances, such as in Botswana, Brazil, Mexico and the Philippines, rates are set by regulation (generally at a level that reflects the cost of termination), and there are also rate re-balancing interventions, in particular, the setting of 'asymmetric interconnection rates', that enable smaller operators to charge higher interconnection rates to their larger competitors (Kalba, 2008; Dymond, 2004). This intervention can be justified on numerous bases, but primarily because there is frequently a positive relationship between market share and cost differences. Smaller operators with much higher costs will experience disproportionate difficulty in reducing their interconnection rates. Accordingly, such asymmetry may support the growth of a small entrant who suffers from a lack of scale due to late market entry.

The historical position in South Africa provides an illustration of the use of interconnection rates to stymie the ability of new entrants to compete in the market. When Vodacom and MTN entered the South African market in 1994 and 1995 respectively, they were given the benefit of an asymmetrical interconnection rate with the then dominant fixed operator, Telkom. At that stage, Telkom, Vodacom and MTN were the only three telecommunications operators in the market, and Telkom was the largest incumbent. The ability to charge Telkom a higher rate for termination contributed to MTN and Vodacom's ability to grow their businesses and obtain the necessary scale benefits.

By the time Cell C launched in 2002, the mobile telecommunications industry had grown far beyond expectation and the large incumbents, MTN and Vodacom, held significant market power in the retail space. When Cell C entered, it also benefited from asymmetry with Telkom, but ICASA did not at that time regulate mobile termination rates. In fact, in anticipation of Cell C's entry to the market, Vodacom and MTN increased interconnection rates by over 500% a few weeks before Cell C was set to open its business (Theron & Binge, 2014). Vodacom and MTN operated without regulatory scrutiny until ICASA finally regulated mobile termination rates in 2010, a period of 17 and 16 years respectively. This severely restricted Cell C's ability to compete vigorously and enabled Vodacom and MTN to continue to grow scale and profitability.

Thus, the regulation of interconnection rates in South Africa has been an area well suited to *ex ante* economic regulation. ICASA is granted explicit powers to regulate interconnection under Chapters 7 and 10 of the ECA. However, ICASA had not exercised this power at the time that Cell C entered the market. By 2006/7, ICASA acknowledged that there was significant market failure within the industry, reflected through extremely high mobile call termination and retail rates, and a continued distortion in the relative market share of the industry players. It thus eventually commenced the process, designed under section 67 of the ECA, of analysing the market, identifying market failure and considering what remedies were appropriate to correct such failure.

Even though the process of formulating the call termination regulation started late, and arguably took too long to complete, the well-structured analysis of the market assisted ICASA in properly identifying where market failure had occurred and how to address it. The process included an 'inquiry' into call termination rates under section 4D of the ICASA Act, and on 29 January 2007 the Authority gazetted a discussion document entitled Notice of Intention to Define Relevant Wholesale Call Termination Markets (ICASA 2007a). This was concerned with understanding the manner in which wholesale termination charges were determined by licensees, through an inquiry that sought to solicit from them broad and general information. The discussion document addressed issues such as (i) the designation of licensees as possessing SMP, (ii) the consideration of issues relating to the competitive functioning of the proposed market for rendering wholesale call termination services and (iii) the consideration of potential structural and behavioural constraints present in the functioning of the proposed market, which prima facie rendered the proposed market as not being characterised by effective competition. ICASA then gazetted a document on 9 November 2007, titled Publication of the Findings to Section 4C of the ICASA Act of an Inquiry Conducted in Terms of Section 4B of the ICASA Act (the Findings Document) (ICASA, 2007b). In detailing its understanding of the powers conferred upon it by the national legislature in relation to the implementation of Chapter 10 of the Act, ICASA set out in the Findings Document the envisaged regulations that it considered necessary to prescribe prior to intervening and making substantive regulations of pro-competitive conditions.

In this regard, ICASA stated that the following regulations would be required (ICASA 2007b, p11):

(i) Regulation(s) defining and identifying the retail and wholesale market segments and the manner in which SMP would be determined.
(ii) Regulation(s) detailing the methodology to be used in determining whether or not a relevant market is characterised by ineffective competition, with reference to particular factors.
(iii) Regulation(s) detailing the potential pro-competitive measures that the Authority might impose where it is of the view that a relevant market is characterised by ineffective competition.
(iv) Regulation(s) detailing both a schedule where the Authority would undertake periodic reviews of the relevant markets as defined, and providing for procedures for the monitoring and investigation of anti-competitive behaviour in the relevant markets as defined.

ICASA proceeded to release draft regulations on each of these components.[1] There was therefore, at the outset at least, a thorough and conscious approach by ICASA to explore the evaluation of the relevant market and the types of intervention that might be required. Unfortunately, however, these 2007 draft regulations were never finalised.

On 9 October 2009, ICASA released a request for information from all licensees to facilitate an up-to-date, evidence-based evaluation of the effectiveness of competition in the call termination market (ICASA, 2009). ICASA also released, on 8 March 2010, a Guideline for Conducting Market Reviews in order to provide stakeholders and licensees with clarity as to how market reviews in terms of Section 67 were to be conducted, including the public consultation process, the relevant powers of information-gathering and the types of information that could be requested by the Authority.

1 These draft section 67(4) regulations were gazetted as follows:
- Draft regulations pursuant to Section 67(4)(a) of the ECA, Government Gazette No. 30850 of 6th March 2008 (General Notice No. 335 of 2008)
- Draft regulations pursuant to Section 67(4)(b) of the ECA, Government Gazette No. 30851 of 6th March 2008 (General Notice No. 336 of 2008)
- Draft regulations pursuant to Section 67(4)(c) of the ECA, Government Gazette No. 30849 of 6th March 2008 (General Notice No. 334 of 2008)
- Draft regulations pursuant to Section 67(4)(d) of the ECA, Government Gazette No. 30848 of 6th March 2008 (General Notice No. 333 of 2008)
- Draft regulations pursuant to Section 67(4)(e) of the ECA, Government Gazette No. 30846 of 6th March 2008 (General Notice No. 331 of 2008)
- Draft regulations pursuant to Section 67(4)(f) of the ECA, Government Gazette No. 30847 of 6th March 2008 (General Notice No. 332 of 2008).

This process eventually culminated in draft Call Termination Regulations (ICASA, 2010a) published on 16 April 2010 and final Call Termination Regulations (2010b) published in October 2010. The pro-competitive remedies in relation to MTRs under the 2010 regulations provided for a reduction in interconnection rates as well as asymmetric MTRs. Asymmetry would enable Cell C and other licensees to charge higher MTRs to Vodacom and MTN than they could be charged in return.

ICASA explained that such remedies were aimed at redressing failures in each of the mobile and fixed markets. In the explanatory notes to the 2010 regulations, ICASA stated that (ICASA, 2010c, Section 2.4.5(6)):

> The application of asymmetric rates for a transitory period will benefit total social welfare by stimulating increased competition in the respective markets, thereby benefiting end users. However, asymmetric (higher) termination rates may only be justified on certain criteria to ensure that only those licensees that are dedicated to the goal of reducing retail prices through competitive forces qualify for such asymmetry.

ICASA also indicated that it expected the imposition of these pro-competitive terms and conditions on operators in the relevant markets to achieve the following: a more efficient and effective access regime; a more dynamic retail pricing environment; and continued access and investment in electronic communications networks in South Africa.

Although ICASA took time to exercise these powers, the regulated reduction of interconnection rates and the imposition of asymmetry were valuable interventions in the South African mobile telecommunications sector. It was at least partially effective in constraining the operators with significant market power - MTN and Vodacom - while facilitating more intense competition from smaller-scale rivals like Telkom Mobile and Cell C. For example, the asymmetry granted to Cell C put it in a better position to lead retail price reductions over the period of the initial regulation, for instance by introducing a flat 99c price per minute for on-net and off-net calls by Cell C subscribers. This prompted the other operators to reduce their prices, at least for on-net calls. However, Cell C did not gain significant revenue share, and argued that the extent of asymmetry granted by the 2010 regulations was too little to facilitate its growth and ability to compete (Cell C, 2014).

This regulation by ICASA was facilitated by the provisions of the ECA, based on a thorough analysis of what pro-competitive measures were needed. However, in the three-year period over which the 2010 regulations were applied, the goals of creating a dynamic retail-pricing environment, a more efficient access regime and increased investment were not fully achieved. The provisions of the ECA and the 2010 regulations encourage a review of pro-competitive remedies. ICASA began this process in July 2013, when it began its Cost to Communicate programme, aimed at exploring the range of issues thought to have caused unacceptably high communication costs in South Africa. One of the issues identified to be evaluated was the high call termination rates. ICASA noted in this regard that it would review the 2010 regulations but not 'consider revisions of either the market definitions or SMP determinations as these will not have changed' (ICASA, 2013a, p.10).

ICASA conducted this review by issuing a questionnaire to licensees, then publishing draft call termination regulations in October 2013 (ICASA, 2013b). This review concluded that the market definitions had not changed, there was still ineffective competition in these markets and there was thus a need to continue to impose pro-competitive remedies. ICASA concluded that far more extensive cuts in call termination rates were called for, with more expansive asymmetry. The final regulations were published on 4 February 2014 (ICASA, 2014).

The incumbents, Vodacom and MTN, challenged the regulation on review in the High Court.[2] Cell C and Telkom Mobile joined ICASA in opposing the applications. The Court reached its decision on only one of the many grounds raised for review, namely that ICASA had failed to take into account the operators' actual costs when setting the MTRs. The Court found that ICASA's determination of a glide path from 20 cents per minute terminated in 2014 to 10 cents per minute terminated in 2016 was arbitrary and could not have been cost-based.[3] Nevertheless, because of the public interest in having MTRs regulated, the Court provided that its order, setting aside the regulations, be postponed for six months, allowing ICASA time to conduct the review again and promulgate new regulations. ICASA promulgated new regulations in September 2014, which regulate MTRs for a further three-year period (ICASA, 2014b). In this six-month period, ICASA required updated costing data to be provided by all operators and used cost-modelling consultants to work out cost-based interconnection rates. It therefore attempted to meet the High Court's requirement for its regulatory decision to be cost-based. However, these regulations provide a far lower level of asymmetry to Cell C and Telkom Mobile than the reviewed regulations did, and therefore it is likely that they will face a High Court review again.

The broad approach to price regulation of MTRs developed by ICASA in terms of the ECA was appropriate, because it followed application of competition analysis for purposes of diagnosing the market failures and identifying appropriate remedies. This discussion does not reflect on the precise content of the regulations, nor does it seek to comment on the level of the rates applied or the extent of asymmetry. ICASA's regulatory process for call termination rates conducted in 2010 and in its subsequent review of that regulation in 2013 and 2014 is not without fault. It is important that any sector regulator properly evaluates and applies the information before it in order to reach the final decision, as pointed out by the High Court. Nevertheless, the provisions of the ECA enabled ICASA to identify the correct type of regulation, via a thorough and well-structured assessment of relevant economic conditions and competitive constraints in the market.

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2 Mobile Telephone Networks (Pty) Ltd v The Chairperson of the Independent Communications Authority of South Africa; Vodacom (Pty) Ltd v The Chairperson of the Independent Communications Authority of South Africa (yet to be reported – case no. 2014/0699 and 2014/6710) 31 March 2014.

3 MTN v Chairperson ICASA; Vodacom v Chairperson ICASA (note 30) para 91.

It is unfortunate that ICASA only engaged in this regulation long after new entrants entered the market, and that the only time it has exercised its Section 67 powers is in relation to interconnection rates. There are numerous other matters in the electronic communications and broadcasting industries where ICASA should exercise these powers. In telecommunications, further *ex ante* regulation relating to access to essential facilities could be pursued. In the broadcasting sphere, ICASA published a Discussion Document on Broadcasting Transmission Services (ICASA, 2011), but had not finalised any regulation at the time of writing. No other steps have been taken in the broadcasting industry – for example no active interventions have been taken in relation to the dominance in the subscription television market, which is ripe for *ex ante* regulation.

In light of the fact that the ECA provided useful guidance to ICASA regarding how to apply a competition analysis to its economic regulation, it is of concern that the amendments to the ECA, which came into force in April 2014, remove some of the particularity that was in the previous version of that legislation. As illustrated above, the more prescriptive considerations relating to assessing the effectiveness of competition in the relevant markets have been removed (such as requiring the evaluation of concentration, control of essential facilities, access to capital markets, etc).

That said, not all guidance is removed by the amendments to the ECA. The general structure remains – that there needs to be a definition of the market, an evaluation of market power in that market and a determination of whether there are market failures. The power to impose pro-competitive conditions where there is ineffective competition remains, and the legislation makes it clear that those interventions must be appropriate, sufficient and proportionate. In explicitly requiring these measures to be sufficient and appropriate, the amendments improve the terms of Section 67. In particular, the reference to 'sufficiency' should provide the authority with scope to amend and extend their regulation when past regulation has not achieved its objectives.

MAXIMUM PRICE REGULATION OF PIPED GAS BY NERSA

It is interesting to contrast the ICASA MTR regulation with the exercise of NERSA's *ex ante* regulatory powers in the piped gas sector, because it illustrates how the framework set out in the legislation assists the regulator to conduct assessments of the market in a manner that will result in determining appropriate economic regulation in one case and not in the other.

The regulatory framework for piped gas is set by the Gas Act No. 48 of 2001, which established a National Gas Regulator and provided for the 'orderly development of the piped gas industry' (RSA, 2001). The Gas Regulator referred to in the Gas Act is in fact NERSA. The Gas Act defines 'Gas Regulator' as NERSA, a juristic person established in terms of section 3 of the NERSA Act. Although the Gas Act was signed in 2001, it only came into effect in November 2005, after the NERSA Act had come into effect and NERSA was established. Accordingly, when referring to the Gas Regulator, the Gas Act means NERSA, and the term 'Gas Regulator' is used interchangeably with 'NERSA'.

The functions of the gas regulator are set out in section 4 of the Gas Act and include the power to 'regulate prices' in terms of section 21(1)(p) in the prescribed manner'; and to 'monitor and approve, and if necessary regulate, transmission and storage tariffs and take appropriate action when necessary to ensure that they are applied in a non-discriminatory manner as contemplated in section 22' (RSA, 2001). Section 21(1) of the Gas Act deals with conditions of licences and provides that the gas regulator may impose licence conditions within a stipulated framework of requirements and limitations, including, in terms of subsection (p) that 'maximum prices for distributors, reticulators and all classes of consumers must be approved by the gas regulator where there is inadequate competition as contemplated in Chapters 2 and 3 of the Competition Act, 1998 (Act No. 89 of 1998)' (RSA, 2001).

The provisions of section 21(1)(p) must be read together with Regulation 4 of the Gas Regulations, which provides that the gas regulator must, when approving the maximum prices, be objective, fair, non-discriminatory, transparent, predictable and include efficiency incentives. The provisions also state that the maximum prices must enable the licensee to recover all efficient and prudently incurred investment and operational costs, and make a profit commensurate with risk.

However, in terms of section 36 of the Gas Act, the Gas Act's provisions were subject to the provisions of the Mozambique Gas Pipeline Agreement (MGPA) between the Minister of Minerals and Energy, the Minister of Trade and Industry and Sasol Limited. The MGPA facilitated the introduction of natural gas by pipeline from Mozambique into South Africa. This agreement endured for a period of 10 years after natural gas was first received from Mozambique until 25 March 2014. Its purpose was to compensate Sasol for the investment it was required to make in order to extract natural gas from the gas fields in Mozambique and to construct a gas transmission pipeline from Mozambique to South Africa. In exchange for supplying 120 million gigajoules per annum of natural gas from Mozambique to South Africa for 25 years after the date when natural gas was first sold and delivered on a commercial and continuous basis to pipeline customers in South Africa (clause 4), Sasol was permitted to charge external customers a price for the gas which was determined in accordance with a 'market value pricing' (MVP) formula (MGPA, 2001). This effectively allowed Sasol to charge discriminatory prices for natural gas and effectively shielded Sasol from complaints in terms of the Competition Act, for example, based on excessive pricing in contravention of section 8(a).

In anticipation of the MPGA coming to an end in 2014, NERSA released a consultation document on 21 October 2010 dealing with the Methodology to Approve Maximum Prices for Piped-Gas (NERSA, 2010) in terms of section 21(1)(p) of the Gas Act. NERSA noted that its responsibility to approve maximum prices required there to be 'inadequate competition' (NERSA, 2010, p.7) as contemplated in Chapters 2 and 3 of the Competition Act.

This implied that 'NERSA should encourage competition and seek to replicate competitive market outcomes in approving maximum prices' (NERSA, 2010, p.16). NERSA explained further that the regulated maximum price for the gas energy component of the maximum price should shadow the hypothetical price that would occur if competition were not limited. NERSA stated that (NERSA, 2010, p.25-26):

> [O]n this basis, the maximum regulated price for gas energy will fall somewhere in the envelope bounded on the low end by the cost of production of gas, and on the high end by the opportunity value for consumers (their cost of a reasonable alternative fuel).

NERSA observed that 'this latter outcome (which may result in Market Value Pricing), is inefficient, and results in a deadweight loss to the economy as a whole' (NERSA 2010, p.26) and concluded that the 'best regulatory option is to seek to replicate market outcomes and set the maximum price for gas energy as closely as possible to the marginal cost of supply' (NERSA, 2010, p.27).

NERSA (2010) stated, however, that the marginal cost approach may not encourage competition, because it may not leave any surplus for a potential competitor to enter the supply market. The energy regulator also expressed the view that marginal cost is difficult to calculate. It further dismissed international benchmarking as an inappropriate basis for piped-gas pricing in South Africa on the grounds that the South African gas market is unique. On this basis, it proposed that the price of alternatives is 'arguably the more appropriate option' (NERSA, 2010, p.30-31.[4]

In June 2011, NERSA released a Draft Methodology to Approve Maximum Prices of Piped-Gas in South Africa. The document stated that '[i]n the absence of a transparent gas market price in South Africa, the maximum price for gas energy (at the point of its first entry into the transmission/distribution system) shall be determined by reference to energy price indicators' (NERSA, 2011a, section 3.1).

NERSA recognised that, in order for it to approve maximum prices of piped gas, it had to be of the view that there existed market conditions or market features indicating inadequate competition, hence it proceeded to set out an assessment of the current piped gas market conditions that indicated, in its view, inadequate market competition and the need to approve maximum piped gas price in the prescribed manner. Those conditions included (NERSA, 2011a, pp. 32-33):

(i) a monopolistic market structure in terms of which Sasol (pursuant to the MVP model) references the price of natural gas to the costs of an alternative energy source available to an individual customer. NERSA noted: *'This is a perfect price discrimination scenario by a monopolis';*
(ii) prices that are higher than those charged in perfect competition or in a competitive market; and
(iii) significant entry barriers, lack of countervailing power, lack of product differentiation, discriminatory pricing and a high degree of vertical integration of Sasol in the gas market.

In September 2011, NERSA produced a discussion document entitled Determination of the Inadequate Competition in the Piped-Gas Industry as Contemplated in Chapters 2 and 3 of the Competition Act, 1988 (NERSA, 2011b). In that document, NERSA repeated the views it had expressed in its Draft Methodology on Maximum Pricing of Piped-Gas regarding the inadequacy of competition in the South African gas industry. In October 2011, NERSA released the final Methodology to Approve Maximum Prices of Piped-Gas in South Africa (NERSA, 2011c) along materially the same lines as the Draft Methodology. It explained that a licensee would be required to apply for maximum prices for each customer class (determined by volume) and each customer category's price would have to be below the maximum price as approved by NERSA for that licensee.

In the discussion document, NERSA recognised that (NERSA, 2011b, p.10):

> Given the costs of fuel conversion, once the decision to use gas has been made, the customer is effectively captured by the gas supplier, and in the absence of multiple gas suppliers the customer is no longer open to competitive threat

and further noted in this regard that (NERSA, 2011b, p.10):

> The adoption of energy price indicators related to other fuels is a pragmatic approach to determine what a competitive energy price should be. It is not evident that alternative fuel types provide adequate competition for gas. NERSA does not support the view that the market is defined as a broad 'energy market', but instead considers the relevant market to be one for piped-gas including (mobile) storage.

4 It stated in this regard that:
The level of the alternative fuel cost can be managed by using a basket of alternative fuels and:
- recognizing that no single fuel is a perfect substitute for gas; and
- allowing regulated prices to be determined at a level that reflects the balance between encouraging new entry and sharing economic surplus between consumers and producers.' (p.29).

On 8 February 2012 (after the approval of the final methodology), NERSA approved the Determination of Inadequate Competition (NERSA 2012a). In early 2013, NERSA received two applications from Sasol Gas Limited (NERSA, 2012b; 2012c) requesting approval of maximum gas prices for the period 26 March 2014 to 30 June 2017 and a trading margin for the period 26 March 2014 to 30 June 2015 (maximum gas price application); and approval of a transmission tariff for the period 26 March 2014 to 30 June 2015 (transmission tariff application).

The applications were published for public comment in February 2014. Detailed written submissions to NERSA were submitted in respect of Sasol's applications on behalf of several large industrial users of gas, who argued that both the methodology and the process adopted by NERSA were flawed. However, on 25 March 2013 the Piped-Gas Sub-Committee of NERSA recommended approval of Sasol's applications and on 26 March 2013, the applications were approved by NERSA's Board (NERSA, 2013).

An application for the review of NERSA's decision in relation to these pricing applications was filed by a group of large industrial users of gas in the North Gauteng High Court on 18 October 2013 (Creamer, 2013). The application alleges that NERSA's decision suffered from serious procedural errors, and that NERSA's pricing methodology was fundamentally inconsistent with the underlying objective of the statutory powers granted to NERSA in terms of the Gas Act, which is to ensure that suppliers charge prices that are reflective of those they could charge in competitively priced markets (as opposed to uncompetitive or monopoly prices). They argued that NERSA's pricing decision would have the perverse effect of entrenching Sasol Gas' monopoly pricing structure and allowing it to charge prices significantly higher than the average prices it charged customers of piped gas, in a market in which pricing had been significantly warped by the fundamentally anticompetitive Mozambique agreement (Steyn, 2014). This is due to the use of NERSA's methodology, which considers the price of several alternative fuel sources, resulting in a maximum price higher than prices that would prevail in a competitive market for piped gas by way of the 'cellophane fallacy' (Motta, 2004). This also results in a maximum price that is higher than the cost of switching out of piped gas to the marginal source of supply. It may be some time before the High Court rules on this application.

It is of some concern that NERSA decided to regulate prices before conducting the inadequate competition assessment, given that such an assessment is a jurisdictional pre-requisite for regulation (RSA, 2001, Section 21(1)(p)). More importantly, the competition assessment was inadequate, because it did not contain a thorough analysis of the nature of competition at various levels of the market. Further, it appeared to display a lack of understanding of key competition law and economics principles. For instance:

(i) NERSA seems to have included products within the market definition purely because of the terms of the Gas Act, rather than based on a view on the substitutability of the alternative products (compressed natural gas (CNG) is viewed as part of the piped gas market because of the definition in the Gas Act)
(ii) Despite the fact that the final pricing methodology relied on the pricing of a basket of alternative fuel sources, NERSA's competition assessment did not consider that alternative fuels are in the same market as piped gas because of the high cost of switching
(iii) NERSA makes its geographic market definition conditional on willingness of suppliers to build the infrastructure; availability of a pipeline to connect the customer; willingness of the customers to pay a connection and transportation costs; and sufficient gas to supply the customer
(iv) NERSA concludes that the relevant geographic market is the whole of South Africa. Although NERSA is correct in stating that if these factors were present then a customer could access gas anywhere in the country, a comprehensive market definition requires an analysis of whether such factors are indeed present.
(v) NERSA concludes that the relevant market is the market for the supply of gas to the wholesale and retail markets, which includes distributors, traders, and reticulators, without having undertaken a functional market definition exercise. NERSA seemingly reaches this conclusion on the basis that Sasol Gas is active at all levels of the supply chain, however there are functional distinctions between these levels and parties that operate at only one of those functional levels
(vi) NERSA made no determination of what the term 'inadequate competition' means, and unfortunately, this term is not defined with reference to the Competition Act. Using sections 7, 8, 9 and 12A(2) of the Competition Act, NERSA was able to identify key issues that impede more effective and adequate competition, namely structure of the market, entry barriers, exercise of market power, anticompetitive conduct such as price discrimination and high prices, and market allocation. However, these considerations are all based on Sasol's position in the market, as well as on Sasol's conduct, permissible in terms of the MPGA.
(vii) NERSA states that it has used sections 7, 8 and 9 of the Competition Act in its analysis. However, while section 7 sets out when a firm is considered to be dominant, sections 8 and 9 deal with abuses of dominance. It is important to note that the mere fact that a firm is dominant and has market power is not viewed as anti-competitive under the Competition Act. It is only the abuse of that dominance that is considered anti-competitive and is therefore prohibited in terms of the Competition Act. A mere assertion of dominance and market power by NERSA is therefore insufficient to show inadequate competition in terms of chapters 2 and 3 of the Competition Act.

The above discussion illustrates that NERSA failed to apply well-established competition analysis in the exercise of its economic regulation. In our view, Section 21(1)(p) of the Gas Act does not provide adequate guidance to NERSA on what process it should follow in order to assess whether inadequate competition exists

and price regulation is necessary, and if so, how should it be enforced. The legislative guidelines afforded to NERSA for price regulation in terms of the Gas Act are far less prescriptive than those laid down by the ECA for ICASA.

Although Section 21(1)(p) clearly implies that NERSA must assess the nature and extent of inadequate competition *before* regulating prices,[5] the Gas Act does not set out a clear series of steps to be followed to identify and then evaluate the competitive conditions in the relevant market. It would be more helpful to NERSA if the Gas Act were to set out clear guidance for the regulator to define the relevant markets and set out a methodology for determining whether there is inadequate competition in these relevant markets. Such guidance could refer to, for example, the factors set out in section 12A(2) of the Competition Act, which are commonly used in traditional economic analysis (ICN, n.d.) to assess the nature and level of competition in a relevant market. These factors would include the actual and potential level of import competition; ease of entry, including tariff and regulatory barriers; level and trends of concentration; history of collusion; degree of countervailing power; dynamic characteristics including growth, innovation and product differentiation; and nature and extent of vertical integration.

Moreover, in terms of the Gas Act, NERSA has no general powers to monitor gas prices or initiate a process to regulate pricing. It can only 'approve' a maximum pricing application once it receives one. Furthermore, there is no provision for NERSA to initiate a review of its decisions on maximum pricing, in the event of a material change in market dynamics, and no means for buyers of gas to trigger such a review. These kinds of powers should be granted to NERSA to ensure that its *ex ante* regulation is appropriate and meets the objectives of the Gas Act, including to promote the development of competitive markets for gas and gas services.

Proposed amendments to the Gas Act are under discussion. The Gas Amendment Bill, 2013 proposes to change section 21(1)(p) so that: 'maximum prices and tariffs for distributors, reticulators, and all classes of customers must be set in the prescribed manner' (RSA, 2013, section 12). It therefore contemplates a far more interventionist regulation of pricing – to set rather than just approve licensees' maximum prices. However, the prerequisite to determine whether there is inadequate competition in the market before exercising its pricing regulation power has been removed in the Bill. Therefore, the proposed amendments suggest that there be no evaluation of the levels of competition before pricing regulation is imposed. These concerns should be addressed so that the final version of the legislation provides for thorough *ex ante* economic regulation, through the application of competition analysis, where the state of competition in the market is such that *ex ante* interventions are necessary.

RECOMMENDATIONS ARISING OUT OF THE COMPARISON BETWEEN NERSA AND ICASA'S *EX ANTE* REGULATION

1. LEGISLATIVE AMENDMENT

The experiences of *ex ante* regulation discussed here suggest that the relevant legislation should be detailed and prescriptive in setting out steps to apply a competition analysis to economic regulation. As noted above, in relation to the ECA, we are of the view that the ECA prior to amendment was more helpful to ICASA in directing it on how to apply a competition analysis.

In relation to the Gas Act, we note above that the proposed amendments to that Act inappropriately propose a move away from a competition analysis approach. The amendments to the Act should not only maintain the requirement for inadequate competition to be present before the imposition of *ex ante* regulation, but should also introduce the kind of guidance contained in the ECA 2005, with respect to how to conduct an assessment of competition in the relevant markets and how to tailor regulation to address those market failures.

2. CONCURRENT REGULATION

The Competition Act requires the Competition Commission to engage with sector-specific regulators when applying its *ex post* regulatory powers. The Competition Act provides for Memoranda of Understanding (MoUs) to be entered into between the parties. However, neither the Gas Act nor the ECA requires that the sector regulator engage the Competition Commission when engaging in the relevant ex ante regulation. As noted above, ex ante regulation should apply competition analyses to ensure that the market is structured so as to best facilitate competition. However, this may require sector regulators to apply competition analysis without much experience of competition law and competition economics or the techniques used by competition authorities to regulate. Accordingly, there needs to be cooperation between the competition and sector regulators to ensure appropriate knowledge sharing. Accordingly, sector specific legislation should similarly envisage MoUs with the Competition Commission to set out practical and particularised steps on engagement in each instance where there needs to be the application of *ex post* regulation in a regulated sector.

3. ADEQUATE PROVISION FOR APPEALS

Neither the Gas Act nor the ECA provides for any internal appeals process in relation to the exercise of competition regulation by independent regulators. In order to review decisions of NERSA and ICASA in the

5 One of the grounds on which NERSA's determination of Sasol's applications is being reviewed is that NERSA determined its methodology before making its finding of inadequate competition.

course of exercising their powers, aggrieved parties have to bring an application to the High Court. As mentioned above, Vodacom and MTN succeeded in having the 2014 Call Termination Regulations set aside by the High Court in the form of an order suspending the implementation of the regulations until the review had been decided. A further review of the re-done process is now likely. A similar review is being pursued against NERSA in relation to its maximum pricing regulation.

While we present no view regarding the validity of NERSA's or ICASA's processes that led to these reviews, or indeed the substantive 'correctness' of the regulation that resulted from these processes, it is noted that reviews like these generally take many years to complete, because all High Court litigation (except in relation to urgent applications) is inevitably slow, and further appeals and interlocutory processes can further delay matters. While the review of the call termination regulations was concluded on an urgent basis after only a couple of months, the consequence of this review was that the market suffered from uncertainty about how it would be regulated post-September 2014. ICASA has now published new regulations to replace those which were set aside, but those new regulations also face a possible review.

This problem highlights the advantages of the competition authorities' process. In this regard, if the Competition Commission regulates, its decisions primarily lead to referral to the Competition Tribunal. There is thus an investigation process during which the Commission can take into account stakeholders' submissions. However, the Commission's decision is then subject to further oversight and decision by the Tribunal, and the Tribunal process provides for the exchange of pleadings of the relevant parties and opportunities for testimony and cross-examination of both factual and expert witnesses (Competition Tribunal, 2011).

It is for this reason that the High Court has found that a referral by the Competition Commission does not amount to administrative action for the purposes of administrative review, because it does not have a direct, external effect on the rights of the affected parties.[6] The decision of the Tribunal will affect parties' rights, and this decision will only be taken after a comprehensive fair hearing process. Such Tribunal processes can be completed in shorter periods than High Court litigation.

It would accordingly be helpful if the ECA and the Gas Act provided for some internal review processes before having to resort to the High Court. For instance, the creation of an 'economic regulation tribunal' may enable questions of both legal procedural process and substantive technical regulation to be considered by an expert body that can adjudicate complaints regarding sector regulators' rulings. A single economic regulation body could play this role (thereby avoiding separate entities for telecommunications, gas, airlines, broadcasting, etc), since the principles underlying economic regulation, with the application of competition analysis are consistent across industries.

Such a Tribunal's decisions may or may not in turn be subject to review in the High Court, but its existence would be designed to provide more efficient and speedier assessment of reviews of economic regulation than the High Court. Such an entity should be staffed by persons who are familiar with economic and competition regulation, so that account is taken of specific needs of economic regulation, and minor gaps in procedural issues are weighed against the substantive outcomes of such process. If the High Court does in turn review this body's decision, it should defer to it, in light of its expertise, as is the case with the Competition Tribunal.

CONCLUSION

The experience of regulation by sector regulators and the competition authorities in South Africa over the past 10 years demonstrates the challenges inherent in aligning competition law enforcement and efficient price regulation in the telecommunication and piped gas sectors.

It is apparent that the governing legislation should define roles and responsibilities clearly and provide for the application of competition analysis in relation to ex ante regulation. There should also be mandatory legislative provision for interaction between competition authorities and sector regulators to ensure knowledge transfer, as well as effective regulation. This may contribute to delivery to the South African consumer of lower prices and improved products and services.

Legislative design, together with South Africa's experience in applying ex ante regulation can hold lessons for other African countries that are relying on regulation to create competitive markets to deliver the best results for consumers in the long term.

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LICENSING OF COMMUNICATIONS NETWORKS AND SERVICES: CASE STUDY OF MARKET LIBERALISATION IN SOUTH AFRICA AND THE UNITED KINGDOM

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ABSTRACT
The article contrasts the regulatory regime for licensing telecommunications networks and services in South Africa with that of the United Kingdom, in order to illustrate how regulation can be used to restrict competition (South Africa) or facilitate entry into the market (the United Kingdom). The purpose of this article is to suggest possible areas for licensing reform in South Africa, which is currently in the process of reviewing its ICT policy framework. There are three areas where licensing policy can play a key role in promoting competition in the market: infrastructure and services; spectrum licensing; and pro-competitive regulation, which allows for additional licence conditions to be imposed on entities that hold significant market power (SMP). This paper addresses the first issue only (infrastructure and services), as an area that is easily capable of reform. Currently, the system for licensing networks and services in South Africa requires the pre-approval of the regulator to be granted before a licence is issued, which is unduly resource-intensive. This article advocates that South Africa adopt a system of general authorisations for the licensing of networks and services similar to that applied in the United Kingdom. Such an approach would free up the regulator to address other areas that have received insufficient regulatory attention to date, notably spectrum licensing and pro-competitive regulation, both of which fall beyond the scope of this article.

KEYWORDS
licensing telecommunications networks, licensing reform, pro-competitive regulation, class licensing framework, general authorisation regime, telecommunications networks and services, South Africa, United Kingdom

INTRODUCTION
In both the United Kingdom and South Africa, telecommunications services were historically provided by a single fixed-line provider as a public utility service administered by the government. This setup became unsustainable as exponential growth in the sector, fuelled predominantly by the development of value-added services, the proliferation of the Internet and unprecedented customer demand for mobile telephone services, introduced new market players into the industry. This in turn necessitated that the licensing regime be reformed to allow for providers of these new services to enter the market.

Both South Africa and the United Kingdom chose to introduce competition on a phased-in basis rather than all in one go. As a first step, the incumbent fixed-line network operator was carved out of government and reconstituted as a corporation with a distinct legal personality. The incumbent was then partially privatised (as was the case with Telkom SA in South Africa), or ultimately fully privatised (as BT was in the United Kingdom), which further reinforced its independence from the state.

As competition in the sector began to increase, the licensing of new entrants emerged as a key method of introducing competition and ultimately of shaping the structure of the market. South Africa and the United Kingdom initially prohibited the provision of telecoms services without a licence and restricted the number of licensees. In the fixed line sector, restrictions were placed on competition, which resulted in the incumbent operator being granted exclusivity over the provision of certain services for a limited period pending the introduction of competition. In the mobile sector, both countries authorised two network operators on a duopoly basis to begin with - because the Internet had historically been given free reign, no significant restrictions were placed on the authorisation of Internet service providers.

The ways in which these countries subsequently opened up their telecoms markets to competition differed dramatically. One of the key drivers of this difference is how their licensing regimes are structured. In the United Kingdom, the regulator has a clear mandate to promote the twin goals of competition and consumer welfare (United Kingdom [UK], 2003, section 3(1)(b)). By contrast, the primary aims of licensing policy in South Africa have been less clear, possibly because policymakers have never been entirely convinced that consumers would be better served by private sector competition, rather than services provided by the developmental state. This view is borne out in the latest version of the National Integrated ICT Policy Discussion Paper, published in November 2014, in which the promotion of competition is not listed as a key policy objective (DoC, 2014, paragraph 2.2). As a result of this ambivalence, the South African telecoms market is characterised by the top-heavy presence of a number of state-owned enterprises and an oligopoly of private sector players. Following suit, licensing policy in South Africa has been directed at liberalising the regulatory regime for existing market players, while maintaining high barriers to entry for new market entrants.

LICENCE DESIGN
The design of an authorisation regime determines the ease (or difficulty) of entry of new players into a market. Broadly speaking, authorisations can take one of two forms: licences and concessions. Under a licensing regime, the authorisation takes the form of a unilateral act of the licensing authority. In concessionary frameworks, the

authorisation consists of a bilateral contract between the government and the operator. Concessions were more common in countries where the regulatory framework was less developed (Intven, Oliver & Sepulvéda, 2000, pp.2-8 to 2-9) and were used extensively in the South America region. Today, licensing regimes are more prevalent and are the authorisation system of choice in both South Africa and the United Kingdom.

In countries where licensing systems have been adopted, three broad methods have emerged for licensing new entrants: individual licences (which require the pre-approval of the regulator, class licences (where no prior regulatory permission is required, but where licence conditions apply which govern the terms on which providers may provide services in the market), and licence exemptions (where there are no licence requirements and entry is completely open to new entrants).

Generally, licensing regimes that require the pre-consent of a regulator are more resource-intensive to administer, as they necessitate a distinct department or division to be established within the regulator to process licence applications. Class licensing systems that require the regulator to monitor and enforce licence conditions are more costly to implement than exemption regimes, but are cheaper to run than individual licensing regimes. Furthermore, licence application and exemption processes can also be complicated (or simplified) by the way in which they are designed.

Individual licences are a common method of authorising new entrants in service categories that are limited with respect to competition – either because the government has taken a policy decision to artificially restrict the number of licensees in a particular category (such as, for example, by placing a limit on the number of facilities-based competitors during the early stages of the market liberalisation process), or because a scarce resource is to be licensed in the context where demand for it exceeds supply (such as spectrum, for example). However, the way in which individual licences can be applied for and awarded can vary dramatically. Key questions that regulators should ask themselves in deciding whether to restrict or liberalise the market include the following:

i. When an applicant is applying for a licence, should the application be made following an invitation to apply (ITA) or should the regulator be able to accept unsolicited applications only?
ii. If by invitation, who should issue the invitation, the regulator or the Minister in charge of the sector?
iii. Should the application take the form of an auction (where the highest bidder wins) or a merits-based competitive selection process (where the best candidate wins, as judged by an independent third party, usually the regulator)?
iv. How comprehensive should the application process be? For example, should the applicant be required to present a business case, substantiated by extensive supporting documentation or should the applicant merely fill in a form describing the services that it wishes to provide in very simple terms? Should there be any pre-qualification criteria?
v. Before awarding the licence, should the regulator invite comment from the public on the applications that it has received and hold a hearing? Or should the licence applications be awarded or declined on a purely administrative basis?

In closed markets it is common to require applicants for certain types of licences (particularly network operator licences) to submit extensive licence applications following an invitation to apply (ITA), and pursue a lengthy evaluation process on the merits thereof before finally choosing a winner (infoDev/ITU, n.d.a). South Africa is a good example of a country that has used licensing to maintain fairly high barriers to entry, and will be discussed in more detail below. However, as markets have become more competitive, many jurisdictions have moved away from onerous individual licensing systems to class licensing regimes, notably in the European Union (EU) (infoDev/ITU, n.d.b).

Class licences are a useful tool for simplifying the authorisation regime where there is no limitation on the number of market entrants, but where there are significant regulatory objectives that can be achieved by establishing general conditions, such as, for example, mandating interconnection or imposing consumer protection requirements (Intven, Oliver & Sepulvéda, 2000, pp.2-10). Under a class-licensing regime, any entity may provide a telecom service or operate a telecom network without the pre-approval of the regulator, provided that it adheres to the terms of the class licence.

Member states of the EU are required by law to licence networks and services under a general authorisation (EU, 2002b). Individual licensing methodologies are kept to the bare minimum – and are usually restricted to finite resources where demand exceeds supply – such as numbers, or auctions for high-demand spectrum. This is considered in the context of the United Kingdom later.

Licence exemptions are typically used where an activity is technically caught within the definition of activities subject to regulation (such as offering a telecom service to the public) but where no justification exists for imposing any licensing requirements (which would be the case with remote control devices to open up a garage, for example, which use the spectrum). Licence exemptions can either take the form of an individual exemption (granted to a specific telco) or a blanket exemption (granted in respect of a particular category of services).

Company specific exemptions would most likely be unlawful in many jurisdictions. As more players have entered the market, jurisdictions such as the EU have introduced anti-discrimination rules to prevent regulators and policymakers from favouring certain companies to the exclusion of others. The EU rules on state aid, set out in the Treaty on the

Functioning of the European Union (TFEU), are a good example of this: EU member states are prohibited from granting state aid (such as subsidies or other preferential treatment) to local businesses where this will distort competition and create an unequal playing field (EU, 2008, Articles 107 to 109). In Africa, by contrast, because there is no pan-African treaty organisation comparable to the EU, no similar rules exist. This has sometimes led to unusual exceptions being made for state-owned enterprises. In South Africa, for example, a statutory exemption was granted to government-owned broadcasting signal distributor Sentech, which allowed Sentech to bypass the very onerous individual licence application procedures for a telecommunications licence under the then Telecommunications Act, 1996 (RSA, 1996, section 32C). Such blatant favouritism would not have passed legal muster in the EU. Then again, it is unlikely that the special dispensation granted to Sentech would have withstood constitutional scrutiny under the equality clause of the South African constitution either, had it been challenged in court (which it was not).[1]

For this reason, where they are to be found, blanket licence exemptions are more common and are far less likely to fall foul of the law. The use of spectrum in the industrial, scientific and medical (ISM) bands provides a good example of an instance where blanket licence exemptions have been applied very successfully. ISM spectrum was historically used for very low devices like microwave ovens and remote controls. However, when the telecoms sector began to grow, and communications networks became increasingly capacity-constrained, regulators and policy makers in many countries opted to allow ISM spectrum to be used for Wi-Fi services on a licence exempt basis.[2]

TELECOMS LICENSING IN THE EUROPEAN UNION

In order to understand the limitations of the South African licensing system, it is necessary to first discuss the licensing system in the United Kingdom, which has generally been successful in promoting competition in the local telecoms market. Nevertheless, it should be noted at the outset that regulatory regimes in the developed world are not always an appropriate benchmark for developing world economies, where socio-economic circumstances may be different. However, in the South African context, reforming the licensing regime for telecommunications networks and services would be relatively easy to implement and would require fewer resources to manage in the long term.

Because the United Kingdom is a member of the European Union (EU), it must comply with EU law. The European Common Regulatory Framework (CRF) consists of five directives, the most important of which, for licensing purposes, are:

i. **The Framework Directive (EU, 2002c)** – which creates the overarching regulatory framework within which the other directives sit
ii. **The Authorisation Directive (EU, 2002b)** – which simplifies the authorisation regime by mandating a system of class licensing
iii. **The Access Directive (EU, 2002a)** – which deals with access to interconnection and associated facilities.

All of the above directives were amended in 2009 by the 'Better Regulation Directive' (EU, 2009). The CRF requires all member states to adopt a class licensing system, under which communications providers (CPs) provide electronic communications networks and services under a system of general authorisations, which apply to all of them equally.

Instead of requiring CPs to apply for different licences according to the platform over which the service is provided (such as fixed or mobile) or the service itself (such as national long distance versus international, or voice versus data) as used to be the case in European jurisdictions such as the United Kingdom, there are now only two broad categories for networks and services which are subject to the general authorisation regime. These are:

i. **Electronic communications networks (ECNs)** – being a transmission system which permits signals to be conveyed regardless of the type of information conveyed (European Union [EU], 2002c, Article 2(a)), and
ii. **Electronic communications services (ECSs)** – being a service normally provided for remuneration which consists wholly or mainly in the conveyance of signals over an ECN, including a broadcasting network, but excluding broadcasting content (EU, 2002c, Article 2(c)).

Under the general authorisation regime, the CRF prohibits EU member states from requiring the consent of the national regulatory authority (NRA) to be given as a pre-condition to the provision of networks and services. So keen has the EU been to lower barriers to licensing that, although member states may require CPs to register with the NRA first (EU, 2002b, Article 3.2), they may not require NRAs to acknowledge receipt of registrations as a pre-condition to providing networks or services, as this would effectively amount to an individual licensing system (EU, 2002b, Article 3.3).

Whilst the general authorisation regime is meant to apply across the board to all CPs who provide networks and services, the CRF allows NRAs to impose targeted conditions on certain CPs, such as:

1 Section 9 of the Constitution of the Republic of South Africa Act 108 of 1996 prohibits discrimination on arbitrary grounds. However, section 36 permits the right to equality to be limited, where this is reasonable and justifiable.. Although there was an outcry at the time that the then Telecommunications Act was amended to confer on Sentech these additional privileges that were not available to any other telcos at the time, no stakeholders ever challenged the amended legislation in court. At the time, the other telcos chose not to challenge these statutory amendments in court, in part presumably, as they were unwilling to risk incurring the political disfavour of government.

2 In the EU, the Authorisation Directive requires member states to refrain from making the use of spectrum subject to individual licensing, where the risk of harmful interference is negligible. In the United Kingdom and in South Africa, the ISM bands are generally licence exempt for Wi-Fi applications.

i. **SMP conditions:** NRAs may impose pro-competitive conditions on entities that hold significant market power (SMP) in relevant markets that are not sufficiently competitive. The purpose of allowing NRAs to impose *ex ante* obligations in this way is to prevent dominant firms from abusing their position in the market. Pro-competitive conditions may only be imposed following a comprehensive market review. Examples of the obligations that NRAs may impose on SMP firms include the duty not to discriminate (EU, 2002a, Article 10), the requirement to provide network access (EU, 2002a, Article 12), a requirement to comply with price controls, cost recovery, cost orientation of tariffs and cost accounting rules (EU, 2002a, Article 13).

ii. **Access related conditions:** NRAs may impose conditions relating to network access and interoperability (EU, 2002a, Article 5.1). Unlike SMP conditions, which are linked to market power, access conditions can be imposed on anybody (EU, 2002a, Articles 5.1(a) and (ab)). In the United Kingdom, for example Ofcom has imposed an access condition on BT to provide interconnection, in order to ensure any-to-any connectivity. 'End-to-end connectivity' is the process of enabling retail customers to make calls to other customers or services on their own providers' networks or on other providers' networks (Ofcom, 2006).

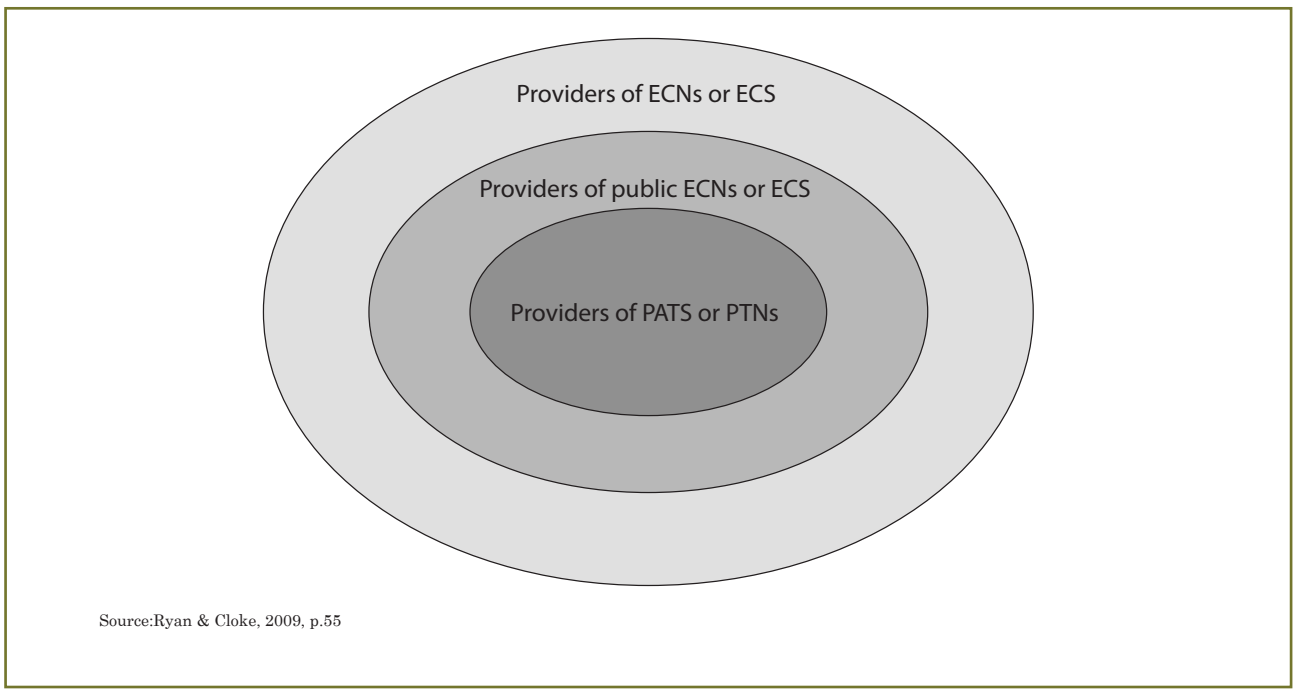
iii. **Universal service conditions:** NRAs may require CPs to make specific services available to end users at an affordable price, regardless of their location, even if it would be unprofitable for them to do so (EU, 2002d, Article 3). Examples of universal service conditions that NRAs are empowered to impose include disability services (EU, 2002a, Article 7), directory enquiry facilities (EU, 2002a, Article 5) and the provision of access from a fixed location (EU, 2002a, Article 4).

LICENSING IN THE UNITED KINGDOM

Before the CRF was transposed into British law in 2003, it was an offence for anybody under the United Kingdom Telecommunications Act 1984 to run a telecommunications system unless authorised to do so by a licence granted under that Act (United Kingdom, 1984). There were several licence categories, each of which contained a different set of restrictions, and different licences were intended to provide different services. As Conradi (2009) has described it, the United Kingdom licensing system was 'a complex and confusing system without any overriding logic to it. Whilst a fantastic arrangement for telecoms lawyers it was clear that the system was generating obstacles to competition in the market' (Conradi, 2009, p.1).

The United Kingdom Communications Act transposed the CRF into law in 2003. The Act empowers the sector regulator, Ofcom, to set general conditions of entitlement (GCs) which apply to CPs who provide networks and services. Although Ofcom has the discretion to require CPs to pre-notify it before commencing a licensed activity (United Kingdom, 2003, section 33), Ofcom has never exercised this power. There are 24 GCs in total, all of which apply to CPs equally, but only according to the types of services that they supply, such as public or private electronic communications networks or services, public services and networks only, or publically available telecommunications services (PATS). It is up to CPs rather than Ofcom to ascertain which GCs are applicable to them and to conduct their business accordingly. The relationship between these three categories of communications provider is as follows:

FIGURE 1: TYPES OF COMMUNICATIONS PROVIDERS IN THE UNITED KINGDOM



Source:Ryan & Cloke, 2009, p.55

For operators who hold SMP, Ofcom may introduce pro-competitive regulatory measures, so as to impose SMP conditions, following a market review. SMP conditions are a form of asymmetrical licensing, in that, unlike the general authorisations, which apply to all CPs, the SMP conditions apply only to firms that have been found to be dominant in a relevant market. Over the years, the United Kingdom regulator has imposed various retail and wholesale SMP conditions on dominant firms, including in relation to markets such as fixed and mobile call termination, leased lines and the like (for example, Ofcom, 2013).

With respect to BT in particular, the regulator sought to extract a number of undertakings at the outset, in relation to a number of markets that were characterised by market failure and where BT was so clearly dominant that that the outcome of a market review was a foregone conclusion. Following a strategic review of the United Kingdom telecommunications sector (Ofcom, 2005), BT voluntarily agreed to a number of behavioural and structural undertakings under competition law to avoid a reference to the Competition Commission under the Enterprise Act, 2002 (Ofcom, 2010). This obviated the need for Oftel (Ofcom's predecessor) to conduct an initial market review into all of BT's activities, although Ofcom periodically reviews and updates the undertakings to ensure that they remain proportionate and current (Ritchie, 2009, pp.93-124). By contrast, neither the sector specific regulator in South Africa, the Independent Communications Authority of South Africa (ICASA), nor the competition authorities sought to extract similar undertakings from Telkom and the other big players, Vodacom and MTN, when implementing the new licensing regime under the Electronic Communications Act 36 of 2005 (ECA). This was an opportunity missed, which resulted in the larger telcos being under-regulated at the outset, pending market reviews that took several years to finalise after the ECA was brought into law. This is borne out most notably by the fact that ICASA only published regulations lowering mobile call termination rates in 2010, some four years after the ECA first came into force (ICASA, 2010). This point is discussed in greater detail below.

PUTTING SOUTH AFRICA UNDER THE SPOTLIGHT

Legally, the South African telecoms market is partially liberalised within a converged licensing structure. The enactment of the ECA has undoubtedly facilitated increased levels of competition, by partially lifting some of the very draconian restrictions on licensing that existed under the now repealed Telecommunications Act, 1996, whilst simultaneously imposing new restrictions under the ECA. As a result, the South African market remains highly concentrated. The fixed line market is structured around two traditionally vertically integrated fixed networks, in the form of Telkom and Neotel. The mobile market operates effectively as a near-duopoly between MTN and Vodacom following Cell C's late entry into the market and its relatively small market share subsequently (Esselaar, Gillwald, Moyo & Naidoo, 2010, p.20). The effect of Vodacom's recent buy-out of second fixed-line network operator, Neotel, remains to be seen. Initiatives such as the rollout of metropolitan fibre optic networks (by Dark Fibre) and the long distance fibre optic network (being constructed by Fibreco), should assist the liberalisation process in the long term.

At the centre of the problem is that the South African licensing framework has been caught in a tug of war between the competing policy objectives of encouraging private sector participation by liberalising the market (primarily through the enactment of the ECA and the partial privatisation of Telkom) on the one hand and, entrenching and expanding the role of the state in the provision of telecommunication services (by increasing involvement through the creation of a state-owned infrastructure company, Broadband Infraco, in 2009 and via Sentech) on the other. One view is that (Esselaar et al., 2010, p.8):

> increased state provision and investment in the sector is a direct result of policy and regulatory and institutional failure to fully liberalise and introduce competition … Not only has this led to concentrated markets … high prices, constrained access and high input costs, which ultimately constrains the development of the information society in South Africa …

Ironically, there would have been less of a perceived need to counterbalance oligopolistic private sector tendencies with greater government involvement and protectionism had competition been introduced much earlier. In the face of this legacy, government 'has struggled with the dual roles of adopting policy and legislation that is enabling for the industry on the one hand, and protecting state commercial interests on the other' (Esselaar et al., 2010: p.6).

The effects of the lack of a clear mandate to promote competition have been borne out in the High Court case of *Altech Autopage Cellular (Pty) Ltd v Chairperson of the Council of the Independent Communications Authority of South Africa & Others*,[3] discussed below. While the *Altech* case helped to open up the local market, subsequent statutory initiatives have attempted to restrict, if not reverse, some of the pro-competitive effects of the High Court's decision.

CONTEXTUALISING *ALTECH V. ICASA*

In order to appreciate the impact of the *Altech* case on the South African telecommunications market, it is necessary to understand the historical context that gave rise to the *Altech* decision as well as the events that have unfolded subsequently.

In South Africa, telecommunications services were provided as a monopoly service under the control of the then Minister of Transport and Communications (Horwitz, 1992, pp.2-3). In 1991, Telkom was incorporated as a corporation, under sections 3(1) and 4(1)(b) of the now repealed Post Office Act 44 of 1958, with the state as the 100% shareholder.

3 *Altech Autopage Cellular (Pty) Ltd vs Chairperson of the Council of the Independent Communications Authority of South Africa & Others,* Case no: 20002/08, High Court, Transvaal Provincial Division (unreported).

Telkom remained a wholly owned state enterprise until 14 May 1997, when the government sold a 30% equity stake in the company to a foreign consortium. Government floated a further 28% of its shares in Telkom on the stock exchange in March 2003. Telkom was listed on the Johannesburg Stock Exchange (JSE) in South Africa on 4 March 2003 and on the New York Stock Exchange (NYSE)) on 6 March 2003. However, Telkom was never fully privatised. To date, the South African government remains the largest individual shareholder in Telkom with a shareholding of 39.8%.[4]

On the regulatory front, the state's interests were initially reinforced by the fact that telecom service providers operated under licences issued by the Postmaster-General, who in turn reported to the Minister (RSA, 1958, section 78(1A)(b)). Thus the Postmaster-General effectively functioned in three capacities – as the regulator, and as a representative of the line ministry and Telkom, all at the same time. In 1991, the Post Office Act, 1958 was amended (RSA, 1991), so as to transfer the Postmaster-General's regulatory and licensing powers to Telkom (RSA, 1991, section 34).

The positioning of Telkom as regulator and operator became increasingly untenable as growth in the telecoms sector began to explode in the 1990s. In the early 1990s, the South African government held extensive public consultations regarding the reform of the sector. This took the form of a Green Paper and then a White Paper, which set out the government's policy position on sector regulation before the Telecommunications Act was promulgated into law in 1996.

The Telecommunications Act introduced two key reforms. Firstly, the new legislation established a sector-specific telecom regulatory agency (which ultimately became ICASA) to take over all of Telkom's regulatory functions (RSA, 1996, section 96). Secondly, the Telecommunications Act granted Telkom a statutory monopoly over the provision of fixed-line services but gave the Minister of the then newly constituted Department of Communications (DoC) the discretion to liberalise the market over time. Two aspects of the regulatory reforms ushered in by the Telecommunications Act were to prove particularly problematic over time:

i. Line ministry problem: The first wrinkle is that the responsibilities for policy formulation for the telecom sector, regulatory oversight of ICASA (via Parliament) and shareholder management of Telkom and Sentech are all located within the DoC – rather than with the Department of Public Enterprises (DPE), the government department ordinarily tasked with overseeing state owned entities.
ii. Continued direct state involvement in regulatory processes: Secondly, the Telecommunications Act requires the Minister of Communications not only to approve, but in some instances to overturn regulatory decisions taken by ICASA. Specifically, the Act gives the Minister the final say over regulations written by ICASA (RSA, 1996, section 96), the selection of certain types of licensees (RSA, 1996, sections 34-35), and in some cases allows the Minister to deviate from pre-existing statutory licensing processes (RSA, 1996, section 35A).

This state of affairs wholly undermines the independence of the regulator. It is highly inappropriate, given the South African government's already high levels of investment in the local telecom industry. The Telecommunications Act institutionalises the conflict of interests between state holdings in the sector and the promotion of competition, borne out in the conversion of Altech's old-style telecommunications service licence to new style network and service licences under the ECA, ultimately giving rise to the *Altech* litigation.

Leading up to a discussion of the *Altech* decision, it is useful to give an overview of the passage into law of the ECA, which replaced the Telecommunications Act on 19 July 2006. The ECA was meant to revamp the Telecommunications Act, which had fallen behind developments in technology and had become increasingly anachronistic. The old Act had been passed into law when Telkom SA was still dominant and wholly state owned, and mobile services were in their infancy. As such, the Telecommunications Act was primarily focused on regulating fixed line services, leaving mobile telephony under-regulated. This became problematic as the mobile sector began to grow and as Vodacom and MTN became dominant to the point where the number of mobile subscribers exceeded the number of fixed line subscribers. In this context, there was a growing recognition amongst policymakers and industry stakeholders that a major overhaul of the regulatory framework was overdue.

Unlike the comprehensive policy formulation process that had preceded the passage of the Telecommunications Act into law, no similar process accompanied the ECA. In July 2003, the then Department of Communications sought to bypass the Green Paper/White Paper process by holding a 'National Colloquium on Convergence Policy' over a period of a few days. Following the colloquium, a drafting committee was established that launched immediately into preparing the Convergence Bill, which ultimately became the ECA after undergoing several iterations in Parliament. By contrast with the Telecommunications Act, the drafters of the ECA had no clearly articulated policy framework to guide them.

Ostensibly, the ECA was meant to reform the regulation of the electronic communications sector in South Africa, and also to promote competition. The passage of the ECA was accompanied by extensive amendments to the Independent Communications Authority of South Africa Act 2000, which guides ICASA. The ECA and the ICASA Amendment Act, 2006, read together, had three broad objectives, namely:

i. The harmonisation and reform of infrastructure regulation across telecommunication and broadcasting networks: Similar to the United Kingdom, different licences were required depending on the service provided (such as fixed line, mobile telephony and value added network services (VANS)) and the platform over which the service was provided (broadcasting signal distribution versus telecommunications).
ii. The consolidation of broadcasting legislation: There had been duplication of broadcasting legislation, which

4 See: http://www.telkom.co.za/about_us/company_information/shareholding.html

the ECA aimed to rationalise. The ECA did not attempt to harmonise content regulation across different platforms, because content regulation remains platform dependent.[5]

iii. The harmonisation of the powers and functions of the regulator with respect to infrastructure regulation and content regulation: ICASA had historically enjoyed a much higher degree of independence from the Minister of Communications in the performance of its broadcasting regulatory functions than in relation to telecommunications.[6]

Following from this, the ECA replaced the Telecommunications Act and the Independent Broadcasting Authority Act, 1993. The Broadcasting Act, 1999 continued in force, primarily with the purpose of regulating the South African Broadcasting Corporation, but mostly with provisions dealing with the licensing and regulation of the broadcasting sector removed.

PARTIAL REFORM OF THE LICENSING REGIME

At first glance, the ECA appeared to depart dramatically from the existing legislation by adopting a system of licensing and SMP regulation similar to that in the EU. Notably, the ECA dispensed with the previous service- and sector-based distinctions that had existed under the Telecommunications Act and the IBA Act. Under the old Acts, an entity could potentially be required to hold two, or sometimes three licences, according to the type of service that they wished to provide, all with different rights attached. To give just a few examples, some of these licence categories included the following:

FIGURE 2: LICENCE CATEGORIES UNDER THE NOW REPEALED TELECOMMUNICATIONS ACT

Licence type	Service licensed	Rights attached to licence
PSTS (public switched telecommunication services)	Fixed line services	Included the right to operate a network.
MCTS (mobile cellular telecommunations services)	Basic mobile services (includes the right to operate a network)	Included the right to operate a radio access network, but fixed links had to be obtained from Telkom (or the second national operator, Neotel) until a date set by the Minister by notice in the *Government Gazette*.
Multimedia services	Enhanced services	Included the right to operate a national network, but excluded the right to provide voice services until a date set by the Minister by notice in the *Government Gazette.*
Carrier of carriers	Wholesale international voice and data	Included the right to operate a national network, but excluded the right to provide retail services.
USALs (under-serviced area licences)	Regional fixed and mobile services in under-serviced areas	Included the right to operate a regional network and to provide voice services over that network.
VANS (value-added network services)	Enhanced services	Historically excluded the right to self-provide own network facilities or provide voice services until a date set by the Minister by notice in the *Government Gazette.*
PTNs (private telecommunication networks)	Private business services	Historically excluded the right to self-provide own network facilities. Such facilities had to be obtained from Telkom (or the second national operator, Neotel).

Source: RSA, 1996

The ECA dispensed with these complexities by introducing two platform and technology neutral infrastructure-based service licence categories for electronic communications network services (ECNS) and electronic communication services (ECS). These categories roughly correspond to the concept of an ECN and an ECS in the EU respectively.

In theory, the ECA allows for ECNS and ECS providers to be licensed in one of three ways: individually, via a class licence and/or via a licence exemption. On the face of it, this appears to be a radical departure from the Telecommunications Act, which required all telecommunications services to be individually licensed. However, in practice the 'class' licensing system introduced by the ECA is not a general authorisation regime. So-called 'class' licensees still require the pre-approval of the regulator to be given (which is the hallmark of an individual licensing system), albeit in accordance with a less onerous procedure than that required of applicants for 'individual' licences.

5 It is not practicable to harmonise content regulation, because different content platforms lend themselves to different degrees of regulation. Traditionally, only certain types of content have been subject to regulation, namely broadcasting content transmitted over terrestrial, satellite and cable platforms. Other forms of content such as Internet content and interactive voice services, are usually left unregulated, subject to self- or co-regulation or alternatively, to very light touch statutory regulation.

6 Historically, the regulation of broadcasting under the IBA was protected under Chapter 9 of the South African Constitution. Chapter 9 institutions are required to report directly to Parliament via the National Assembly rather than via a line ministry. Whereas the IBA reported to Parliament and had complete freedom over licensing and other regulatory processes, SATRA reported to the Minister of Communications. The constitutional status of ICASA as a Chapter 9 institution was never resolved, following the merger of the IBA and SATRA into ICASA. As a result, there is still some debate as to whether the institutional independence afforded by Chapter 9 extends to ICASA as a whole or only to its broadcasting regulatory functions.

To complicate things further, the ECA empowers ICASA to designate whether an activity is individually licensed, class licensed or licence exempt, depending on what the ECA euphemistically refers to as its 'impact' on 'socio-economic development' (RSA, 2005, section 5(3)(e)). Some activities are pre-categorised in the ECA as follows:

FIGURE 3: LICENCE CATEGORIES UNDER THE ECA

	Electronic communications network services	Electronic communications services	Licensing methodology
Individual	For profit national and provincial infrastructure providers. Providers in whom the state owns 25%+	Voice telephony providers who use numbers from the national numbering plan. Providers in whom the state owns 25%+	No unsolicited applications are permitted for an individual licence. An application for a licence may only be made following an ITA issued by ICASA. ICASA must follow a comprehensive notice and comment procedure and hold public hearings before issuing an individual licence (RSA, 2005, section 9).
Class	For profit municipal infrastructure providers, but not where the state owns 25%+	Data services, voice telephony not using numbers from ICASA, but not where the state owns 25%+	Any person may apply for a class licence on an unsolicited basis at any time. ICASA must decline or approve the licence within 60 days, otherwise the licence will be deemed to have been granted (RSA, 2005, sections 16-19).
Exempt	Small ECNs such as local area networks, PTNs	Non-profit ECS, resale	ICASA currently requires exemptees to notify it before providing a licence exempt service, which defeats the purpose of a licence exemption regime (RSA, 2005, section 5(6)).

Source:RSA, 2005

This has introduced an unnecessary layer of complexity into the licensing regime, as the geographic coverage of a licensee's operations does not always fit neatly into municipal, provincial or national boundaries.

In some cases, the new regime lowers some of the barriers to entry for new market entrants, but in other cases has erected new ones. The ECA has maintained obstacles to entry for new market entrants that previously existed under the Telecommunications Act, particularly for individual licensees. Notably, the ECA still precludes some categories of applicants from applying for a licence of their own accord, unless an ITA has been issued. Applicants for national infrastructure based licences no longer have to rely on the Minister of Communications to finally approve their applications, as was the case for PSTS and MCTS licence applicants under the Telecommunications Act. This is a good thing, as the concurrent licensing powers that ICASA and the Minister previously shared under the Telecommunications Act invariably caused significant delays for new market entrants (as occurred with Neotel and Cell C), particularly when the Minister and ICASA did not agree on who the licensee should be. However, the Minister still retains the upper hand in determining market structure under the ECA: notably, ICASA may not issue an ITA for an individual ECNS (I-ECNS) licence unless the Minister has first authorised this by way of a policy direction (RSA, 2005, section 5(6)).

In other instances, the ECA has erected new barriers to entry where none existed before. Under the Telecommunications Act, VANS providers who wanted to provide voice services using numbers allocated by ICASA could simply apply to ICASA for a new licence whenever they wanted to. This right has been stripped away under the ECA. Now, no prospective providers of voice services, to be paired to numbers from the national numbering plan, may apply for an individual electronic communications service (I-ECS) licence on an unsolicited basis (RSA, 2005, sections 5(3) and 9).

LICENCE CONVERSIONS UNDER THE ECA

Because the licensing regime ushered in by the ECA differed from that under the Telecommunications Act, ICASA was required to convert existing telecommunications service licences to the new ECA licence categories (RSA, 2005, sections 92-93). Under the ECA, certain ground rules apply to the conversion process:

i. Firstly, ICASA is mandated to convert existing licences on no less favourable terms (RSA, 2005, section 93(1)). The only exception to this is that the ECA forbids ICASA from conferring any monopoly or exclusionary rights under the new licence regime (RSA, 2005, section 93(7)). As such, it is not open to ICASA to extend the exclusivity provisions in Telkom's licence, for example.
ii. Secondly, the ECA requires ICASA to issue separate ECNS and ECS licences to licensees whose existing licences authorises them both to provide services and operate telecommunications networks or facilities (RSA, 2005, section 93(4)). The implications of this are that ICASA is required to issue two licences in the place of all existing vertically integrated licences, such as fixed line (PSTS) and mobile (MCTS) licences.

ALTECH AND THE CONVERSION OF VANS LICENCES

Altech had historically held a VANS licence under the Telecommunications Act, which it asked ICASA to convert to I-ECNS and I-ECS licences under the ECA. However, ICASA, under pressure from the Minister of Communications, attempted to limit the number of VANS licensees who were entitled to receive a converted I-ECNS licence. In response to this, Altech referred a dispute to the High Court, and won.

The facts giving rise to the *Altech* decision bear some mention, as they provide a fascinating insight into the structural conflict of interest that subsisted between the Minister and ICASA. The seeds of this institutional tension had been planted by statute, firstly under the Telecommunications Act and reinforced under the ECA. Historically, the Telecommunications Act treated VANS as a sub-category of telecommunications services. Section 40(2) of the Act required VANS to lease their telecommunications facilities exclusively from Telkom until 07 May 2002, and then from Telkom and the second national operator (Neotel) on a duopoly basis, until a date set by the Minister in the *Government Gazette*.

On 03 September 2004, the Minister of Communications published a series of determinations in the *Government Gazette*. The determinations provided as follows in relation to VANS licensees: 'In terms of section 40(2) of the [Telecommunications] Act, 01 February 2005 shall be the date from when value added network services may also be provided by means of telecommunication facilities other than those provided by Telkom and the Second National Operator or any of them'. Initially, ICASA took the view that the legal effect of the determinations was that, after 01 February 2005, VANS licensees were at liberty either to self-provide their own telecommunications facilities, or to lease their facilities from a third party other than Telkom or Neotel (ICASA, 2004: clause 2.2(b)). On 22 November 2004, ICASA issued a media release, which confirmed its view that VANS were entitled to self-provide their own facilities from 01 February 2005. ICASA subsequently published draft regulations along the same lines.

Presumably as a result of intense lobbying by industry stakeholders with vested interests, the Minister sought to backtrack on the determinations. The turning point came on 30 January 2005, when the Minister issued a press statement in which she stated that the intention behind determinations had not been to allow VANS to self-provide their own facilities, and that VANS providers would need to lease their facilities from another licensee. The media statement provided as follows (ioz@internet.org.za,2005):

> The issue of self-provisioning was issued in the government's policy determinations only in relation to mobile cellular operators in terms of fixed links, to give full meaning to the intention to reduce the costs of telecommunication services in SA, *it is the intention that VANS operators may obtain facilities from any licensed operator and as specified in the determinations.*
>
> It is not the government's intention to license every single activity that can be provided by a VANS operator, as this would lead to an absurd result. I can assure the sector that the Convergence Bill [which the draft ECA was then called], when tabled, will bring much needed certainty to the sector in this regard. (Emphasis added).

This press release was not published in the *Government Gazette,* as the Telecommunications Act did not allow the Minister to withdraw a determination after it had been issued. To circumvent this provision, Ivy Matsepe-Casaburri, the then Minister of Communications, stated that the press statement did not seek to amend the determinations but sought merely to 'clarify' them.

As a result, the Minister declined to approve the draft VANS regulations, which ICASA was required to submit to her for approval under sections 96(6) and 95(3) of the Telecommunications Act. The court papers in the *Altech* litigation revealed that the Minister sent a fax to ICASA on 08 February 2005, mandating it to redraft the VANS regulations so as to remove any explicit reference to self-provisioning from the final VANS regulations (*Altech* v ICASA and others), to which ICASA eventually conceded.

ICASA then embarked on the process of converting VANS licences under the ECA. Initially, ICASA indicated that it would issue both ECNS and ECS licences to VANS licensees. However, the Minister of Communications disagreed. On 17 September 2007, in a stunning disregard of the regulator's independence, the Minister published a set of policy directions under the ECA, in which she directed ICASA to consider whether "some or none" of the existing VANS licensees should receive I-ECNS licences (Minister of Communications, 2007: clause 3).

In response to ministerial pressure, ICASA issued various draft licence conversion matrices, in which it stated that it was considering awarding I-ECNS licences to a select group of five VANS licensees (which excluded Altech) – in general disregard of the provisions of the ECA (ICASA, 2007). This was the straw that broke the proverbial camel's back. Altech then sued ICASA in the High Court and won.

CONCLUDING REMARKS

Following the *Altech* judgment, ICASA granted and issued 288 I-ECNS licences, as well as granting, without issuing, another 256 I-ECNS licences in January 2009 (ICASA, 2009a, 2009b). This has helped to liberalise the market significantly by facilitating the rollout of networks and services by alternative providers. However, because the individual licensing process under the ECA remains so onerous, the market effectively remains closed to new market

entrants who want to roll out larger scale voice and data networks, unless they are able to take transfer of I-ECNS and I-ECS licences from an existing licensee.

South Africa should aim to transition to a full class licensing regime, such as in the United Kingdom, where there are no bars to entry, other than access to spectrum and a pair of pockets that are deep enough to fund network rollout. The fact that so many network licensees were authorised following the *Altech* judgment means that it no longer makes sense to maintain artificial restrictions to entry for telecommunications networks and services and network services licensees. Rather, ICASA should focus its resources and attention on more important issues, such as licensing high-demand spectrum to enable the deployment of faster broadband (which has repeatedly been delayed) and pro-competitive regulation.

POSTSCRIPT: THE CURRENT POLICY REVIEW PROCESS

Before the national and provincial elections on 07 May 2014, there were some indications that changes might be underway. In January 2014, the DoC issued a draft National Integrated ICT Policy for consultation, effectively a policy Green Paper, which raises questions about options for reforming the regulatory framework. The Green Paper does not raise any substantive proposals to reform the licensing framework. Disappointingly, the draft policy document merely summarises the existing licensing framework in paragraph 5.2.3 of the ECA, without suggesting that it needs to be reformed in any way (DoC, 2014: 24). Instead, the paper rehashes the somewhat tired question as to whether policy is best served by promoting facilities-based competition (where there are no or limited restrictions on the number of licensed network operators) or service-based competition (where the number of network operators remains restricted) (DoC, 2014: 44).

The Green Paper was followed by an amendment to the ECA in April 2014. If submissions regarding licensing were received from the public in response to the Green Paper, these never found their way into the 2014 Electronic Communications Amendment Act (RSA, 2014), which has kept the existing licensing framework almost intact. This was an opportunity missed.

In November 2014, the Ministry of Telecommunications and Postal Services published a discussion paper on the proposed national integrated ICT policy, which sets out various options for policy reform in a number of areas. There are a few promising indications that reforms may be introduced in specific areas, including positing spectrum trading and spectrum sharing as policy options (Ministry of Telecommunications and Postal Services, 2014, pp.97-98) and proposing to enhance ICASA's powers to conduct more regular market reviews, while generally strengthening ICASA's ability to impose pro-competitive regulation on SMP designees (Ministry of Telecommunications and Postal Services, 2014, pp.44-46). The introduction of a general authorisation regime for telecommunications networks and services is not presented as an explicit policy option.[7] This should be addressed when the National Integrated ICT Policy is translated into legislation.

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VALUE ADDED, EDITED CONTRIBUTIONS

CASE NOTES: CONSIDERING POSSIBLE REGULATORY APPROACHES TO TELEVISION WHITE SPACES (TVWS): A VIEW FROM SOUTH AFRICA

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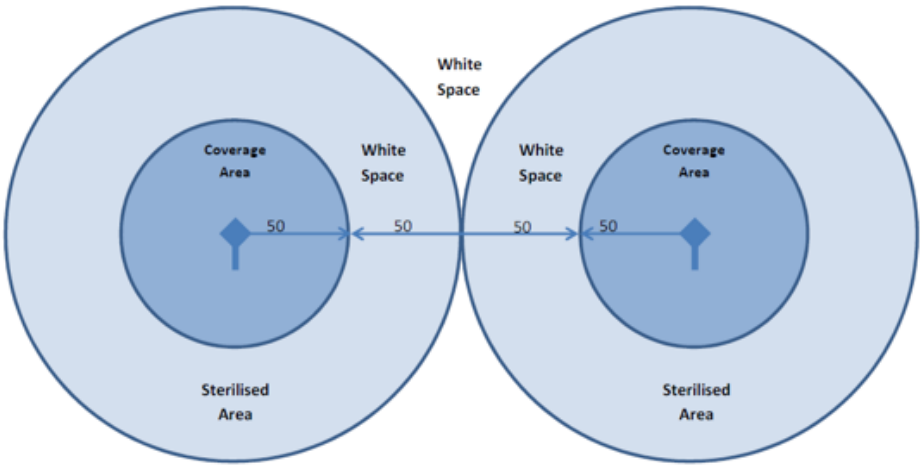
ABSTRACT
South Africa is one of the countries in the SADC region carrying out research and tests of television white space (TVWS) technology. TVWS technology, and dynamic spectrum management generally, have the potential to increase significantly the usage of valuable spectrum, that is considered to be scarce, and hence reduce the perceived scarcity. In so doing, TVWS technology has the potential to facilitate greater coverage and penetration of broadband in South Africa. However, this requires a paradigm shift from the traditional manually approved spectrum licensing process, usually on an exclusive basis, to an automated, dynamic process, where spectrum is shared between many users, some of whom will be assigned a higher priority than others. This can be achieved using a geo-location database, which implements complex radio propagation modelling and assigns permissions to use spectrum according to rules specified by the regulator. This, however, requires a new regulatory approach to spectrum assignment. A multi-level use approach is proposed ranging from protected exclusive, through protected secondary. to unprotected licence-exempt. None of these uses may cause interference to a higher level.

INTRODUCTION

Regulators around the world, including those in the SADC region and on the African continent, are working to develop technical, economic and regulatory models for the use of television white spaces (TVWS). ICASA, the South African national regulator, is a member of the regional regulatory association, the Communications Regulatory Authority of Southern Africa (CRASA), and is leading this work in the region in partnership with the CSIR[2] Meraka Institute.

TV white spaces are those TV channels that are unused in a particular spectrum band licensed for broadcasting or other purposes at a particular place. Careful calculation (Korowajczuk, 2011, Ch. 6). indicates which channels could be used for secondary broadband purposes. This is typically achieved with a geo-location white space database (GL-WSDB), which carries out calculations based on the known radio characteristics (transmitter power, antenna gain, type, orientation and height) of licensed (primary) spectrum users. Given the radio characteristics of the desired white space devices (WSDs), it is possible to authorise these devices to operate in specific channels, at specific locations, at specific times, with allowed transmitter power. This is enabled partly by the disparity between typical TV broadcast transmitters, which have antennae on very high towers transmitting tens of kilowatts, compared to a typical WSD, which produces a few watts into a relatively low antenna. The WSD is therefore unlikely to produce a powerful enough signal to cause detectable interference to consumers watching television nearby, even on the same or an adjacent channel. Furthermore, any particular frequency channel used for television broadcasting requires a large geographical separation before that frequency can be re-used, leaving large areas of "white space". See Figure 1, below, which depicts typical co-channel television transmitters, their coverage areas and the white space resulting. Typical distances shown are in kilometres.

FIGURE 1: TYPICAL BROADCAST TRANSMITTER COVERAGE AND STERILISATION AREAS



Source: William Stucke, 2013

In addition, in the case of analogue television transmissions, only every fourth channel is used at a single transmission site, in order to avoid adjacent channel interference, as all transmitters typically feed into a single

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antenna system, so adjacent channels are similarly available. After the transition to digital terrestrial television (DTT), this will remain true in South Africa, although the requirement is no longer absolute.

The UHF and VHF television bands are currently used primarily by broadcasters, with several secondary uses possible, including studio-transmitter links (STLs) and conventional broadband in the 850MHz band. The TV white spaces concept opens up the possibility of increasing the utilisation of unused spectrum for broadband purposes, at no cost to the incumbents, either primary or secondary. This approach would expand the value of existing broadband infrastructure to provide additional connectivity within urban areas and to provide cheaper connectivity to underserved communities in rural areas. The lower (VHF and UHF) frequencies used by broadcasters have a longer propagation range than the existing IMT[3] frequencies, so that base stations may be further apart, thus reducing the cost of providing broadband services in sparsely populated rural areas. In addition, these frequencies have better penetration through walls, hence they are also valuable in dense urban areas for deep building penetration by operators, as well as being more useful for private, licence-exempt home use, supplementing existing home WiFi routers (sometimes called "Super WiFi"). Overall, the use of white space UHF frequencies has the potential to increase both the ubiquity and coverage of broadband services.

The research problem being investigated here is which of several possible regulatory regimes best suits the needs of the regulator, operators and consumers in South Africa. South Africa is a country characterised by good connectivity in urban areas, but relatively low coverage in large, poor, under-populated areas. These underserved areas are especially challenging, as the combination of a small population with low income over large distances means that the return on investment in such areas is particularly low. The VHF and UHF frequencies used by TVWS devices have good propagation characteristics over longer distances, and hence may be exploited to provide broadband coverage at a lower cost, provided that the chosen regulatory model is sufficiently flexible, and does not unduly increase costs. Further, the concepts of dynamic spectrum assignment may be extended to other IMT bands, and thereby reduce spectrum scarcity and achieve the objectives mentioned above. The emerging convention of making TVWS devices licence-exempt may not wholly satisfy the South African requirement of being able to provide commercial services with acceptable reliability and quality of service (QoS) in rural areas.

SOUTH AFRICAN TVWS TRIALS

The first South African trial of TVWS technology[4] was concluded in Cape Town on 25 September 2013. It demonstrated, inter alia, that it was possible to achieve successful communication within a network of TV white-space devices without causing any interference to the incumbent broadcasters and their viewers. Three base stations on the roof of Tygerberg Hospital connected 10 schools via symmetrical UHF radio connections that allowed teachers and pupils high-speed access to the Internet. Google was the project sponsor, and built and operated the geo-location database. TENET[5] supplied the backhaul connectivity and was the project manager, with the CSIR[6] as the trial licence holder in terms of their MoU with ICASA to develop technology in this and other areas. E-Schools Network[7],WAPA[8] and Comsol Wireless Solutions[9] were also partners in the project, together with the 10 schools involved. Due to the uncertainty around the trial, schools that had existing ADSL Internet connections and computer labs were chosen. The equipment used was from Carlson Wireless[10] (US) with software from Nuel[11] (UK). The high-speed connectivity achieved facilitated research, website updating, email distribution and the use of online lessons for teaching purposes. This TVWS trial achieved several milestones not yet reached elsewhere in the world, including adjacent channel usage without interference, effectively tested against both analogue and digital transmissions, and provided the tightest spectrum mask achieved thus far.

The primary purposes of the trial were to demonstrate that:

1. TVWS can deliver improved broadband access to the Internet without interfering with licensed spectrum holders
2. Regulatory support for TVWS technology and its use for the delivery of broadband must be obtained.

It was successful in both of these aims. Additional trials in Limpopo and elsewhere are planned. These trials will address a number of issues, including broadening the current scope of knowledge in this field and refining our understanding of possible TVWS regulatory regimes. It is notable that the FCC is considering reducing the required channel separation between occupied TV channels and WSDs, and quotes the Cape Town trial as justification (FCC 14-144).

The South African regulator, ICASA, has recently licensed the CSIR to conduct a second TVWS trial, which will set up base stations at Limpopo University. The intention is to connect five rural schools using TVWS devices at a range of up to 10km. This trial will use different equipment from a different manufacturer (6Harmonics Inc., Canada), with Microsoft as the project sponsor. The CSIR will build and operate the dynamic spectrum management (DSM) geo-location database (GL-WSDB), working in collaboration with the same other parties, TENET, WAPA and e-Schools Network.

3 International Mobile Telecommunications, which for our purposes may be translated as "mobile broadband".
4 http://www.tenet.ac.za/tvws
5 The Tertiary Education NETwork: http://www.tenet.ac.za
6 Council for Scientific and Industrial Research. A division known as the Meraka Institute is primarily involved.
7 http://www.esn.org.za/
8 Wireless Access providers Association: http://wwwwapa.org.za
9 http://www.comsol.co.za/
10 http://www.carlsonwireless.com
11 http://www.neul.com/neul/.

The University of Limpopo is the host. This trial plans to test the capability of the technology in a challenging rural area, which is both hilly and wooded. In addition, it will carry out specific tests in relation to digital terrestrial television (DTT) signals. The initial equipment supplied by 6Harmonics was rejected by JSAG[12] as having excessive third and fifth harmonic outputs, as well as an unsatisfactory spectral mask. These issues were resolved before the trial commenced, but meant that adjacent channels could not be used throughout the frequency range.

Unlike the Cape Town schools, which had both existing connections and equipped computer facilities, the Limpopo schools have neither. Microsoft has supplied tablets and other equipment to all the schools.

The engineering issues that are intended to be addressed by these trials include a demonstration that successful communication between a network of WSDs can be achieved, at an acceptable data rate, without causing any detectable interference to television viewers, and that the radio frequency propagation modelling carried out by the database accurately depicts the situation in practice. In addition, the GL-WSDB implemented for this trial has the potential to record the characteristics of the WSDs, and prevent interference between them. (Mfupe, Mekuria & Mzyece, 2014) During the first trial, the modulation used was improved up to 16QAM. The current state of the art is 64QAM. The second trial addresses issues of non-line-of-sight propagation (TENET, 2013).

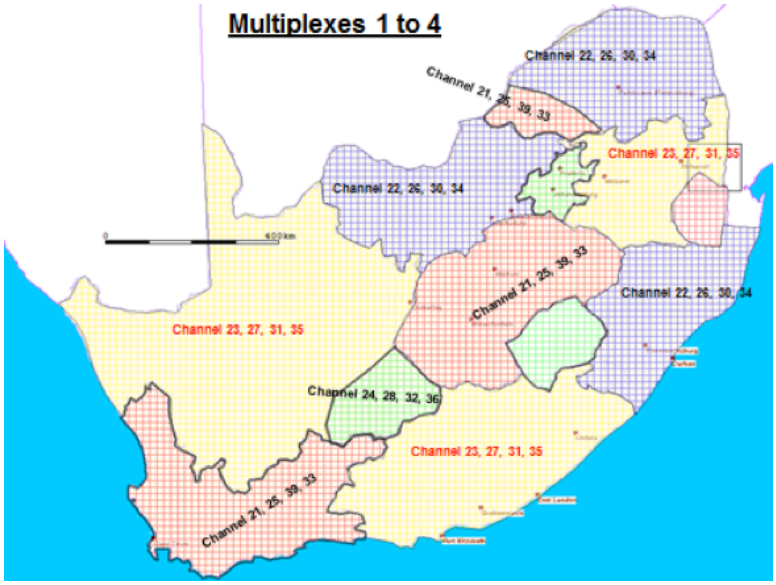
The primary regulatory issue that arises is the feasibility of changing the paradigm of spectrum licensing from the conventional "static, exclusive" regime to one of dynamic spectrum management (DSM).

AVAILABLE SPECTRUM FOR TVWS

Let us consider two scenarios: the dual-illumination period (from April 2015[13]) and the digital period after the restacking process. The restacking process consists of moving all remaining digital UHF broadcast channels, after the analogue signals are switched off, from their current frequencies spread in the range 470MHz to 896MHz as per the GE06[14] based national radio frequency plan, down to the range 470MHz to 694MHz. Ideally, this needs to be achieved without causing an interruption of service to television viewers. Currently, 392MHz of UHF spectrum is reserved for analogue TV transmission. Of this, up to 93% is unused at any one place, largely due to onerous interference issues. Most of this is available for TVWS use.

After the digital migration, some 168MHz will be freed for "IMT" use for broadband communications services. Of this, a total of 2x63MHz is currently planned for frequency division multiplexing (FDD) broadband use giving a total of 126MHz (ICASA, 2014). The balance effectively constitutes guardbands, and much of this may be used for time division multiplexing (TDD) or white-space uses. The balance of the UHF TV band, consisting of some 224MHz, is reserved for broadcasting use. Of the 224MHz, up to 75% will be available at any one place for TVWS use, because of South Africa's intention, already coordinated via the ITU with all neighbouring countries, to implement 11 large single frequency networks (SFNs), up to several hundred kilometres across. Figure 2 below shows the channels planned to be used for the first four out of seven SFNs.

FIGURE 2: PLANNED LARGE REGIONAL SFNS AFTER FULL IMPLEMENTATION OF DTT



Acknowledgement for map to Koenie Schutte and Richard Makgotlo

12 CASA's Joint Spectrum Advisory Group, chaired by the author.

13 No official start of Dual illumination has been specified by either the Ministry of Communications or the Ministry of Telecommunications and Postal Services. Neither has any duration of dual illumination been declared. Note that the analogue switch off (ASO) date agreed by South Africa via the ITU remains 17 June 2015. This date is unlikely to be met.

14 ITU Regional Radiocommunications Conference held in Geneva in 2006 (RRC-06) adopted the GE06 Agreement for Region 1 (Europe and Africa).

POSSIBLE REGULATORY REGIMES

A number of potential regulatory regimes exists for TV white spaces – and indeed dynamic spectrum management in other bands. In order to address this, it is necessary to understand key concepts involved in this area of spectrum licensing. In both the US (FCC 12-36, 2012) and the UK (Ofcom, 2013), a single, simple model has been used – Licence Exempt (ECC Report 132, 2009). The licence-exempt model has led to extraordinary innovation and growth in WiFi and has many benefits, such as delivering universal and affordable broadband access (Thanki, 2012). One of the reasons for its success is the widespread adoption of common, if rapidly evolving, standards. This results in WiFi equipment being manufactured in vast volumes, which brings the unit cost down. However, it does not lend itself well to commercial services with a defined quality of service (QoS), since the licence-exempt regime provides neither performance guarantees nor protection (ICT Regulators Toolkit, 5.1.3.1; Hayes & Lemstra, 2009). The potential therefore exists for a combination of models, including licence-exempt and managed spectrum.

In the case of pre-defined use, such as walkie-talkies and ski boat radios, no attempt is made by the regulator to coordinate usage (ICASA, 2012, p.70). No protection is provided to licensed users, other than from unlicensed ones. You talk when the channel is quiet. In the case of licence-exempt spectrum (such as the 2.4 GHz ISM band), the regulator provides no protection whatsoever. This is referred to in band plans as "no interference, no protection (NINP)". Users are obliged to adhere to certain standards, and their equipment is type approved to facilitate this (ibid: 69). Despite the anarchic nature of licence-exempt spectrum, the system works remarkably well. Originally, the 2.4GHz band was considered unusable – junk spectrum – because it matches the oxygen-hydrogen bond band gap in the free liquid water molecule, and is thus used by microwave ovens. However, the fact that no licence is required was an enormous spur to innovation (Hayes & Lemstra, 2009). Today, well over a billion WiFi devices are manufactured every year (ABIresearch, 2012).

The concept of "protection from interference" is an important one when considering spectrum licensing (TENET, 2013; Pahl, 2007). Briefly, it means that the licensee has recourse to the regulator for assistance when interference is experienced from the services offered by another party. The regulator has the skills and equipment to detect and identify the sources of interference, and in most cases, to deal with the problem rapidly by sealing, seizing or otherwise removing the source of interference. A primary user has protection from the regulator against all other users of the licensed spectrum. A secondary user has protection against all other users except the primary user. Indeed, it is the responsibility of the secondary user to ensure that his service causes no interference to the primary user. When spectrum is shared, then the users are obliged to coordinate and ensure that they cause no interference to each other (TENET, 2013; Pahl 2007). Dynamic spectrum management (DSM) is the emerging regulatory model that arises out of TVWS research (Mfupe, Mekuria & Mzyece, 2014), addressed further below.

SELECTING AMONGST REGULATORY MODELS

The countries that are most advanced in regulating TVWS are the cUS and the UK (FCC 12-36, 2012; Ofcom, 2013). In both cases, they have focused on one model in their proposed rules, namely licence exempt. The license-exempt regime is epitomised by WiFi, where devices are required to conform to certain type approval specifications, but may otherwise be freely used in the RSA and other countries (Carter, Lahjouji & McNeil, 2003). This has proven to be a powerful spur to innovation, with some 1.5 billion WiFi devices shipped in 2012 (ABIresearch, 2012). Indeed, in many developed countries, almost 50% of mobile data is offloaded to WiFi networks, whether in the home, office or the local pub (Thanki, 2012; Cisco Networking Index 2013; Nitin, B., 2013).

The economic value of licence-exempt usage is considerable, with the potential of WiFi networks in South Africa estimated at USD143 million or approximately ZAR1,6 billion (Thanki, 2012). Furthermore, the rate of use of WiFi devices continues to increase (Cisco, 2014). However, a cursory calculation of the benefit derived from licensed usage of high demand spectrum also gives a value of well over ZAR1 billion, from published revenue figures of Vodacom and MTN alone. This leads the researcher to suppose that the licensed regime – as compared to the licence-exempt or "unlicensed" regime – bears closer examination.

Moreover, the licence-exempt regime is not without its problems. Chief of these is the limited spectrum available and more particularly, the inability of operators making use of WiFi and its associated standards (such as IEEE802.11a/b/g/n) to provide a quality of service (QoS) guarantee (Williamson, Punton & Hansell, 2013). While "best effort" is often good enough, there are circumstances where an operator needs to be able to offer a specified level of service. In this case, the TVWS paradigm may need to shift from a simple licence-exempt regime to a managed-access regime. On what basis should that access be managed? Should it be on a similar basis to the current licence-exempt regime, where no protection is provided to users, or a protected basis or some combination of the above?

LICENCE-EXEMPT REGIME

In the licence-exempt regime (Pahl, 2007; Ofcom, 2013) for WSDs, all devices are registered in the geo-location database. They are lowest priority. They are assigned spectrum such that they cause no interference to other higher priority users, in the highest numbered available channels (up to one third of the channels available at that time and place). Once a device has been assigned licence-exempt usage of a channel, that channel is marked for licence-exempt use only. No protection is provided to the device from any other devices, whether coordinated or not. The device is obliged to renew its spectrum lease at regular intervals. If renewal is refused, transmission on that channel must cease immediately, but an alternative channel may be requested.

COORDINATED USAGE REGIME

In the coordinated usage, or managed access regime (TENET, 2013; Pahl, 2007) for WSDs, all devices are again registered in the geo-location database. They are assigned spectrum such that they cause no interference to other higher priority (incumbent) users, in the lowest numbered available channels (up to two thirds of the channels available at that time and place). Once a device has been assigned coordinated usage of a channel, that channel is marked for coordinated usage only. Coordination is carried out with all other devices, in order to ensure that no interference is experienced by any registered device, including licence-exempt WSDs. The device is obliged to renew its spectrum lease at regular intervals. If renewal is refused, transmission on that channel must cease immediately, but an alternative channel may be requested.

DYNAMIC SPECTRUM MANAGEMENT

Traditionally, national regulatory authorities (NRAs) have assigned spectrum in terms of what may be called "1960s technology". The assumption is that assignment of spectrum to a single entity "sterilises" that area for all similar uses (See Figure 1). In practice, tests show that broadband spectrum typically has a utilisation averaging 14% in dense urban areas, and rather less in rural areas (Pahl, 2007; Google and OTI, 2008; internal ICASA surveys 2012-2014). While broadcast spectrum may have a higher utilisation in terms of high-power broadcast transmitters on tall towers, there is considerable potential for low-power usage within a limited range. In either case, a new regime, dynamic spectrum management, has an important role to play. Dynamic spectrum management (DSM) entails carrying out calculations, as often as on a real-time basis, to determine if a candidate use can be accommodated without causing interference to other users (Mfupe, Mekuria & Mzyece, 2014).

In order to have effective DSM, full GPS position data is required, as well as an efficient and detailed radio propagation model (Korowajczuk, 2011). This is to ensure that an accurate radio frequency propagation pattern may be developed for each WSD, in order to calculate whether the WSDs will interfere with each other, or with television viewers. South Africa uses several radio propagation algorithms, with GIS and clutter data, also called a geo-location database (Mfupe et al, 2014). The position and characteristics of every licensed user of the spectrum in question must be accurately recorded in the database, and every white space device authorised to operate – whether licensed or licence-exempt – must similarly be recorded. When the situation changes, such as a primary user enabling a new transmitter, all calculations are rerun, and if necessary, TVWS devices are automatically instructed to shut down. They may request an alternative assignment, if this is available. Hence the TVWS devices need to incorporate significant intelligence as well as a software configurable radio (Lehr, 2014; Wu, 2014; Wyglinski et al., 2010).

REGULATORY APPROACHES TO TVWS LICENSING FOR SOUTH AFRICA

An earlier concept paper on a possible regulatory approach to TVWS presented at the CSIR Workshop on Smart Radio Technology (Stucke, 2013) addressed the following issues from a South African perspective. The paper proposed a regulatory approach that would include a registration-based process with multiple stages. Spectrum is assigned on a protected basis as is the case with licensed spectrum, unlike WiFi. This is secondary to the primary use, namely broadcasting. There should be a limited time duration for a "lease" of spectrum, followed by a renewal process. GPS position identification is essential. The system should be simple to use and fast enough for "dynamic" assignment.

An outline of the process that was suggested is as follows:

1. A pre-registration process takes place, in which the characteristics of the devices are specified
2. The TVWS device is installed at a location
3. Candidate channels are found for the target location via a geo-location database
4. The TVWS device scans the spectrum and verifies that no signal transmitted by others is received on the candidate channel. The spectrum scan is provided to the database. The scan may be repeated at intervals, allowing the regulator to build up a comprehensive spectrum survey
5. The TVWS device is registered in the geo-location database, in order to avoid later TVWS devices causing interference with it
6. The TVWS device is automatically authorised to use the candidate channel, via the geo-location database, in terms of the rules specified by the Regulator
7. This master device then authorises other slave devices in its network to operate using the candidate channel.

Subsequently, the author has been persuaded that a combination of licence-exempt and managed access may be more appropriate. This is primarily because of recognition of the immense power of the licence-exempt regime, as noted above.

A standard for accessing such geo-location white spaces databases is in the process of being developed: Protocol for Accessing White Space (PAWS) (IETF 2012, 2013 & 2014). It should be noted that this standard does not specify the operation of the GL-WSDB, but merely the method of interacting with it by WSDs and others.

Generally, the "rules of operation" of the GL-WSDB are specified by the relevant regulator for the country concerned. WSDs from various manufacturers in various countries can be used in other countries, provided some minimum compatibility is maintained. The issues that need to be considered in this regard include: the frequency band used;

the channel width; the maximum allowed transmitted power, and whether the power output is controllable; the accuracy of the GPS location data provided by the device; and whether scanning of the frequency environment is required and should this be uploaded back to the GL-WSDB, at what intervals.

Emerging standards for WSDs include IEEE 802.22 and IEEE 802.11af, but these will not be discussed here.

DESIGNING TVWS SPECTRUM LICENCE FEES

ICASA implemented an Administered Incentive Price (AIP) spectrum fee system in 2011 (ICASA, 2011). This has had a significant effect, reducing the cost of spectrum for most licensees, but considerably increasing it for "previously advantaged licensees" – those licensees who existed before January 2009 and had access to PtMP spectrum, prior to the Altech decision (Thornton, 2008) – who were the beneficiaries of spectrum for some of which they previously did not pay. The scheme has had the effect that those licensees with excessive assignments of spectrum have carefully considered which spectrum to return, thereby enabling other licensees to make more efficient use of the spectrum.

Calculation of the spectrum fee is based on a seven-part formula to calculate the fee due for either point-to-point (PtP) or point-to-multi-point (PtMP) uses. The formula assumes that spectrum will be used on a full-time basis, and provides a 50% discount for spectrum sharing. A spreadsheet (ICASA, 2012) is available to carry out these calculations. A possible approach to administered pricing for TVWS would be a further 50% discount (75% in total) for coordinated TVWS usage. This is in exchange for the undertaking to vacate spectrum when it is required by other licensed users, on a real-time basis.

What of the scenario where a licensee only uses spectrum for a month, or a day, or an hour? The AIP principle is capable of extension to this case, thereby facilitating a situation where a licensee will only pay for the TVWS spectrum assigned to it, for the period for which it is assigned. Thus charges would be based on time used as a proportion of the annual fee. This implies a charge of about ZAR39 per hour per MHz for national usage. Of course, the nature of TVWS is that use will be over relatively small areas at a time. Furthermore, since the geo-location database carries out careful calculations of the coverage area of the WSD network, it is easily possible to calculate all seven parameters of the AIP formula, as well as the time used, to determine the spectrum fee that ought to be due from each registered licensee for each usage.

VALUE CONSIDERATIONS

There are a number of ways of measuring spectrum value, such as its economic, social and empowerment value. Each of these can, in turn, be considered as having several dimensions. For example, the economic value of TVWS spectrum will be considered very differently in the hands of a consumer, an operator, or the state. In addition, GDP multiplier effects can play a role.

The social value of TVWS spectrum may be considered in terms of the opportunities that it provides to content creators and consumers, and in terms of the ability to communicate with friends, family and business acquaintances. The social value of the communication that may be afforded by the use of spectrum includes building social cohesion, for example such that speakers of a particular language have an opportunity to use their language and grow its written record. From an empowerment point of view, the communications that make use of additional spectrum might bring opportunities to take advantage of e-government services, including online health advice and e-education.

ECONOMIC VALUE

Considering only the economic value of TVWS, it will have vastly differing values to the various role players. Consumers value TVWS technologies and spectrum in terms of the increased communication abilities it brings them. The UHF (and even more so, the VHF) TV bands have good characteristics in terms of longer range than higher frequencies, and hence are likely to facilitate the provision of broadband in rural areas at lower cost (GSMA:5, 2014), many of which might currently be underserved. This will allow an increasing proportion of the population to become part of the digital economy.

Operators value TVWS spectrum as an opportunity to expand their service provision on a profitable basis. Together with their investment in equipment and networks, it provides an economic return. The state benefits from spectrum fees, where these are applicable, from taxes resulting from the increased economic activity that TVWS will facilitate, and from the GDP multiplier effect. The GDP multiplier effect operates in two ways. Firstly, work by the World Bank indicates that in a middle-income developing country, such as the South African economy, a 10% increase in broadband penetration brings a 1.38% increase in GDP (Kim, Kelly & Raja, 2010). Secondly, where spectrum is auctioned (unlikely in the case of TVWS), the effect on the GDP is some eight times the auction fees (USTTI, 2011). Although the licence-exempt use of the 2.4GHz and other bands is carried out without any spectrum fees due to ICASA, this does not mean that it has no economic value. One estimate places the current economic value of WiFi usage in RSA at some USD143 million (Thanki, 2012). The availability of additional spectrum in the UHF TV broadcast band as well as in the 700 and 800MHz digital dividend bands will significantly increase the utility of the licence-exempt regime, and hence its economic value.

With up to 75% of the DTT spectrum available for white space use at any one place, the potential for broadband usage of this spectrum is considerable. Coordinated usage also has an important role to play. In another paper (Grootes & Stucke, 2013), the value of this spectrum is calculated as being at least ZAR1.8 million per MHz per annum. While the spectrum fees collected for this usage will be no more than a quarter of this value, the economic benefit from commercial usage

should have a considerably higher impact on the economy, because of the increase in availability and ubiquity of broadband connectivity that will result.

CONCLUSION

These case notes explore the potential for a dual-stream regulatory model for TVWS. There is room for a "spectrum commons" of licence exempt spectrum usage within the TVWS domain, with its concomitant potential for explosive growth of ad hoc usage and wireless offloading of mobile traffic (Geerdts, Langenhorst & Cull, 2014). At the same time, there is also room for a coordinated usage or managed access licensing regime, where registered users of TVWS spectrum are provided with protection against other users, such that they can achieve high quality connectivity to their customers for commercial broadband services. Such coordinated usage licensing would provide for a time-dependent spectrum fee.

A four-level regulatory regime is thus proposed: primary, secondary, managed spectrum and licence-exempt licensees. The location and characteristics of all devices in the four categories would be recorded in the database and lower-level devices only authorised to transmit such that they cause no interference to higher-level devices. No detailed consideration of master and slave, fixed and mobile WSDs is considered in these short notes. Furthermore, in all cases except licence exempt, coordination of usage between devices on the same level is required, in order to ensure that they do not interfere with each other. At present, primary and secondary uses are licensed under the existing static regime in the TV bands. In the future, it is expected that a gradual migration to dynamic spectrum management at all levels will be achieved in other bands. This holds the potential for significantly increasing the usage density of high-demand spectrum and hence, facilitating meeting South Africa's objectives in terms of ubiquitous high-speed broadband at an affordable cost to consumers (South Africa Connect, 2013).

It is apparent from the literature (Jun, Park & Lee, 2012) and from the initial Cape Town trial, that TVWS can have a significant economic value. The quantum of that value depends on from whose point of view it is measured: the consumer, the operator or the state. In addition, in implementing geo-location-based dynamic spectrum management in the relatively simple case of the TV bands, where the incumbent licences are mostly for large fixed transmitters, valuable lessons may be learnt for South Africa and for other regulators on the African continent and elsewhere. This experience will be a good foundation for South Africa to pursue engineering and regulatory innovation of dynamic spectrum management in the more challenging situation of other bands.

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REVIEW OF RESEARCH PAPER: ECONOMIC REGULATION

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Hawthorne, R., Bonakele, T., & Cull, D. (2014). *Review of economic regulation of the telecommunications sector*. Johannesburg, South Africa: Centre for Competition, Regulation and Economic Development (CCRED), University of Johannesburg. Available from http://www.competition.org.za/s/1400407_EDD-UJ_RECBP_Project-Report_App10_Telecommunications-Sector-Review_Final.pdf or https://static.squarespace.com/static/52246331e4b0a46e5f1b8ce5/t/537f2e60e4b0b4236d47a5bb/1400843872601/1400407_EDD-UJ_RECBP_Project%20Report_App10_Telecommunications%20Sector%20Review_Final.pdf

[Editor's Note] : The article titled Economic regulation of the telecommunications sector in South Africa 2009-2014, published in this journal issue, is based on the research paper referenced above. It would be important to readers interested in the field of economic regulation and competition to read the full research paper, hence the inclusion of this review to direct readers to the more detailed work. The paper was produced as part of the regulatory entities capacity-building project, commissioned to the Centre for Competition Regulation and Economic Development (CCRED) at the University of Johannesburg, by the Economic Development Department.

COMMENTARY

As South Africa moves into the White Paper phase of its ICT policy review process, a comprehensive assessment of the kind undertaken here by Hawthorne, in respect of the telecommunications sector, its performance and impact, and its regulatory oversight, is indeed timely and valuable. Hawthorne and his collaborators provide an in-depth assessment of the regulatory function and its performance with respect to the telecommunications sector in South Africa that is seldom attempted. Comparisons can be made with the historical work of the LINK Centre (Esselaar & Gillwald, 2007) and of Research ICT Africa (Gillwald, Moyo & Stork, 2012), and, to a lesser degree, with other recent work undertaken to inform the ICT policy review process (BMI-T, 2013).

What sets Hawthorne's work apart is its greater academic rigour. Situating its analysis within the context of the academic discourse on economic regulation, it explores the complex set of relationships between communications infrastructure rollout and regulatory effectiveness on the one hand, and the performance of the ICT sector and economic growth on the other.

Readers of the report, including policy makers, regulators and students of sector performance, will find much of interest and value in its various sections. In particular, the sections charting the performance of the telecommunications sector and assessing the effectiveness of the sector regulator, ICASA, will be of interest to researchers and analysts. Likewise of interest are the two case studies, dealing respectively with (i) ICASA's relatively successful struggle to regulate call termination rates,[1] and (ii) its stalled foray into local loop unbundling (LLU).

The danger in undertaking a review of the performance of the telecommunications sector (Chapter 4) is that the data becomes rapidly outdated. However, the information presented here is less concerned with the latest raw numbers, but rather focused on identifying trends across the period 2005 to 2012, and on discussing and analysing their implications. The areas covered range from teledensity, pricing and quality of service, through investment, employment and profitability, to the level of competition in the sector and the ITU's ICT Development Index.

Equally valuable is the review (Chapter 5) of the performance of the regulator, ICASA, and to a lesser extent, of the competition authorities. The starting point is an analysis of the various regulatory performance assessment tools on offer, moving on to the application of a slightly modified version of the approach set out in Brown, Stern, Tenenbaum and Gencer (2006). Whilst its conclusion that 'there are important flaws in the regulatory framework for the telecommunications sector' (Hawthorne et al. 2014, p.99) will surprise few, the analysis and the conclusions are thoughtful and considered.

The two concluding and contrasting case studies address areas of policy and regulation – call termination rates and local loop unbundling – that have occupied much public debate in the past several years. Both are key areas of regulatory intervention necessary to achieve a more competitive level playing field in the market. These cases are grounded in a consideration of the theoretical literature underpinning the competitive justifications for such interventions in the market, which gives a degree of generalisation to the discussion.

In relation to the call termination rate intervention, Hawthorne et al. concludes that this 'facilitated significantly greater competition, not only in voice markets but in a range of adjacent markets … [despite the risk of the high degree of asymmetry in the rates] favouring competitors at the expense of competition' (Hawthorne et al. 2014, pp.135-136). By contrast they suggest that the LLU process undertaken by ICASA has been bedevilled by 'political interference or at the very least a lack of political will' and concludes with the pessimistic assessment that 'the functional separation [imposed by the Competition Commission] and LLU process may not be effective' (Hawthorne et al. 2014, p.164).

Whilst the report as a whole is valuable and important reading for those working in South Africa's ICT sector, be they academics or practitioners, policymakers or regulators, it is not without shortcomings.

1 The conclusion of the call termination rate issue only came some months after the publication of this report with the issuing by ICASA of final call termination rate regulations at the end of September 2014 (ICASA, 2014).

For instance, although there is a common thread concerned with the promotion of competitive telecommunications markets that runs through the report, the relationship between the various sections and their contribution to the whole is not always sufficiently clear. In particular, the section dealing with the economic impacts of telecommunications, whilst providing a valuable overview of the literature and debates on the issue, could have been more strongly placed as a foundation for a review of the performance of the sector and the effectiveness of its regulation. It is perhaps outside the scope of this report to interrogate some of the assumptions and modelling frameworks of the work this section reviews, but it is of interest to note that some recent work in the field casts doubt on the accepted models and suggests an altogether more complex dynamic at work (Mayer, Madden & Dang, 2014).

Whilst the focus on economic regulation is important and underpins the pro-competitive animus of this report, for a fully balanced assessment it is also necessary to give due weight to the social aspects of regulation, along with those concerned with resource allocation and control. The economic regulation framework adopted here effectively prevents proper attention being given to issues such as universal access and service, quality of service and consumer protection (there is some mention of these issues in the report, but less than the attention they deserve). One also ponders whether a case study on the debacle around spectrum, for example, or the failure of universal access and service interventions, could have been accommodated within the economic regulation framework.

A final, if explicitly chosen, limitation of the report is the fact that it restricts its scope to telecommunications. The realities of the phenomenon known as convergence, and the resultant blurring of the boundaries between the traditionally distinct realms of telecommunications, broadcasting and information technology, render it increasingly difficult to consider any one of these spheres in isolation. Likewise the resultant interplay, complex and dynamic, between infrastructure and services, markets and providers, content and applications, has led commentators such as Fransman (2010) to characterise the environment with the phrase that has since become somewhat of a cliché: the 'ICT ecosystem'[2] . Granted, it is often necessary for the sake of simplifying the analysis to restrict one's scope to an area like telecommunications, as this report does. However, one does so at the risk of bowdlerising the environment, and so some form of caveat is in order. And, while it would be churlish to insist that a report like this should also encompass broadcasting and postal services, a fully balanced regulatory performance assessment must surely also consider how ICASA has fared in respect of these equally key areas of its competence. This report expressly does not venture into these areas, but it needs to be read bracketed by an awareness that there is a bigger world out there.

The few quibbles above aside, this report is a valuable addition to the debate on and the assessment of South Africa's ICT policy and regulatory environment. It not only provides a careful evaluation of the regulation of the sector, but situates its appraisal within the context of the academic discourse on economic regulation and its assessment. Its data, analysis and conclusions provide important input into the ongoing review of the ICT sector, and furnish a useful framework for future evaluations.

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2 It seems we also have a broadband ecosystem and an Internet ecosystem.