Improving internet connectivity during Covid-19

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Abstract

The Covid-19 pandemic has forced all of us to live, work, learn, and communicate online, making reliable and affordable access to the internet indispensable. However, those who are already disadvantaged are suffering greater digital exclusion during this time, in the form of inadequate internet connectivity. At the same time, the Covid-19 pandemic has been a catalyst for positive regulatory change, since it has presented countries with an opportunity to deploy different regulatory and policy tools to improve internet access. Through the discussion of four cases – Panama, South Africa, Kenya, and the State of Kerala (in India) – this paper looks at the steps taken by governments to meet the increased demand for internet during the pandemic. It also examines the regulatory changes that may be necessary to nudge mobile network operators to ensure continued internet connectivity.

The paper summarises the different approaches that have met with success in the four cases in maintaining and improving internet connectivity during the pandemic. Governments and regulators can allocate spectrum temporarily; freeze internet and mobile payments on a temporary basis; prohibit a price increase; implement tax measures; support telecom infrastructure providers; use the unutilised money in the national Universal Access Fund; provide zero-rated access to websites (after taking into consideration certain factors); and monitor network capacity regularly. Countries should also adequately consider the time frame of their policies. These options can form part of a country's policy toolkit during an emergency, and can be deployed depending on the local context and economic, political, and social factors.

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1. Introduction

We live in an increasingly digital world, where the internet plays an integral role in facilitating access to information, education, employment, healthcare, and financial services. This has become even more apparent during the Covid-19 pandemic, which has confined people to their homes. Reliable internet connectivity has now become essential to work from home; access e-learning, telemedicine, and virtual courts; conduct financial transactions; consume online entertainment; and stay in touch with the news, family and friends.[1]

However, those who are already disadvantaged, due to economic or structural inequalities, will suffer greater digital exclusion during the pandemic, in the form of inadequate access to affordable and high-speed internet.[2] This is perhaps then, a moment of opportunity for countries, especially developing countries, to use the current crisis to implement positive regulatory and policy changes to provide meaningful internet connectivity[3] to their citizens.

This paper seeks to understand how Covid-19 has served as a catalyst for positive regulation relating to internet connectivity through the discussion of four cases – Panama, South Africa, Kenya, and the State of Kerala (in India). Specifically, the paper asks the following questions:

- **What regulatory and policy steps were taken by governments and regulators to meet the increased demand for access to the internet during the Covid-19 pandemic?**

- **What changes in regulation are necessary to nudge mobile network operators (MNOs) to work with governments to ensure continued and affordable access to the internet?**

The paper will use the four cases to analyse the regulatory and policy measures that can be adopted by governments during a period of emergency – such as the pandemic – to maintain and improve internet connectivity. However, the steps that governments can take to improve access to online services such as mobile banking or remote learning; or that MNOs can take voluntarily to improve connectivity are not the main focus of this paper.

2. Panama

2.1 Overview

Panama declared a national emergency on March 13, 2020 in light of the Covid-19 pandemic, and the government imposed enhanced curfew measures and movement restrictions thereafter.[4] The President subsequently passed an executive decree to create the 'Panama Solidario' or the Panama Solidarity Plan, a temporary support program to mitigate the economic impact of those most affected by Covid-19. Businesses were expressly encouraged to participate in the Solidarity Pledge.[5]

To meet the "noticeable increase" in demand for the internet during the pandemic,[6] the Panamanian government adopted various positive regulations – (a) temporary spectrum/frequency allocation for four months; (b) temporary freeze on internet payments for certain users for four months; and (c) a Solidarity Plan that provides business with income tax deductions for contributions in cash and kind. These regulations have encouraged MNOs to adopt measures (such as capacity expansion and data offerings) that have helped maintain and improve connectivity during the pandemic.

2.2 Temporary allocation of additional spectrum by the regulator

Under Panamanian law, in an exceptional situation and in national interest, the public service regulator, the Autoridad Nacional de los Servicios Públicos (ASEP), is authorised to temporarily allocate radio spectrum frequencies up to a maximum period of four months, at the request of a company.[7]

Pursuant to this power, ASEP issued note DSAN-0746-2020-C in March 2020, informing all the MNOs in Panama that they may temporarily request the use of certain spectrum in the Advanced Wireless Services (AWS) band for 90 days, free of cost. It offered 120 MHz radio spectrum in the AWS band, with a maximum of 30MHz for each of the four MNOs in the country, over and above the existing spectrum allocation of 240MHz assigned to them.[8] ASEP clarified that the temporary spectrum was allocated "in order that" the MNOs could help the government, private sector, and the general public stay better connected during the national emergency by offering greater capacity and speed, and introducing offers and promotions to reduce prices.[9] Thus, it seems that the allocation of spectrum was tied to the expectation that the MNOs would take steps to help improve connectivity and affordability during the pandemic.

Pursuant to ASEP's note DSAN-0746-2020-C, all four MNOs acting in the country – Cable & Wireless, Telefónica, Claro and Digicel – formally requested the temporary assignment of different channels at different frequencies in the spectrum. Thereafter, ASEP issued four separate resolutions between 26 and 30 March 2020 granting between 10-30MHz radio spectrum to each of the four MNOs free of charge until June 30.[10] While allocating such spectrum, ASEP took into consideration the

ability of the MNO to ensure that critical health and education websites, witnessing high internet traffic, would not be affected. Given the declared state of emergency, ASEP waived the MNOs' legal obligations to install new mobile towers and other infrastructure as a condition for spectrum allocation.[11]

In June, foreseeing network congestion problems, the MNOs formally requested ASEP to extend the 90-days period for spectrum allocation for the entire duration of the national emergency. On June 29, ASEP passed fresh resolutions extending the temporary spectrum permit granted to each MNO till July 31, 2020, free of charge. It initially rejected the MNOs' longer extension requests for two reasons – the law only permitted it to temporarily authorise the use of frequencies for a total period of four months; and the free assignment of spectrum had an economic cost to the government, in terms of foregone revenue from spectrum auction proceeds.[12] However, these considerations appear to have been outweighed by the ongoing demand for connectivity and continuity of public services. ASEP held a public consultation in the last week of July, and subsequently passed a resolution extending the temporary allocation of spectrum by two months, and establishing a procedure to allow MNOs to apply for the same, free of charge.[13]

Nearly two weeks after the government declared a national emergency, ASEP became the first regulator in Latin America to temporarily assign spectrum to all the MNOs in the country.[14] Although it had initially only offered spectrum in the AWS band, it demonstrated flexibility when it granted temporary permission to Digicel to use the D-D' channel in the 1900Mhz band (which was contiguous to its existing spectrum and would not require new equipment) since Digicel lacked the network equipment to operate in the AWS band.[15]

While spectrum allocation is an important regulatory response to improve connectivity,[16] it is likely to be insufficient by itself in Panama. The overall spectrum allocation of 240MHz to mobile services in Panama is much lower than the average spectrum allocation of 392.1 MHz in Latin America, being second to last, only ahead of Guatemala (allocating 210.6 MHz).[17] This represents only 12.2% of the ITU recommendation for spectrum allocation by 2020.[18] Panama has still not assigned the 2.5 GHz IMT spectrum for mobile services, even though it can be used for LTE deployment.[19] Other spectrum bands also remain unassigned.[20] Low spectrum allocation has an impact on network infrastructure and performance; reduces the reliability and quality of mobile broadband services; and can affect the future deployment of mobile broadband technologies.

2.3 Temporary freeze on internet payments by the government

Pursuant to the declared state of emergency, the government promulgated Law No. 152 of May 04, 2020, regulated by Executive Decree No. 291/2020 of May 13, 2020 (the "Moratorium Law"), to ensure affordability and continued internet connectivity over the course of the crisis by freezing payments for certain users.

As a "special social measure", the government suspended payments for three public services – internet, landlines and mobile phones, and electricity bills – for four months, with retrospective effect, from March 01 till June 30, 2020. Under the terms of the law, payment obligations for the

four-month period will resume from July 01, 2020 and users will be given 36 months for repayment. These payments will be prorated over the three years (commencing from July 2020), without any levy of interest or surcharge on the debt. Thus, beneficiaries of this law can maintain their current mobile phone plans without making any bill payments between March-June 30, 2020. If their application is successful, they will receive an interest free payment arrangement to cancel the debt accumulated during the four-month period.[21] The freeze on payments has not been extended beyond June 30,[22] although some MNOs and electricity companies have voluntarily decided to extend these benefits through July.[23]

Only certain identified groups of people could benefit from this freeze on payment, including those whose monthly family income has reduced or was less than $2000 a month; who had been furloughed or rendered unemployed due to the declaration of national emergency; retirees and pensioners; those with reduced work hours; independent workers, and others. The benefits of the law do not apply automatically, and individuals have to make specific applications, demonstrating their compliance with the conditions. All service providers, including MNOs, have to establish simple procedures for complying with these obligations, that shall be audited by ASEP.[24]

One of the most important provisions of the law is that individuals who avail of its benefit will not see their credit history affected. The government has also decreed that the quality of services being provided by the MNOs may not be worsened during the four-month suspension period.[25]

2.4 Steps taken by MNOs as a response to governmental regulation

In response to the government's Solidarity Pledge, all four MNOs came together to announce a 'Solidarity Mobile Plan', a free basic package for those unable to afford their current data plans. It provides 200 text messages and 100 minutes for calls (both within the same network) as well as free access to the Panama Solidarity Portal, and the websites of the Ministries of Health, Education, and Public Security. Such basic connectivity packages, guaranteed by all MNOs, seem to be a consequence of the obligations placed on them by Law 152 of May 04, 2020.[26] Incidentally, Cable & Wireless (which runs +Movil) gave additional benefits over and above this industry plan.[27]

ASEP has described the basic connectivity package as a step taken by MNOs to support the Solidarity Plan.[28] This is because the government's Solidarity Plan allow companies to claim an income tax deduction for contributions in cash or kind to the Solidarity Fund. The accompanying regulations issued by the Ministry of Finance make it clear that donations can be in the form of new goods, imported goods, services provided in favour of the Solidarity Plan, time or space on social media, although all in-kind donations have to be certified by the entity receiving the donation.[29]

During the pandemic, MNOs in Panama have also invested in capacity expansion, offered free capacity upgrades to certain customers, and installed free WiFi hotspots throughout the country.[30] These measures generate a lot of positive publicity, especially since most companies are regularly asked to outline the steps taken by them in the wake of Covid-19. However, capacity increase by MNOs is also a result of the conditions/expectations tied to the free allocation of temporary spectrum by ASEP. For instance, +Movil has stated that the temporary expansion of its operating frequency spectrum has helped increase its radio access network capacity and network capacity in general. Millicom Tigo Panama (which owns Telefónica) used the additional 30MHz of temporary spectrum to facilitate additional capacity at critical sites such as hospitals and health centres and execute a modernisation plan at 493 sites throughout the country.[31]

3. South Africa

3.1 Overview

South Africa declared a 'National State of Disaster' on March 15, 2020. Thereafter, the government issued two legal instruments to ensure the continuation of service and the smooth operation of the electronic communications industry during Covid-19.

The Minister of Communications and Digital Technologies issued the Electronic Communications, Postal and Broadcasting Directions (ECPB Directions) on March 26.[32] Subsequently, the telecom regulator, the Independent Communications Authority of South Africa (ICASA), issued the ICT COVID-19 National Disaster Regulations (ICT Regulations) on April 06.[33]

Both these regulatory instruments have been used to maintain and improve internet connectivity during Covid-19 in South Africa in three ways – (a) to temporarily allocate emergency spectrum; (b) to impose obligations on telecom infrastructure and service providers to ensure continued service during the National State of Disaster, and (c) to require MNOs to provide zero-rated access to certain government and local educational websites.

3.2 Temporary allocation of additional spectrum by the regulator

To meet the increased data demand during the lockdown,[34] ICASA invited applications under the ICT Regulations for the temporary assignment of radio frequency spectrum in the 700MHz, 800MHz, 2.3GHz, 2.6GHz and 3.5GHz bands. It also waived the prescribed licensing procedures and fees for the grant of these spectrum bands.[35]

Based on the conditions prescribed in these regulations, applicants had to demonstrate the impact of the additional spectrum on their network performance, including benefits to customers, such as reduced data prices, free daily bundles, and WiFi connectivity. On April 17, 2020, out of the 35 applications received, ICASA granted temporary, free emergency radio frequency spectrum to MTN, Vodacom, Telkom, Rain Networks and Liquid Telecom. As a condition of this grant, successful licensees have to support and create virtual teaching and classrooms, and digital technologies in various districts for the duration of the National State of Disaster.[36]

The grant of additional spectrum will last till three months after the end of the National State of Disaster, or till November 30, 2020, whichever is earlier. Under the ICT Regulations, licensees can share the assigned spectrum to mitigate the challenges of network capacity.[37] ICASA has clarified that this emergency allocation will not interfere with the permanent assignment of spectrum, scheduled to take place through auction at the end of 2020.[38]

The temporary release of high-demand spectrum[39] is intended to reduce network congestion, sustain high quality of broadband services, and reduce costs of internet access during the pandemic. ICASA's response is particularly significant since the allocation of high demand spectrum has been subject to significant delay over the last few years, leaving MNOs with insufficient spectrum and inadequate access to favourable low frequency spectrum.[40] This has increased capital and operational costs, raising data prices.[41] Covid-19 has, thus, ended up pushing the regulator to respond to long-standing industry demand for additional IMT spectrum allocation, albeit temporarily.

The eventual success of the emergency spectrum allocation, nevertheless, will depend on concomitant action from MNOs to ensure that benefits are passed on to users. For instance, Vodacom, MTN, Telkom, and Cell C, have reduced data prices across their data bundles,[42] in line with the conditions for spectrum allocation highlighting affordability.[43] No doubt, they have also been influenced by ICASA's request that all MNOs facilitate affordable/free access to data, and inform it of the measures taken;[44] as well as the findings of the Competition Commission of South Africa that there was scope for price reductions "in the region of 30-50%".[45]

Additionally, Vodacom has committed to spending US$27 million during April-June 2020 to enhance network capacity. It is the first MNO to utilise its temporarily assigned 50 MHz spectrum in the 3.5 GHz band to launch Africa's first 5G network in Johannesburg, Pretoria and Cape Town; and has credited the emergency spectrum allocation with improving network efficiency and reducing network congestion. Incidentally, the 5G network equipment deployed by Vodacom operates in the same frequency bands that will be auctioned in December this year.[46] MTN too, has utilised its emergency spectrum to launch its 5G network, using dynamic spectrum sharing.[47]

However, there is an inherent risk that such increased investment by MNOs and the correspondent growth in their user base due to the emergency spectrum allocation may make this temporary allocation permanent. MTN, has already stated that it hopes to secure a commercial agreement with the government to ensure that its temporary spectrum outlasts the pandemic.[48] This can have a long-term impact on spectrum management and sector competition, especially if ICASA's spectrum auction plans get delayed, which seem increasingly likely now.[49]

At the same time, ICASA could have used the temporary allocation to attempt innovative approaches to spectrum management, including providing community networks access to spectrum, incentivising spectrum sharing, using regional/local licencing through secondary spectrum and dynamic spectrum etc. In South Africa particularly, under-utilisation of spectrum in rural areas undermines the efficiency of community networks that could serve these areas.[50]

3.3 Measures applicable to telecom infrastructure and service providers

The South African government has declared broadcasting and telecommunication infrastructure and services (including optical fibre installation; network planning, testing, and maintenance; and cell tower construction) as "essential services" under the Disaster Management Act.[51] Businesses performing such essential services are permitted to operate during the lockdown. However, owing to practical constraints such as the necessary municipal officials not being available or private property being locked, the operation and additional roll out of fibre networks has been restricted.[52]

The ECPB Directions require providers of telecom infrastructure and services and ISPs and MNOs to ensure "continued service" during the disaster, which seem to indicate a priority to prevent any network breakages during the disaster. If requested, they must also "rapidly" deploy temporary electronic communications networks and services in identified areas. They are, however, given concessions in the form of temporary deferment of wayleaves and fee payments and prioritised approval of infrastructure deployment that will help ease network upgrades related to Covid-19 in cases where it is possible. Under the ICT Regulations, spectrum license fee renewals, payable on March 31, were postponed by three months to June 30, 2020.

3.4 Obligations imposed on MNOs to ensure zero rating

The ICT Regulations and ECPB Directions require all licensed MNOs and internet service providers (ISPs) to zero rate, i.e. provide free access to, all Covid-19 websites identified by the Department of Health and to "local education content related websites".[53] Any website wishing to be zero-rated has to fill up an application form and submit it to either the Depart of Health, Department of Basic Education, or the Department of Higher Education and Training.[54]

Some of the over 1000 websites approved for zero-rated access include the Covid-19 South African Resource Portal; the Department of Basic Education (including its cloud and curriculum content resources); Department of Higher Education and Training (including its intranet and career services portal); various public technical and vocation education and training colleges, universities, and high schools.[55] Community-built cooperative wireless ISP, Zenzeleni, which work with rural communities in South Africa, has also been hosting a community notice board (in English and Xhosa), which lists all the zero-rated sites, making it free to access.[56]

It is worth noting zero-rating may be technically difficult to implement in some cases, since it is as much a billing practice (requiring usage-based pricing) as a network management practice. For instance, certain ISPs may not have the technical architecture to differentiate billing based on traffic sources, i.e. they may be unable to provide individualised billing based on the websites visited. In such a situation, it is likely that these ISPs would be expected to comply on a best-effort basis, such as by raising the caps on all limited traffic services, or removing the caps from such services.[57]

Additionally, the government's mandate of providing zero-rated access only to "local" educational content websites[58] may unduly restrict access to high quality digital learning content – for instance, content produced outside South Africa; local content stored on a cloud server (which, usually cannot be distinguished from other cloud content); or local content with embedded YouTube/ Google/ Wikipedia/third party links. It is also not possible to distinguish between the educational content of websites and platforms (such as YouTube) from their entertainment content, thus excluding them from the zero-rating obligations altogether. In fact, these limitations have led Universities in South Africa to enter into deals with MNOs to offer students free data to access websites that are not included in the list of zero-rated websites.[59]

While zero-rating may be useful during the Covid-19 pandemic, especially since data is relatively expensive in South Africa,[60] the government has to ensure that it does not undermine net neutrality in the long run. The fact that commercial educational websites are permitted to be zero-rated means that some commercial content providers will be given preferential treatment by the government, when they are included in the government-approved list of zero-rated websites. In addition, MNOs such as MTN and Telkom, have been exercising discretion by also providing zero-rated access to educational websites, e-learning platforms, and public benefit organisations chosen by them.[61] This has meant that some sites that are zero-rated by one operator are not zero-rated by another.

Apart from the obligation to zero-rate discussed above, MNOs and ISPs have to also support district virtual teaching platforms. MNOs and ISPs with access to high demand spectrum must provide connectivity to 152 district virtual classroom platforms, with minimum speeds of 10Mbps, to encourage virtual teaching during the State of National Disaster.[62] While licensed MNOs and ISPs were earlier prohibited from effecting any price increase, the ECPB Directions were amended in May 2020 to remove such restrictions.[63] There is also no prohibition against disconnecting non-paying customers during the National State of Disaster.

4. Kenya

4.1 Overview

On March 25, as a response to the Covid-19 pandemic, the government announced a national curfew.[64] Prior to that, on March 16, 2020, the Central Bank of Kenya had ordered mobile money platforms such as M-Pesa and Airtel Money to waive transaction charges (for transactions below KSH1000) till June 30 to support the government's push for increased cashless transactions.[65] The Central Bank has now extended this waiver till December 31, 2020.[66]

In contrast to short-term regulatory initiatives such as waiving mobile money transaction charges, intended to mitigate the impact of Covid-19, the government's primary initiatives to improve internet connectivity during the pandemic through (a) fast-tracking the regulatory approval for the Loon Project and (b) constituting a Covid-19 ICT Advisory Committee, have been more focused on the medium-term. The MNOs in Kenya, meanwhile, have taken a number of voluntary initiatives to ensure the affordability of their service during the pandemic.

4.2 Expanded 4G coverage through the government's approval of high-altitude internet balloons

In July 2018, Alphabet's Project Loon signed a contract with Telkom Kenya (an MNO) to deploy high-altitude internet balloons[67] by 2019 to facilitate 4G coverage. In July 2019, it received approval for commercial testing, but due to various regulatory hurdles, was unable to obtain final clearance.[68] Finally, on March 23, 2020, amidst the outbreak of the Covid-19 pandemic, President Uhuru Kenyatta fast-tracked the regulatory clearances and announced his approval for the Loon Project "in line with Government's measures to respond" to the Covid-19 disruption, "to foster communication", and to ensure "universal 4G data coverage throughout Kenya".[69] The Kenyan Civil Aviation Authority also signed an agreement with Loon to permit its balloons to fly over its airspace.

Project Loon was commercially launched on July 07, 2020. It will initially provide 4G LTE connection across 50,000 square kilometres (around 11% of the country) in central and western Kenya.[70] The Loon technology will be progressively deployed by Telkom Kenya to its customers from July 2020, although no timeline has been specified yet.[71]

Project Loon is an important attempt to improve 4G coverage in Kenya, particularly in remote and under-served areas, since the balloons provides MNOs with a cheaper and more flexible alternative compared to laying underground cables or building cell towers. This allows new users to be onboarded in areas with inadequate telecom infrastructure.[72] However, for the reasons described below, this innovative regulatory approach can only improve internet connectivity in the medium-term, and may not help meet the Covid-19 related spike in internet demand in Kenya.[73]

First, the extended roll-out between the final regulatory approval on March 23 and its actual (limited) commercial launch on July 07 has meant that for the duration of the national curfew, Kenyan citizens were unable to benefit from Loon's capabilities to provide 4G access. Even now, the project does not cover the under-served northern and north-eastern regions of Kenya, where nearly 70% residents live in poverty.[74]

Second, Loon itself does not view the balloons as a replacement for the physical telecom infrastructure necessary to guarantee continued connectivity. It only provides internet services between 6 am and 9 pm, and external factors such as wind patterns and restricted airspaces result in intermittent service.[75]

Finally, Loon's exclusive partnership with Telkom Kenya (which has a market share of only 5% and where the government owns 40% stake),[76] for an undisclosed amount, may limit the reach of the project, without the financial implications and opportunity cost to the government becoming clear.[77]

4.3 Constitution of COVID-19 ICT Advisory Committee by the government

On April 21, the government issued a gazette notice constituting a COVID-19 ICT Advisory Committee for coordinating ICT-specific responses to the "effects of the Covid-19 pandemic", focusing on "ubiquitous digital learning, universal access communication services; and universally affordable connectivity." The Committee has been given an initial term of six months to submit its report. It put out a call for submissions for funding local ICT submissions that can help the government's efforts in combating the effects of Covid-19 and has received the first set of applications.[78]

The government views the constitution of the Committee as a regulatory response towards achieving "universally affordable connectivity" in the context of the pandemic. However, much like the approval of the Loon project, this is a medium to long-term regulatory initiative, whose success depends on the applications it receives,[79] the funding it can provide, and final implementation the projects. The opportunity cost of establishing such a Committee in the middle of a pandemic is high, since the government's time and money could have been better spent in pursuing other positive regulations, such as improving network resilience or reducing the existing internet tax,[80] that could improve internet access during Covid-19.

4.4 Release of additional spectrum by the regulator

The Kenyan regulator, the Communications Authority, Kenya, has stated that it has offered additional emergency spectrum to MNOs meet the increased demand for internet services.[81] However, the details of such an offer – in terms of the spectrum band offered, the duration of such temporary allocation, and underlying legal instrument used – are vague. Moreover, there does not seem to be any uptake on this offer by MNOs. The reason for this is not entirely clear, although it can relate to the uncertain nature of the spectrum allocation offer[82] or disagreements amongst the MNOs regarding spectrum allocation.[83] More likely, however, is the fact that spectrum is not a constraint for MNOs in Kenya. Conversations with government officials and experts indicate that since MNOs already have enough spectrum assigned to them, there was no interest in the spectrum allocation offer.[84]

The Kenyan example suggests that in cases where MNOs have sufficient spectrum already assigned or are not operating at maximum capacity across their current allocation, temporary spectrum allocation during a crisis may not be the right regulatory tool to improve access and network bandwidth/quality for users.

4.5 Steps taken by MNOs

The MNOs, Safaricom,[85] Airtel,[86] and Telkom Kenya,[87] have taken a host of voluntary initiatives to offer cheap data packages and YouTube bundles; provide free data bundles to hospitals; improve internet speeds; provide zero-rated access to select websites, including educational websites; and extend packages to customers to allow them to upgrade their 2G phones to 4G-enabled smartphones. Although the Communications Authority of Kenya has claimed to have "engaged" with the MNOs on issues of affordability,[88] there is no underlying regulation/ law that requires them to provide data packages or ensure continuity of service. The Kenyan government, however, reduced the Value Added Tax across the board from 16% to 14% with effect from 01 April 2020, which would likely have had an impact on the price of data bundles and fixed data services for end users.[89]

One possible hypothesis that could explain the Kenyan government's focus on the medium to long-term regulatory measures is that the MNOs have been very proactive in taking the aforesaid steps to demonstrate their commitment to their users, by maintaining internet connectivity during the Covid-19 pandemic. Actions by the MNOs thus, seem to have helped many Kenyans in continuing to afford and reliably access the internet through the crisis. Such an approach, however, may not be sustainable and scalable across countries, since it depends, in large part, on goodwill gestures by MNOs, who will have to take into account cost and profit considerations. For instance, Safaricom has stated that its Covid-19 relief measures (including the waiver on mobile money transactions, which is not the focus of this paper) will cost it around US$ 51.5 million over three months.[90]

At present, telecom operators in Kenya contribute 0.5% of their annual turnover to the Universal Service Fund established in 2009 under the aegis of the Communications Authority, Kenya to improve ICT connectivity infrastructure in underserved areas. Although the Fund currently has KSH 10.6 billion (US$98.7million), implementation of projects under this Fund have been beset with delays and challenges,[91] and do not seem to have been re-directed towards Covid-19 efforts.[92] A short-term regulatory measure that the government could have taken to support the MNOs would be to temporarily suspend payments into the Fund, as was done by the Colombian government,[93] and use the money in the Fund to support government-led initiatives to expand internet connectivity. In this manner, the additional 0.5% revenue savings for the MNOs could be passed on to customers, while the existing unutilised money in the Universal Service Fund could be used on initiatives such as digital classrooms.

5. Kerala (India)

5.1 Overview

The first Covid-19 case in India was confirmed in Kerala, a state located on the south-western coast of India, on January 30, 2020. The Government of India declared a complete national lockdown on March 24, requiring all but essential establishments to be closed. An exception was made for "telecommunications, internet services, broadcasting and cable services, IT and IT-enabled services", which were deemed essential.[94]

This paper has elected to focus on the measures taken by the government of Kerala, rather than the Central Government, because Kerala is uniquely positioned in terms of the importance given to internet connectivity and its recognition of access to basic internet facilities as a right of every resident.[95] The State Government has tried to maintain internet connectivity during the pandemic by (a) monitoring network capacity and bandwidth; (b) sanctioning the upgradation of 3G towers to 4G; and (c) ensuring adequate electricity supply to telecom towers; although details of all these measures are not fully available in the public domain. The Central Government has tried to encourage MNOs to adopt measures to ensure affordability, but there has been some pushback from the MNOs, given the lack of underlying legal basis and cost implications.

5.2 Government monitoring of network bandwidth and capacity

Nearly two weeks before the national lockdown was announced, the Kerala government began examining options to increase network bandwidth to deal with increased internet usage.

A meeting was held on March 11 between the State Information Technology Secretary, the Telecommunication Department, and all the MNOs in the Kerala Circle. The government and the MNOs agreed to monitor consumption patterns and network capacity through the submission of daily performance reports by MNOs, containing details about bandwidth utilisation.[96] The government's pre-existing toll-free number was opened up to the public to register complaints about low internet speed and availability, with the Kerala State IT Mission tasked with following-up on such complaints with the MNOs where necessary.[97] In the meeting, the MNOs also agreed to enhance network capacity by 30-40% in order to meet the rise in demand, if required. However – and perhaps because the MNOs knew that the majority of Kerala's internet consumption was through local servers, and hence, the need to increase network capacity was unlikely – no concrete plan was formulated on how this would be achieved in a short time.[98]

As it turns out, wholesale network expansion was not necessary. Although MNOs across the country had initially sought a temporary allocation of spectrum, they eventually clarified that no extra spectrum allocation was necessary to maintain network stability or the quality of services.[99] This was because, in addition to India's internet infrastructure traditionally being underutilised,[100]

the average national internet demand during lockdown only increased by 10% and the streaming services switched from high definition (HD) to standard definition (SD) resolution for their mobile networks (following a request from the industry body, the Cellular Operators Association of India).[101]

The regulatory initiatives in Kerala have been grounded on regular communication between government officials and MNOs, and focused on monitoring and assessing daily network performance. This helped the authorities avoid inefficient options such as temporary spectrum allocation, since they concluded that there was no need to increase network capacity (although it is unclear if the MNOs would have been able to act promptly in enhancing capacity, if the need had arisen).

5.3 Sanctioning an upgrade to 4G network

On April 27, 2020 the State IT Department issued a government order for upgradation to 4G networks, recognising that uninterrupted internet coverage is "necessary" in view of the enforced lockdown and that, conversion from 3G to 4G networks is "essential" to guarantee high speed internet connectivity. A conversion to 4G networks requires upgrading the transmission equipment in existing mobile towers. However, the upgradation of telecom infrastructure had been delayed in certain tower locations in Kerala, on account of varied reasons.[102] Consequently, in view of the expected rise in internet demand, the government passed an order on April 27, granting *en masse* approval to permit the MNOs to upgrade their networks from 3G to 4G in specified tower locations. The government order directed that all field level and site level work should take place with minimum number of workers, after following all the government-prescribed Covid-19 precautionary measures (such as social distancing).[103]

5.4 Actions taken by MNOs to improve affordability

On March 29, 2020, the regulator, the Telecom Regulatory Authority of India (TRAI) wrote to all MNOs, requiring them to extend the validity period to ensure that "all prepaid subscribers can enjoy uninterrupted services" during the period of lockdown. TRAI further "requested" the MNOs to provide it with the details of the steps taken to ensure availability of uninterrupted services on a priority basis.[104]

On the next day itself, MNOs in India announced data packages, limited free talk time, and extended the validity of the pre-paid packs, to help low income customers during the lockdown.[105] These measures were targeted at around 280-300 million customers, and cumulatively cost the MNOs approximately INR 600 crore (around US$80.13 million).[106] Thereafter, TRAI wrote to the MNOs again, questioning their selective approach in extending the validity and offering talk time credit only to certain prepaid users, and asked the MNOs to ensure continued service for all prepaid users during the national lockdown.[107]

However, the legal basis for TRAI's request is unclear. That is possibly why on April 09, the Cellular Operators Association of India (COAI), representing all MNOs in India, informed TRAI that individual operators had taken measures as they "deemed fit" to ensure that the "underprivileged and needy customers have uninterrupted services in case of medical emergency." The letter highlighted that considering the "dire financial situation" of the telecom industry in India and the business viability of MNOs, individual operators had conducted independent assessments and decided to limit the benefits of extended validity and extra talk time only to the "truly needy". The benefits announced by the MNOs would not be extended to all the prepaid subscribers since that would amount to an unjustified subsidy for the larger class of customers.[108]

The MNOs further clarified that their actions were in "national interest", and if the government wanted them to extend benefits to all prepaid subscribers, then it should provide a subsidy to the telecom sector (treating it like an essential service). The MNOs suggested that the subsidy could be compensated from the Universal Service Obligation Fund, which has more than INR 51,500 crore (US$ 6.8 billion) lying unutilised.[109] Thereafter, TRAI seems to have stopped pursuing the issue. Notably, the stance taken by the MNOs received validation when the Supreme Court of India dismissed a petition filed by an individual seeking free and uninterrupted calling and internet services during the national lockdown.[110]

5.5 Ensuring adequate electricity supply for mobile towers

Uninterrupted cell service requires, amongst other things, adequate supply of diesel for Diesel Generator sets (DG sets) powering mobile towers.[111] In Kerala, like much of India,[112] many mobile towers are exclusively reliant on DG sets, since they are not connected to electricity from the grid. Conversations with government officials revealed that the State IT Department worked with the Kerala State Electricity Board in identifying these towers and monitoring the supply of diesel to these towers during the Covid-19 lockdown.[113] This helped prevent any major power outage in the cell phone towers, and reduced the risk of interruption in cell service. While this may not be a direct regulatory move, it reveals the importance of communication and coordination between the regulator and the telecom infrastructure and service providers to ensure continued service during a national lockdown.

Incidentally, since electricity and internet connectivity problems were making it difficult for employees to work from home, the government has separately launched a "Work Near Home Scheme, 2020". By October 2020, it plans to create small work-sharing facilities (by acquiring abandoned buildings and hotels) that have uninterrupted WiFi, power supply, and videoconferencing facilities throughout the state, so that employees (especially those who have gone back to their village/hometowns) can work near their homes during, and beyond, the Covid-19 pandemic.[114]

6. Policy options to improve internet connectivity in times of crisis

The Covid-19 pandemic has been a catalyst for positive regulatory change, since it has presented countries with an opportunity to deploy different regulatory and policy tools to improve internet access. This section summarises the different approaches that have proved to be somewhat successful in the four examples discussed in the paper in maintaining and improving internet connectivity during the pandemic. These options can form part of a country's policy toolkit during an emergency, and can be deployed depending on the local context and economic, political, and social factors.

• Allocating spectrum temporarily

Governments can temporarily allocate unassigned spectrum in a fair and non-discriminatory manner, so as to improve network efficiency, improve bandwidth, and reduce network congestion. As in Panama and South Africa, such emergency spectrum allocation can be done through a legal instrument that sets out (a) the duration of the temporary allocation; (b) the application procedure and the requirements that need to be met by applicants (such as demonstrating network performance); (c) whether the temporary allocation is free of charge or not; and (d) the conditions/ expectations that are tied to the allocation (such as reduced data costs or network expansion). Care should be taken that the beneficiaries created or the investment made by licensees as a result of the temporary spectrum assignment do not impact the regulator's long-term spectrum allocation plans (for instance, by making the temporary allocation permanent) and do not reduce the competitiveness in the telecom sector (by entrenching dominant players).

It is worth bearing in mind that temporary spectrum allocation is unlikely to help in a situation such as in Kenya or India, where the MNOs have sufficient spectrum or the current spectrum is idle or inefficiently utilised.

• Freezing internet and mobile payments on a temporary basis

Governments can consider temporarily freezing payments on internet and mobile charges to ensure continued connectivity during an emergency, even for customers with overdue bills. As in Panama, such a measure can be imposed through a legal instrument that clearly stipulates (a) the duration of the temporary freeze, i.e. the period for which payment can be deferred; (b) the criteria for selecting the intended beneficiaries; (c) the repayment method, including the number of instalments and the total time period; (d) whether the repayment is interest-free; and (d) whether there is any impact on the credit history of an individual if they avail of this measure. The advantage of an underlying regulation is that it does not leave citizens reliant on the goodwill of MNOs and does not create a situation like in India, where the regulator and MNOs disagree on the exact nature of the obligation placed on them.

• Prohibiting a price increase

Instead of mandating continued service for defaulting clients, governments can prohibit MNOs from effecting any price increase in mobile and internet services during the course of the pandemic, as in South Africa.

• Implementing tax measures

Governments can give MNOs income tax deductions, similar to Panama's Solidarity Plan, for any contributions in cash or kind to the government's crisis efforts, including for improving internet connectivity during the pandemic. Such a proposal provides flexibility to MNOs to devise data plan offerings that are attractive to customers and sustainable for the companies. Governments can also consider reducing the Value Added Tax, like in Kenya, so that the benefit of the indirect tax cut can be passed on directly to consumers in the form of reduced data costs.

• Supporting telecom infrastructure providers

Governments should provide support for telecom infrastructure providers to ensure continued services during a disaster, as in Kerala, where the government was able to ensure a regular supply of diesel for all mobile towers to prevent any outages. In case governments wish to impose a legal obligation of continued service on telecom infrastructure providers, as in South Africa, they could extend corresponding regulatory support – in the form of postponement of license and fee payments and prioritised infrastructure approvals.

• Using the unutilised money in the national Universal Access Fund

Many countries, such as Kenya and India have a universal access fund or a universal service obligation fund in place, where MNOs are required to contribute a percentage of their revenue. A large amount of money is often lying unutilised in these funds, which can be re-directed during an emergency to specific connectivity measures that improve affordability or network resilience. Alternatively, MNOs can be granted a temporary relief from contributing to the fund, as in Colombia, so that they can pass on the savings to their customers.

• Providing zero-rating access to websites

Some countries, such as South Africa (where data costs are relatively high, have required MNOs to zero-rate health and local educational content related websites, so as to provide a basic minimal access to certain content. However, before advocating zero-rating, a country should consider four important factors – (a) zero-rating is often technically complex to implement; (b) it may not work with cloud service providers or third party content, such as embedded videos and texts, on the zero-rated websites (thus reducing the intended benefit); (c) it is difficult to distinguish between the educational and entertainment content of a website; and (d) by allowing governments and/or MNOs to privilege certain websites over others, it may undermine net neutrality in the long run.

• Monitoring network capacity regularly

Government should have regular meetings with MNOs and seek periodic network performance reports to establish the impact of Covid-19 on the state's network capacity. Such real time data will help governments decide on which regulatory tool to deploy, by targeting their intervention and avoiding inefficient policy options. For instance, in Kerala, the government realised that it did not require MNOs to increase network capacity by 30-40% (even though they had agreed to it) nor did the Central Government have to allocate spectrum, since the current network infrastructure was sufficient to handle the relatively smaller increase in demand for internet access.

• Adequately considering the time frame of the policy

Regulatory measures that are aimed at improving internet connectivity during an emergency should not be limited to the medium or long-term. During an emergency, people are confined to their home, causing a spike in the demand for the internet, and necessitating immediate policy action. There is an opportunity cost to focusing on medium-term regulatory initiatives (even if they involve innovative use of technology such as Kenya's Loon project), if they come at the cost of short-term measures, since any positive impact of these initiatives will take months to fructify.

Endnotes

1 Keeping the world connected: Development challenges in times of COVID-19, GSMA, 2 April 2020; Null, E., Expanding connectivity to fight Covid-19: Recommendations for governments and telcos, Access Now, April 2020; Soon-Shiong et al., Using digital technologies to re-imagine cash transfers during the Covid-19 crisis, Digital Pathways at Oxford Paper Series, no. 2, 2020.

2 Pathways for Prosperity Commission, Digital lives: Meaningful connections for the next 3 billion, 2018; Colom, A., COVID-19 and what the digital divide means for people's livelihoods in Kenya, Open University, 19 April 2020.

3 Internet connectivity can be measured in a number of ways. It is traditionally measured as the percentage of population with access to the internet, or who have used the internet over the last three months. (See ITU, Manual for measuring ICT access and use by households and individuals, 2014). However, many believe that such an exclusive focus on whether people can access the internet ignores the question of *how often, how fast*, and *how cheaply* can they access the internet. To holistically capture these parameters, Alliance for Affordable Internet (A4AI) released a new standard defining "meaningful connectivity" measuring regularity of internet access, appropriate device, enough data, and speed of connection. For more information see Alliance for Affordable Internet, Meaningful connectivity: A new standard to raise the bar for internet access, 2020.

4 Cabinet Resolution No. 11 of March 13, 2020 declared the national emergency. The full curfew was implemented under the aegis of Executive Decree No. 507 of March 24, 2020. For more details of the restrictions, see IMF, Policy response to Covid-19: Panama (2020) and OSAG, Health alert: Panama, increased movement restrictions, Covid-19 situation report, and reminders, 14 April 2020.

5 Executive Decree No. 400 dated March 27, 2020 issued by the President. The Solidarity Plan covers people who are vulnerable, in multi-dimensional poverty, live in remote areas, or are self-employed. Under the Plan, these groups will receive food bags, solidarity bonuses, and monthly digital vouchers (where US$80 is credited against their personal identity cards redeemable at various supermarkets). Businesses involved in this Plan have to register with the National Authority for Government Innovation. For more details, see BDO, Panama Solidarity Plan, 09 April 2020.

6 For instance, +Movil witnessed a 50% increase in demand for internet services and 40% increase in mobile traffic after the declaration of emergency. Fixed internet use demand for Millicom Tigo Panama (or Telefonica) also increased by more than 50% after the first week of Covid-19 reaching Panama. There was a simultaneous increase in demand for mobile data for Millicom's customers. See Hernández R.,+Movil expanded network and released key access, LaPrensa, 14 April 2020; Llorente O., Millicom unleashes its power against Covid-19, LaPrensa, 14 April 2020.

7 Article 16.3 of the Plan Nacional de Atribucion de Frecuencias (PNAF) or the National Frequency Attribution Plan of 2019. See also Articles 20 and 21 of Law 26 of January 29, 1996, as amended by Law 10 of February 22, 2006 (on file with author) regulating the powers of ASEP.

8 ASEP, Telework with greater capacity thanks to ASEP's measure, 2020.

9 ASEP, Resolution AN No.16045-Telco dated 26.03.2020.

10 Vide Resolution AN No.16045-Telco dated 26.03.2020, ASEP granted temporary permission to Telefónica Móviles Panamá, SA, to use Channels D-D ', E-E', F-F ', located in the segments frequencies between 1710 MHz to 1780 MHz and 2110 MHz to 2180 MHz (AWS Bands). Similarly, ASEP granted temporary permission vide Resolution AN No.16044-Telco dated 26.03.2020 to Digicel (Panama) SA to use DD channel in 1865-1870 MHz and 1945-1950

MHz; Resolution AN No.16046-Telco dated 26.03.2020 to Cable & Wireless Panama SA to use the AA channel in the segment from 703 MHz to 708 MHz and from 758 MHz to 763 MHz; and Resolution AN No. 16053-Telco dated 30.03.2020 to Claro Panama SA to use AA, BB, CC channels in 1710 MHz to 1780 MHz and 2110 MHz to 2182 MHz (AWS Bands).

11 *Id.*

12 Resolution AN No. 16155-Telco dated 29.06.2020 for Cable & Wireless Panama SA; Resolution AN No. 16156-Telco dated 29.06.2020 for Digicel (Panama) SA; Resolution AN No. 16157-Telco dated 29.06.2020 for Telefónica Móviles Panamá; and Resolution AN No. 16158-Telco dated 29.06.2020 for Claro Panama SA.

13 ASEP, Resolution AN No. 16214-Telco dated 31.07.2020. See also ASEP, ASEP will guarantee broadband to users, 27 July 2020; Panama's Onda Cable awarded for high speed Internet, Prensa Latin, 28 July 2020. Although the PNAF (National Frequency Attribution Plan) imposes a four month limit on the temporary allocation of spectrum, since PNAF is issued via an ASEP resolution, it can implicitly be amended via another ASEP resolution.

14 ASEP, Panama leader in expanding spectrum to mobiles by Covid-19, 2020.

15 Thus, Digicel was authorised to temporarily use 10 Hz (2 x 5MHz) to expand its current carrier 4G LTE from 10Hz to 15 Hz. ASEP, Resolution AN No.16044-Telco dated 26.03.2020.

16 ITU, Pandemic in the internet age: Communications, industry responses (June 2020). See also ASEP, Telework with greater capacity thanks to ASEP's measure, 2020.

17 Barely 20% of the mobile spectrum suggested for 2020 by the ITU in Latin America, Panama 24 Horas, 07 January 2020.

18 To understand some of the reasons for low spectrum assignment, including the various resolutions passed by ASEP over the years, see 5G Americas, Analysis of ITU spectrum recommendations in Latin America: White Paper, June 2020. For the importance of spectrum allocation, see 5G Americas, Status of the 700MHz and 2.5GHz spectrum bands in Latin America, 2017; 5G Americas, Analysis of ITU spectrum recommendations in Latin America, 2018.

19 The last spectrum assignment in Panama took place in 2018 when Digicel Panama was awarded 20MHz in the 700MHz band. See Panama has the potential to become Central America's most innovative telecommunications market, TyN Magazine, 09 April 2019. Conversations with experts such as Jose F. Otero reveal that the 2.5GHz frequency for multichannel multipoint distribution services (wireless cable) was assigned many years ago. In 2014, ASEP initiated a consultation asking MNOs on steps that should be taken with respect to this spectrum band, which process. Based on this consultation ASEP published a resolution in January 2019, stating that it will consider technical advice for the more efficient use of the 2.5GHz band including its potential use for IMT services, no further information on this band has been announced by the Panamanian authorities.

20 In 2019, following a consultation with MNOs, ASEP notified its intention of distributing 91 MHz IMT spectrum within the frequency band 1427MHz-1518MHz (or the 'L Band') for mobile use within two years, although it did not explicitly recommend using the band for 5G. No action seems to have been taken pursuant to this resolution. See GSMA, Effective spectrum pricing in Latin America: Policies to support better quality and more affordable mobile services, 2018; GSMA, State of mobile internet connectivity, 2019.

21 Articles 2 and 3, Executive Decree No. 291/2020.

[22] Cable & Wireless Panama, Moratorium, 2020, which states that *"The form to accredit the benefit of the moratorium is no longer available, since the period to apply expired on June 30, 2020, according to Law No. 152 of May 4, 2020 and its regulations."* A proposed draft law 35, that extends the effects of the Law 152 till December 31, 2020, was introduced by an independent member, H.D. Juan Diego in the Assembly on July 16. However, it has not been passed yet, and has not become a law.

[23] ENSA extends a month more benefits of Moratorium Law on payment of public services, En Segundos, 07 July 2020; Claro Panama extends the benefits of the Moratorium Law until July, ElCapital, 12 July 2020.

[24] Articles 2-4, Executive Decree No. 291/2020 of May 13, 2020. For an idea of the types of documents required for demonstrating fulfilment with the moratorium conditions, see Digicel, Moratorium Law; ENSA, Requirement for the Moratorium Law 152.

[25] Articles 2 and 3, *Executive Decree No. 291/2020*. See also Wilfredo J., Companies await regulation for moratorium, LaPrensa, 08 May 2020.

[26] On its website, while responding to FAQs regarding this Solidarity Plan for postpaid mobile and residential customers, Cable & Wireless (+Movil) has a separate link to "Apply to Moratorium", which states that the period to accredit the benefit of the moratorium has expired as per Law 152 of May 04, 2020 and its regulations. See #StayinPanamaHouse, +Movil, (2020).

[27] It additionally provided free use of WhatsApp text, without any data consumption, from May 22 till July 15; as well as zero-rated access to certain supplementary government and university websites. See Plan Solidario #StayinPanamaHouse, +Movil,(2020); Plan Basico Prepago #StayinPanamaHouse, +Movil (2020).

[28] ASEP, Companies guarantee telecommunications service, 2020.

[29] Resolution No. 201-2418 of April 16, 2020 regulating the donation process established vide *Article 15, Executive Decree No. 400* (Solidarity Plan). For donations in kind, the acquisition cost of the good will be taken as the amount donated for the purpose of assessing the income tax deduction. For more details see Perea C., They regulate donation to Plan Panamá Solidario for their tax deductibility, TeleMetro, 18 April 2020.

[30] Llorente O., Millicom unleashes its power against Covid-19, LaPrensa, 14 April 2020, where the company's general manager explained that it had increased its capacity for internet access by more than 40%, at a cost of over US$ 1 million; and had installed more than 700 WiFi hotspots throughout the country as an emergency measure, for access by the general population, without requiring a specific company login. See also Hernández R., +Movil expanded network and released key access, LaPrensa, 14 April 2020.

[31] *Id.*

[32] Department of Telecommunication and Postal Services, Electronic Communications, Postal, and Broadcasting (ECPB) Directions, 2020 (ECPB Directions).

[33] ICASA, Information and Communications Technology COVID-19 National Disaster Regulations, 2020 (ICT Regulations).

[34] Vodacom witnessed a surge in 40% data traffic during the lockdown. See Mchunu S., Vodacom sees 40% data traffic growth with surge in demand, IOL, 17 April 2020.

[35] Regulation 6, ICT Regulations.

[36] ICASA, Temporary radio frequency spectrum issued to qualifying applicants in an effort to deal with covid-19 communication challenges, 17 April 2020.

37 Regulations 6(6), 6(7), and (10), ICT Regulations.

38 McLeod D., ICASA to open wide tracts of spectrum to kick-start economy, TechCentral, 06 April 2020.

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41 Competition Commission of South Africa, Data Services Market Inquiry: Final Report (2019).

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43 Annex A, ICT Regulations.

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45 Competition Commission, *supra* note 41. Incidentally, the Competition Commission subsequently entered into a settlement with Vodacom in March, where Vodacom agreed, with effect from 01.04.2020, to reduce the price of data bundles by over 30% across all channels and provide "pro-poor personalised discounting." The Commission reached a similar agreement with MTN as well, with MTN undertaking to reduce data prices. See Bonakele T., Announcement of the CCSA-Vodacom Agreement, 10 March 2020; South Africa: MTN welcomes Competition Tribunal's approval, IT Web, 29 June 2020.

46 S. Africa's mobile operators granted emergency lockdown spectrum to meet data, Reuters, 17 April 2020; Vodacom switches on Africa's first 5G live services, Capacity Media, 06 May 2020.

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50 Hadzic S., A global south perspective on alternative spectrum policy, Research ICT Africa Policy Brief 1: December 2019; Research ICT Africa, Temporary COVID-19 spectrum – a missed opportunity for some regulatory innovation?, Policy Brief 1: April 2020. See also Song *et al., supra* note 40.

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52 Labuschagne H., Rollouts delayed – How South Africa's fibre networks are impacted by the lockdown, My Broadband, 23 April 2020.

53 Regulation 6(15) ICT Regulations and Paragraphs 9.1 and 10.2, ECPB Directions.

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56 Zenzeleni, Community noticeboard, 2020.

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62 Paragraph 9.3, ECPB Directions.

63 Department of Communications and Postal Technologies, Amendment of the ECPB Directions dated 08 May 2020 deleting Paragraph 12 of the ECPB Directions. See also de Wet P., The ban on mobile number porting has just been dropped, so you can change networks again, Business Insider, 08 May 2020.

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65 Press release: Emergency measures to facilitate mobile money transactions, Central Bank of Kenya, 16 March 2020; Waweru D., M-PESA transactions to be free following coronavirus outbreak, Gadgets Africa, 16 March 2020.

66 Waweru D., CBK extends free transactions on M-pesa and Airtel Money for 6 months, Gadgets Africa, 24 June 2020.

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70 Westgarth A., Loon is live in Kenya, Medium, 07 July 2020. During its pre-launch testing phase, it connected 35,000 users to the internet using the Loon balloon, although according to its CEO, "most didn't realize it." Thus, it seems that these 35,000 users were pre-existing Telkom Kenya users. During testing, they also saw an uplink speed of 4.74 Mbps, a downlink speed of 18.9 Mbps, and latency of 19 milliseconds. See also Dahir A.L., A bird? A plane? No, it's a Google balloon beaming the internet, New York Times, 07 July 2020.

71 Telkom and Loon announce progressive deployment of Loon technology to customers from July, Telkom Kenya 07 July 2020.

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83 In September 2019, where Airtel Kenya and Telkom Kenya were in talks of a proposed merger, Safaricom issued a statement objecting to the consequent "disproportionate imbalance in the spectrum allocation" since post-merger, Airtel-Telcom would jointly hold 77.5Mhz spectrum (against a customer base of 17.3 million), compared to Safaricom's 57.5Mhz (against a customer base of 31.8 million). See Airtel-Telkom merger, Safaricom, 04 September 2019.

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85 On March 17, Safaricom announced that it would double the internet speeds for users of its home fibre packages for free for 90 days so as to ease remote working and e-learning. Safaricom also partnered with Google to offer cheap data packages and YouTube data bundles between May and August 2020. For KES10 (US$0.09) and KES 20 (US$0.19) a day, users can access 80MB and 200 of data for use on YouTube. Safaricom also has data plans, capped at 250MB per day, for free access to zero-rated educational content (on Shupavu Web, Viusasa E-learning and the Longhorn) for primary and secondary school students for 60 days. Finally, Safaricom allowed its customers to upgrade their 2G phones to 4G-enabled smartphones by purchasing a KES 20 a day package for around 200 or 300 days, based on the smartphone model being purchased. See Double home fibre speeds for current Safaricom subscribers, Tribus Technologies, 18 March 2020; Safaricom, education content providers partner to enable free access to digital learning, Safaricom, 02 April 2020; Onaleye T., Safaricom partners Google to Provide 4G Smartphones at N74 Per Day for Low-income Earners in Kenya, TechNext, 13 May 2020; Safaricom to offer affordable YouTube data bundle as consumption of digital content grows, Safaricom, 10 June 2020.

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93 Adjusting mobile tax policy in light of COVID-19: How fiscal policy can keep us connected, GSMA, 05 May 2020.

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