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**GSR discussion paper**

**M-services and applications: Perspectives  
on regulatory measures to foster  
diffusion and access**

Work in progress, for discussion purposes

Comments are welcome!

Please send your comments on this paper at: [gsr@itu.int](mailto:gsr@itu.int) by 25 June 2015.

The views expressed in this paper are those of the authors and do not necessarily reflect the opinions of ITU or its Membership.



*“The world was so recent that many things lacked names, and in order to indicate them it was necessary to point.”*

Gabriel Garcia Marquez<sup>1</sup>  
One Hundred Years of Solitude

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<sup>1</sup> Colombian novelist, short-story writer, screenwriter and journalist (March 1927 – 17 April 2014)

## **M-services and applications: Perspectives on regulatory measures to foster diffusion and access**

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### **1. Executive summary**

Mobile services and applications are playing a prominent role within the broader digital ecosystem to unlock economic opportunities and avail critical services to citizens. As consumer demands are placed on it, disruptive technologies and innovation are enabling it to continue bringing about new possibilities in the future. Governments, Regulators—consumers and indeed the world – are only beginning to understand the true development potential of mobile services and applications. Despite this, a few elements are emerging:

One, the old telecom rules of engagement may not stand the test of time and some aspects may need to be re-written to address the changing environment. More so, there is a need to depart from rigid rules to a light touch approach for the regulatory framework to be more responsive to the innovative ecosystem of m-services and apps. The regulatory scope of principles of competition, universal service, resource allocation, interoperability and standards among others need to be reviewed.

Two, sector regulators have been thrust into a multi- sectoral space due to the cross cutting nature of disruptive innovation. This has broadened their domain and capacity to influence across sectors – but to do so, they must reach out and collaborate proactively more than reactively going forward. In addition, the multi-sectoral entry has brought in new stakeholders which the sector regulator needs to identify and engage in order to leverage for mutual benefit.

Three, a flexible, transparent approach that promotes competition will allow innovation to thrive, provide incentive for investment and ultimately consumer benefit. Greater consideration is therefore required in the development of regulatory frameworks that will govern the growth of the digital ecosystem in order to ensure that it continues to surprise the world and stretch the imagination with new ideas and innovations.

For this to happen, the regulator needs to adopt a delicate balance as it has long been recognized that regulation can have an impact on innovation, both positively and negatively. The awareness to foster the inter-dependencies necessary to enable the digital ecosystem to evolve into a healthy environment that creates economic value and adds well being to society on one hand and to deter and punish discordant players on the other will require a resolute approach and stakeholder support. Otherwise, innovation can tend to take a backseat when straddled by complex issues and uncertain rules.

This paper seeks to explore regulatory perspectives that can be considered in facilitating use and access and in so doing, re-viewing regulatory constructs that have become barriers over

time. It proposes that efforts must be made to place the consumer at the center of the digital ecosystem by installing consumer safeguards. The paper encourages regulatory approaches that will ensure there is a balanced, proportionate and robust mechanism for players in the digital economy to flourish so that development goals can be realized. In this way, m-services and apps will leverage on the phenomenal growth of mobile and the fact that this powerful technology is available in most rural and remote areas, empowering development in areas such as healthcare, education, agriculture, commerce, banking and so on.

The purpose of this paper is to make a contribution to the efforts and discussions that continue to guide and shape the continued re-definition of regulatory architecture towards the establishment of an empowering digital future.

## **2. Introduction**

We are living in the midst of a social, economic, and technological revolution. How we communicate, learn, socialize and conduct business has moved beyond the narrow confines of language and geographical proximity and onto the Internet. The Internet has in turn moved into our phones, device, homes and cities, and it continues to wield profound influence on civic, commercial and social engagements in society.

One of the outcomes is an explosion of data that is bringing about numerous insights that are changing our world<sup>2</sup>. A study conducted in 2013 found that the impact of the mobile sector on other industries such as energy, health and financial was so profound to the extent that it could fundamentally change how those vertical segment operate<sup>3</sup>. These top three categories have encountered the most disruption – questioning the efficacy of conventional models of doing business.

## **3. Welcome to the digital ecosystem**

### **3.1 What are m-services and applications?**

The mobile platform is a fundamental part of the digital ecosystem. In the last two decades or so, it has played into the heart of the digital ecosystem with offerings on voice, data and increasing speeds of broadband. This mobile platform has been of great impact by bridging access gaps and progressively being used to deliver services to businesses and citizens alike. While there are several other players within the digital ecosystem, the objective of this

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<sup>2</sup> If you think that you are suffering from information overload then you may be right – a new study by the University of Southern California shows that everyone is bombarded by the equivalent of 174 newspapers of data a day. Further, that every day the average person produces six newspapers worth of information compared with just two and a half pages 24 years ago – nearly a 200-fold increase. <http://www.telegraph.co.uk/news/science/science-news/8316534/Welcome-to-the-information-age-174-newspapers-a-day.html> (accessed on Feb.23, 2015).

<sup>3</sup> Chetan Sharma, Mobile 4<sup>th</sup> Wave: Evolution of the next trillion dollars, Mobile Future Forward, September 10, 2013, Seattle at page 7

paper is to discuss perspectives on regulatory strategies that can be adopted in facilitating diffusion and access of m-services and applications.

In building up this discussion, it is important to mention that m-services and apps are different with the latter riding on networks of the former. Indeed both can thrive on similar regulatory approaches to some extent. However, at some point each of these could call for differentiated regulatory intervention in order to establish an enabling environment. Given this context, this paper will approach the perspectives under discussion under the broad ambit of the digital ecosystem, and draw out distinctions, as necessary to illustrate regulatory strategies for fostering diffusion and access with reference to m-services and applications. Particular referencing will be made to m-payments and m-health to highlight specific issues.

The portability of mobile has promoted ease of access to the Internet and has made available conventional services such as banking, access to government services and education in regions where these services were either unavailable or inadequate. Governments are looking to this platform for innovative ways to improve the delivery of public services and to foster participation in public policy making throughout the world and particularly within the developing country context<sup>4</sup>. The unique characteristics heralded by the Golden age of Mobile enable efficiencies that continue to hold much promise and tremendous benefits for citizens, businesses and governments alike.

The interface between the Internet and devices, particularly portable ones, offers an attractive distribution platform on which multiple applications (more popularly referred to as apps) and services are offered to consumers. Initially, mobile apps were originally offered to enable general productivity and information retrieval, including email, calendar, contacts, stock market and weather information. However, public demand and the availability of developer tools drove rapid expansion into other categories, such as word processing, social media, picture sharing, mobile games, factory automation, GPS mapping and location-based services, banking, networking and file transfer, education, video streaming, order tracking, ticket purchases and more recently mobile medical apps and more. The popularity of mobile apps has continued to rise, as their usage has become increasingly prevalent across mobile phone users.

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<sup>4</sup> See results of the United Nations Public Service Awards Winners 2014 available at : <http://workspace.unpan.org/sites/Internet/Documents/2014%20UNPSA%20List%20of%20Winners.doc.pdf> (Accessed on March 3, 2015).

Digital India is an initiative of [Government of India](#) to integrate the government departments and the people of [India](#). It aims at ensuring the government services are made available to citizens electronically by reducing paperwork. The initiative also includes plan to connect [rural](#) areas with [high-speed internet](#) networks.

**Box 1: A Mobile app**

**What is a mobile app?**

A mobile app is a software program you can download and access directly using your phone or another mobile device, like a tablet or music player.

**What do I need to download and use an app?**

You need a smart phone or another mobile device with Internet access. Not all apps work on all mobile devices. Once you buy a device, you're committed to using the operating system and the type of apps that go with it. The Android, Apple, Microsoft and BlackBerry mobile operating systems have app stores online where you can look for, download, and install apps. Some online retailers also offer app stores. You'll have to use an app store that works with your device's operating system. To set up an account, you may have to provide a credit card number, especially if you're going to download an app that isn't free<sup>5</sup>.

**What is mobile for development?**

Mobile for development is a broad term that captures initiatives that brings together mobile network operators (MNOs) and the development community to drive commercial mobile services for the benefit of underserved people in emerging markets. These initiatives are driven by the premise that mobile is the predominant infrastructure in emerging markets and seeks to identify opportunities for social, economic and environmental impact<sup>6</sup>.

Apps are usually available through application distribution platforms typically operated by the owner of the mobile operating system. Usually, they are downloaded from the platform to a target device, such as an iPhone, BlackBerry, Android phone or Windows Phone, but sometimes they can be downloaded to laptops or desktop computers. Mobile applications usually help users by connecting them to Internet services more commonly accessed on tablets, smartphones or notebook computers, or help them by making it easier to use the Internet on their portable devices. But for these apps and services to be available, access to an ICT network is required.

**3.2 Sector Growth**

According to ITU statistics, the number of mobile-cellular subscriptions worldwide is approaching the number of people on earth – estimated at approximately 7 billion corresponding to a penetration rate of 97%, up from 738 million in 2000. Globally, it is estimated that 3.2 billion people are using the Internet of which 2 billion are from developing countries.

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<sup>5</sup> <https://www.consumer.ftc.gov/articles/0018-understanding-mobile-apps> (Accessed on May 18, 2015)

<sup>6</sup> <http://www.gsma.com/mobilefordevelopment/overview> (Accessed on May 18, 2015)

The statistics also indicated that mobile broadband is the most dynamic market segment with a penetration reach of 47% in 2015- a value that has increased 12 times since 2007. The fixed-broadband uptake was found to have grown at a slower pace, with a 7% annual increase over the past three years and was expected to reach an 11% penetration by the end of 2015. The proportion of the population covered by a 2G mobile-cellular network grew from 58% in 2001 to 95% in 2015. During the same period, 3G mobile-broadband coverage was extending rapidly and into the rural areas<sup>7</sup>.

Looking towards the future, the mobile networks will play an even more significant role in the post 2015 development agenda. This opportunity will arise through use of the networks as leverage for the diffusion of m-services and applications. As countries continue to make positive interventions such as upgrading of mobile networks, deployment of 3G+ technologies and adoption of more enabling regulatory policies and practices, it is expected that broadband and mobile devices will become more affordable and thereby stimulate the development of the digital ecosystem.

The use of modern information and communications technology continues to grow— with slightly over three billion people online and seven billion mobile-cellular subscriptions

### **3.3 Drivers for diffusion and access of m-services and apps**

#### *Commitment to digital inclusion*

The entry of ICTs to enable the achievement of development goals has introduced a new matrix and strengthened the case for the “social inclusion” objective to include broadband connectivity, telephony service coverage, and Internet access, aimed at small and medium-sized rural communities and the urban poor. The increasing use of applications to deliver civic services, health, education and drive businesses and commerce means that there is need for commitment to digital inclusion. This will drive the articulation of coherent and comprehensive national broadband plans in order to achieve the intended benefits<sup>8</sup>. There is

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<sup>7</sup> ITU ICT Facts & Figures 2015. Available at: <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf> (Accessed on June 2, 2015)

<sup>8</sup> Robert Frieden, “Lessons from Broadband Deployment in Canada, Japan, Korea and the United States” Telecommunications Policy 2005 at Page 9.

no one size fits all<sup>9</sup>. According to the OECD, as broadband technology continues to improve and bandwidth increases, the capacity for broadband to act as an enabler of structural change in the economy will expand due to its impact on an increasing number of sectors and activities<sup>10</sup>.

**Box 2: Karnataka app M-One**



**What You Can Do with M-One**

- **Applications** for DL, PAN, passport and other government services
- **Pay property** tax, income tax and other taxes, traffic fines and other penalties
- **Pay utility** and mobile bills, other government and private payments
- **All banking** services such as ordering a cheque book or a DD
- **Book gas** cylinders
- **Buy movie** tickets, bus, rail & air tickets
- **Book cab** and auto services
- **Application status** for passport, income tax refund and other such services
- **Book government** guesthouses & private hotels

Karnataka state in India launched its ambitious mobile governance project on December 10, 2014. It is the first of its kind in the country that allows. M-One, which will act as a single window to 637 services offered by the government, both central and state, but more importantly, link the consumer to 3,644 private services at one touch.<sup>11</sup> The platform has a voice portal that can be accessed through any phone - landline or mobile - and also via computers, laptops, tablets.

The mobile app allows citizens to pay utility bills for electricity, pay property tax, apply for a host of services like driving license, passport or PAN, pay up for traffic challans, book tickets on rail and road transport, among others. People can even lodge complaints with civic authorities about garbage strewn around, and a women's safety app is something the government is taking pride to give to women citizens. The app has features that allow citizens to access many of these services even without a smart phone. Over 3500 services related to healthcare, transport are also available on the same platform.

The platform has a voice portal that can be accessed through any phone - landline or mobile - and also via computers, laptops, tablets. Consumers can call in and work through the interactive voice response system, send SMS, or use the services via the smartphone app for Android or Apple devices. All local languages and English will work. The project was devised by Karnataka's e-governance department in January 2013 under

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<sup>9</sup> Some countries choose to have one policy for universal service and re-define universal standards to include broadband. Others have a policy for universal access and another for broadband deployment. Still others subscribe a general target for access nationally while others differentiate from region to region. In Malaysia, for example, broadband and universal service policies are separate, and levels of access are terraced by region.

<sup>10</sup> <http://broadbandtoolkit.org/4.2>

<sup>11</sup> <http://ibnlive.in.com/news/karnataka-launches-m-one-app-citizens-can-access-637-government-services/517116-62-129.html> (Accessed on May 4, 2015)



the BJP government. The platform seeks to ensure that "Whatever is accessible on the computer to the urbanite will now be available to everyone, including those in remote areas and those who are travelling, at their fingertips."

Mobile phone penetration in India, according to a June survey by TRAI<sup>12</sup>, the telecom regulator, is 942.9 million. In Karnataka, 55 million of its 64 million population own mobile phones. This is way more than the personal computer penetration, which is an estimated 10% of India's 1.25 billion population. Karnataka is working on integrating a pre-paid mobile wallet with the app, which will allow citizens to pay for any services - including payment of utility bills, taxes - with one touch.

### *Competition*

The progressive reliance on competition as the primary driver of consumer benefits has spurred significant economic growth in many countries. For example, in 2014, mobile services added 3.2% (\$548 billion) to the United States GDP, exceeding the contributions to GDP of a number of other industries including entertainment, transportation, automobile, hospitality and agriculture<sup>13</sup>. Adopting strategies for robust competition has brought about lower prices, improved quality, greater innovation and diversity in consumer choice.

The rapid expansion of fixed and mobile broadband services and the drop in broadband prices have been major drivers of the information society. The biggest drop has occurred in developing countries – thereby widening possibility for affordability and access to m-services and apps<sup>14</sup>. High-speed Internet access usage has continued to increase as broadband prices fall and mobile broadband networks expand rapidly. Almost all countries in the world have launched at least third generation (3G) mobile-broadband services, and the number of subscriptions has been growing rapidly. It is anticipated that by the end of 2014, there will be 32 mobile-broadband subscriptions per 100 inhabitants globally, almost double the penetration rate in 2011<sup>15</sup>.

### *Access to big data*

Today, data is more deeply woven into the fabric of our lives than ever before. The data can be used to anticipate and solve problems, improve well-being, and generate economic prosperity. The collection, storage, and analysis of data is on an upward and seemingly unbounded trajectory, fueled by increases in processing power, the cratering costs of computation and storage, and the growing number of sensor technologies embedded in devices of all kinds<sup>16</sup>. Data collection and handling - data aggregation and analysis bring out new insights that are informing monetization opportunities in the mobile ecosystem.

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<sup>12</sup> <http://www.trai.gov.in>

<sup>13</sup> United States Federal Communications Commission contribution to the 2015 Global Symposium for Regulators Consultation.

<sup>14</sup> Measuring the Information Society Report, 2014

<sup>15</sup> Ibid.

<sup>16</sup> Big data: Seizing opportunities, preserving values, Executive Office of the President, May 2014

[https://www.whitehouse.gov/sites/default/files/docs/big\\_data\\_privacy\\_report\\_may\\_1\\_2014.pdf](https://www.whitehouse.gov/sites/default/files/docs/big_data_privacy_report_may_1_2014.pdf) ( Accessed on May 13, 2015)

### **3.4 Emerging concerns**

The growing diffusion of mobile services and applications within the broader framework of the digital ecosystem also raises concerns that need to be addressed in order for the digital ecosystem to sustain. To start with, increased adoption of the digital inclusion agenda will mean isolation of populations that have no access to m-services and apps. How is a regulator to respond and ensure that the benefits of social inclusion are enjoyed by its citizens?

While competition has spurred consumer choice and enhanced their benefits, the regulatory concern remains: Is competition being encouraged adequately? Are there any competition concerns? Where meaningful competition lacks, are there timely interventions being put in place to support universal service? Are regulatory principles in place to encourage and incentivize investment and innovation into the digital ecosystem?

Undeniably, the markets continue to become more complex. Mobile network operators (MNOs) have become the custodians of sensitive data within the digital ecosystem and this has brought about privacy concerns related to consumers' use of mobile technology<sup>17</sup>. Are consumers able to make informed decisions about their information and privacy and to ensure that user privacy is respected and protected by those designing and building mobile applications? The concern as to whether consumers are well supported to make informed choices in an increasingly complex market place becomes valid.

There are broader concerns as m-services and apps are increasingly vulnerable to security concerns with networks worldwide falling victim to hacking by cyber criminals. Cases of fraud, misuse of data and use of mobile phones as an accessory in the commission of crimes are on the increase. The impact of this can lower trust and confidence in the digital ecosystem.

These concerns raise weighty issues and call for a thoughtful consideration of policy and regulatory action going forward. While there is a need to protect personal freedoms, it is important to do so in a manner that does not hamper the ability to innovate around an opportunity. It is important to uphold trust and confidence in the digital ecosystem and take active steps to mitigate the emerging concerns, if the gains are to be made. Regulators therefore need to consider whether the policy and regulatory framework is fit for purpose – to ensure the achievement of a delicate balance for m-services and apps to thrive within the digital economy.

## **4. Policy and Regulatory Perspectives**

This part of the paper seeks to highlight policy and regulatory perspectives that can be considered in promoting growth of m-services and apps while at the same time ensuring that innovation is not stifled and that consumer benefits are maximized. In doing so, this section will identify critical regulatory principles that should be addressed and offer

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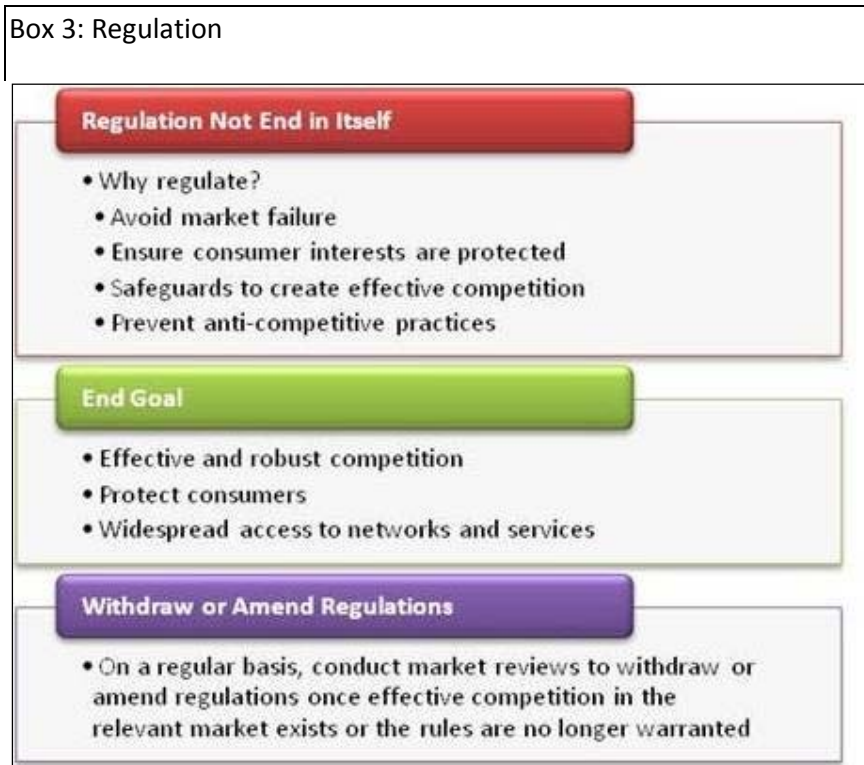
<sup>17</sup> Big data: Opportunity or threat? B Andrew Haire & others, GSR 2014 Discussion Paper. Available at: [http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2014/Discussion%20papers%20and%20presentations%20-%20GSR14/Session3\\_GSR14-DiscussionPaper-BigData.pdf](http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2014/Discussion%20papers%20and%20presentations%20-%20GSR14/Session3_GSR14-DiscussionPaper-BigData.pdf) (Accessed on March 27, 2015)

perspectives for leveraging the anticipated benefits against the risks. The perspectives shared in this part will contribute to a series of critical questions that policy makers and regulators can use as a guide in making considerations on proposals seeking to foster m-services and apps.

### 4.1 Goals of Regulation

The ICT regulatory framework was conceptualized to guide structural changes as the sector transitioned from monopoly to competition and thereafter to promote effective competition and foster the long-term development of the ICT market<sup>18</sup>. The sector has undergone structural changes pushed by convergence and innovation and needs to be flexible to accommodate any reviews as necessary. The regulator will need to ask some critical questions to enable identify an ideal option for regulating.

Regulation is not intended to serve as an end in itself as illustrated below.



Source: Telecommunications Management Group, Inc.

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<sup>18</sup> [www.ictregulationtoolkit.org](http://www.ictregulationtoolkit.org) /6.2

*Are there limitations in the current regulatory regime?*

While the conventional regulatory framework is necessary to resolve disputes, address competition concerns, protect consumers, and attain national goals such as universal access and economic development, it can also become a bottleneck to innovation and investment if it fails to respond to the issues of the day. The apparent need to adopt regulatory mechanisms within a cross-sectoral framework is a critical interdependency for m-services and applications to thrive within the digital ecosystem. However, this was not anticipated within the conventional 'silo' sector regulatory arrangements. It therefore calls for a paradigm shift to permit a new way of doing things.

It is a daunting task for regulators to identify the right regulatory approach within a fast changing environment where services and applications evolve faster than the regulations that underpin them<sup>19</sup>. However, it would be advisable to identify the objective of regulation before articulating a framework to avoid unnecessary regulation. Innovation cannot thrive within a formal confinement of rules.

The regulatory approach to be used is equally important once the object of regulation has been identified. In the early stages, formal heavy prescription was adopted as new rules, rights and obligations were being imposed. However, the general evolution has tended towards a light touch approach to encourage and foster m-services and applications by giving room to embrace ideas that were not anticipated earlier.

It calls for a delicate balancing act.

The evolution of the M-Pesa mobile money transfer service is a classic case in illustrating how a paradigm shift was employed to overcome traditional regulatory arrangements in order to enable the entry of an innovative m-service. Cross-sectoral regulatory forbearance was applied to deal with an innovation that was not anticipated and hence not accommodated by both the telecom and the financial sectors that it straddled. It brought forth a light touch regulatory approach at the launch of the transfer service - gradual introduction of payment systems regulation for better financial oversight on one hand and the requirement for interoperability between the Safaricom network with the other networks to foster competition.

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<sup>19</sup> Ibid. See Creating the "right" enabling environment for ICT (Guermazi & Satola)

**Box 4: M-Pesa**



M-Pesa, used in Kenya is one of the world's most successful mobile money transfer service. It was launched in 2007 by Safaricom, Kenya's largest MNO. Through it, millions of people who have access to a mobile phone, but do not have or have only limited access to a bank account, to send and receive money, top-up airtime and make bill payments.

Customers register for the service at an authorized agent, often this is a small mobile phone store or retailer, and then deposit cash in exchange for electronic money which they can send to their family or friends. Once they have registered, all transactions are completed securely by entering a PIN number and both parties receive an SMS confirming the amount that has been transferred. The recipient, who does not have to use the same network, receives the electronic money in real-time and then redeems it for cash by visiting another agent.

There are several mobile money schemes established world-wide. Why has m-pesa been the most successful?

Some of the concerns worth noting in the consideration of this unprecedented proposal were:

- The unique model was being led by non-banking entities that were regulated under a different regime.
- Due to the cross cutting nature of this model, which institution was best placed to regulate? Was this a platform to collaborate?
- The novelty of the proposition meant that there was no precedent to draw from.
- Despite the promise to meet a great need, it was imperative to put in place consumer protection mechanisms in order to inspire confidence.
- Any guidelines to be developed needed to be flexible in order to accommodate new changes and not confine the development of new services.
- There was need to ensure that a level playing field was maintained in the telecommunication industry and be sensitive to any competition concerns.

The financial sector regulator, Central Bank of Kenya (CBK), the telecom Regulator (then CCK now the Communications Authority) and the Ministry of Finance conducted a due diligence to assess associated risks before commissioning the project. CBK put in place minimum KYC standards to promote trust and confidence in the payment system hence promoting consumer welfare. It also gave a special license to Safaricom that contained less stringent conditions as compared to licenses given to banks and other financial institutions. The regulators' initial decision to allow the

scheme to proceed on an experimental basis without a formalized regulatory framework was the root of this success.

The exercise of regulatory forbearance allowed innovation to thrive without being 'boxed in' by conventional practices. Having established a base of initial users, M-pesa enjoyed the network effects of being hosted by the largest MNO. The more people signed up for it, the more it made sense for others to do so.

While regulatory forbearance was exercised in the inception stages in order to encourage innovation and uptake, a measure of formal prescription has been adopted over time to provide for formal oversight over payment systems and prescribe anti-money laundering measures. The National Payment Systems Regulations became law in August, 2014.

The M-pesa agency system initially operated within the Safaricom network only and is now interoperable with other networks. The accommodation for interoperability came in the wake of a petition by Airtel to the CAK to compel Safaricom to open up its M-pesa agency network.

M-pesa has made a contribution to financial inclusion in Kenya and enjoys the patronage of over 20 million subscribers currently.

Source: Author.

### *To license or to exempt?*

The regulatory goals being pursued have a direct bearing on the licensing approach that is adopted. Previously, the construct adopted rigid service and technology specific licenses that were often installed as an administrative catchment for revenue. Regulators are encouraged to adopt more flexible licensing regimes in order to accommodate technological and market changes. The convergence achieved within the digital ecosystem has eroded aspects of the traditional licensing regimes hence the need to move from technology and service specific licenses and yield to a unified authorization regime, or simple notifications in order to promote the ease of doing business<sup>20</sup>. In so doing, the license or notification is retained to achieve regulatory accountability without being a barrier to new innovations.

Maintaining the traditional licensing regime would mean that not only would an MNO obtain a license to operate mobile services, they would also have to obtain a value added services license for each and every m-service and app operating on its network. Having to obtain licenses from healthcare, education, financial, agriculture regulators etc. would not only be a highly cumbersome, it would severely restrict the diffusion of m-services and apps. Regulators therefore need to regularly review their licensing practices and approaches with a view to identifying and removing potential barriers.

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<sup>20</sup> <http://www.ictregulationtoolkit.org/3.8.1.2> Licensing for Converged and Next Generation Networks

#### 4.1.1 Competition for consumer benefit

New technical capabilities made possible by IP-based broadband networks have given rise to new entrants competing in traditional markets with new business models and completely different cost structures than traditional providers. New technologies and upgraded networks have also enabled the introduction of a wide variety of new services and applications. What are the impacts of these changes on the competitive environment?

The emerging scenario introduces regulatory complexity and the need to address several principles that are critical in promotion of competition<sup>21</sup>.

These questions are particularly valid in a market with dominant operators due to their ability to skew the markets and abuse their dominant positions to the detriment of their competitors and customer base. As mobile markets continue to become more competitive the regulator should be alert for the many ways in which dominant operators can engage in anticompetitive behavior (*e.g.*, predatory pricing, cross-subsidization, price discrimination, discriminatory provisioning of network facilities, overpricing of essential facilities and other network elements and services provided to competitors, unfair trade practices, tie-in sales, and anticompetitive bundling).

One of the more likely outcomes is that an m-service or app that rides on a large network will ultimately be a beneficiary of the network effects, much to the discomfort of other operators in the same market. This happened in Kenya when Airtel money which operates the second biggest mobile money platform in Kenya petitioned the Competition Authority of Kenya (CAK) to investigate Safaricom for alleged abuse of its position as the market leader in M-commerce in Kenya<sup>22</sup>.

Airtel Kenya had claimed that Safaricom's charges to its customers when sending money to Airtel Money accounts was double the amount of that required for Safaricom-to-Safaricom transactions. Airtel Kenya also wanted Safaricom to allow M-pesa agents to deal with other agents like Yu money, Airtel money and Mobikash<sup>23</sup>. In a demonstration of regulation in a multi-sectoral space and regulatory forbearance, the CAK deferred the issue to the Central Bank of Kenya (CBK) and the Communications Authority of Kenya (CA).

In July 2014, the CA ordered Safaricom to allow its mobile money agents to also operate other platforms. The CA further recommended that the CBK handle the petition on M-pesa tariffs as

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<sup>21</sup> GSR Discussion Paper (2014): Why competition matters and how to foster it in a dynamic ICT sector. Hernandez et al. Available at: <http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2014/Discussion%20papers%20and%20presentations%20-%20GSR14/Session%202%20GSR14%20-%20Discussion%20paper%20-%20Competition.pdf> (Accessed on May 20, 2015)

<sup>22</sup> Safaricom ordered to open M-Pesa platform. Available at: <http://www.kbc.co.ke/safaricom-ordered-to-open-m-pesa-platform/> (Accessed on June 1, 2015)

<sup>23</sup> Ibid.

these were charges for financial services<sup>24</sup>. The M-pesa agency system initially operated within the Safaricom network only and is now interoperable with other networks.

The scenario just described raises several perspectives on issues to consider when regulating to foster diffusion of m-services and apps. It indicates that assessment of competition concerns in the digital economy requires an 'in-depth' investigation to evaluate the 'pain point' being raised. It is clear that a restrictive arrangement does arise when an m-service is locked to an MNO or an app to an operating system and this has the potential to raise competition concerns. The 'lock-in' effect has spurred discussions for platform agnosticism and the creation of an open mobile app. This was provoked by considerations for free sharing to the mass market of content thought to be critical in achievement of development goals, such as m-Learning content, as well as dissemination of commercial resources in order to achieve development goals<sup>25</sup>.

- Some of the perspectives can be clarified through asking questions such as these:
- Are the regulatory arrangements for infrastructure sharing adequate to achieve goals for national access?
- Are the exclusive arrangements governing m-services and apps riding on MNOs and operating systems raising competition concerns?
- What is the impact of these exclusive arrangements on pricing? Are the tariffs fair and non-discriminative?

Have all relevant stakeholders in this issue been identified and consulted widely for input?

Answers to these questions will guide on appropriate regulatory interventions to take in order not to entrench anticompetitive features unwittingly. They will guide on considerations to be made when setting parameters for pricing as the cost of sending a text message or purchasing an app will ultimately determine the affordability and access to the m-service or app. As such regulators must ensure that the interconnection framework is clearly defined and that interconnection charges between networks are based on objective, economically sound, and solidly substantiated costs.

It is also apparent that in aiming for a robust competitive environment, the telecom construct for competition regulation may be inadequate to handle the brief. It is therefore incumbent upon regulators to put in place appropriate safeguards and interventions to leverage opportunities in the digital ecosystem. Introduction of number portability, interoperability and sharing of infrastructure are other mechanisms that could also be considered. These safeguards will be discussed further on in this paper.

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<sup>24</sup> Ibid.

<sup>25</sup> M-Powering Development Initiative Report 2015 at page 14. Available at: [http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative\\_Report2015.pdf](http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative_Report2015.pdf) (Accessed on May 28, 2015)



#### **4.1.2 Stimulating demand – Universal access**

The network reach and smartness of infrastructure to support access to m- services and apps remains on the regulator’s radar now more than ever before. The urgency to bridge gaps compels new ideas and creativity in order to identify optimal strategies for achievement of universal service.

Traditionally, efforts to address access gaps were directed to deployment and improvement of telecommunications infrastructure access networks only. Today, it calls for a more integrated multi-sectoral approach. It is about expanding the network to include broadband services, but within a broader outlook to stimulate the development of content that is relevant in context and language and in this way foster the development of m-services and apps<sup>26</sup>.

This would also mean that national broadband plans can no longer be perceived as deliverables within the sector only. The roll out of mobile networks and broadband enablement would need to be construed in a holistic manner, beyond the ICT sector horizon in order to enable other actors to leverage on the broadband network and make a significant contribution in the march towards universality<sup>27</sup>. This would avoid vertical ‘silo’ interventions and enable identification of where m-services and apps can ‘plug-in’ in an integrated and interoperable manner with already existing systems and solutions.

This broad approach would provide financing mechanisms to accommodate local content development, application development, incubation, scaling and monetization as well as provision of support in development of mechanisms to protect content to allow for exploitation for commercial gain. It would also prompt a radical re-thinking around the nature of universal service obligations imposed on service providers<sup>28</sup>.

The Broadband Commission has set ambitious goals to make broadband policies universal in order to drive prices down and make it affordable<sup>29</sup>. Drawing from international commitments such as this prompts urgency for regulators to articulate an integrated national approach. There is no one size fits all solution. Each country must quantify the unique hurdles to be overcome, the resources and investment required, and it must develop a comprehensive plan at the national level in relation to the size of the gaps to be bridged.

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<sup>26</sup> M-Powering Development Initiative Report 2015 at page xi. Available at: [http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative\\_Report2015.pdf](http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative_Report2015.pdf) (Accessed on May 28, 2015)

<sup>27</sup> See example of The National Broadband Strategy for Kenya. Available at: <http://ca.go.ke/images/downloads/PUBLICATIONS/NATIONAL%20BROADBAND%20STRATEGY/National%20Broadband%20Strategy.pdf> (Accessed on May 18, 2015)

<sup>28</sup> This framework should not be limited to the creation of a Universal Service Fund and should be open to other mechanisms such as internal cross-subsidies, public-private partnerships (PPPs), pay or play mechanisms, General Government Budget Contributions/Grants, Interconnection Surcharges a Municipal network alternatives and other funding approaches.

<sup>29</sup> [http://www.broadbandcommission.org/Documents/Broadband\\_Targets.pdf](http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf) (Accessed on May 20, 2015)

In the health sector, for example different countries have adopted varied focus points in the development of m-health applications in response to the health needs of their populations. In some cases the m-services and applications are accessed through the Internet while in others, it is through SMS. As such, there are various categories of m-health services and apps ranging from data collection, disease surveillance, treatment adherence reminders, emergency medical response systems, support to health care professionals, rural health workers, supply chain management, health financing, disease prevention and health promotion<sup>30</sup>.

**Box 5: m-Cessation (m-Health for Smoking Cessation)**

The project, launched in Costa Rica in April 2013, aims to prevent smoking-related diseases such as cancer and other lung diseases. Tobacco smoking has been recognized as a big problem in Costa Rica and many health costs are considered preventable by getting people to quit smoking.

The project includes building and maintaining a database of mobile numbers based on a registration process, creating tailor-made short messages and developing two-way communication with smokers. This will entail managing both outgoing and incoming short messages.

A mechanism for feedback and reporting management has been established at the Ministry of Health.

Source: M-Powering Development Initiative

The need to continually review universal access policies and mechanisms is necessary in order to inform the establishment of a universal service framework that will enable governments to achieve their public policy objectives of availability, affordability and accessibility of services in a fast converging sector. Strategies to embed diverse innovative mechanisms such as public private partnerships and multi stakeholder projects in the design of universal access policies will be crucial for them to remain agile and responsive to the ever changing demands<sup>31</sup>.

### 4.1.3 Pressure for resources

#### *Spectrum*

All wireless communications require radio spectrum. New entrants have made their way into the sector by leveraging on capabilities of disruptive technology, new spectrum access methods and new business models<sup>32</sup>. As a result, there is a proliferation of numerous m-services and applications which continue to build up pressure to free up access to more

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<sup>30</sup> M-Powering Development Initiative Report 2015 at page 5. Available at: [http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative\\_Report2015.pdf](http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative_Report2015.pdf) (Accessed on May 28, 2015)

<sup>31</sup> See key elements to consider in development of an effective framework to address universality in GSR 2009 Background Paper, Trends in Universal Access and Service Policies by Sofie Maddens. Available at : <http://www.ictregulationtoolkit.org/en/toolkit/docs/Document/3829> (Accessed on May 20, 2015)

<sup>32</sup> The Aspen Institute, Communications and Society Program, “*Spectrum as a Resource for Enabling Innovation Policy*” Feb, 2013 at viii Foreword

spectrum for broadband wireless network access. Regulators are scrambling to find more spectrum for the wider channels and greater throughput available with advanced wireless technologies such as LTE. Both licensed and unlicensed spectrum are needed to support the digital ecosystem, for connections appropriate to long and short distances, indoor and outdoor scenarios as well as mobile and static situations<sup>33</sup>.

*How is a regulator to respond to this pressure?*

At this point the primary regulatory objectives will be three fold - to ensure availability of adequate spectrum to accommodate the increasing number of apps and m-services being delivered over mobile or WiFi networks, to ensure availability of the resources optimally in order to avoid erecting barriers on pricing or even competition and thirdly, and most importantly, to ensure that the existing spectrum policies can help create an environment that makes it easier for innovators to use spectrum as a resource for new technological goods and services<sup>34</sup>.

*Balancing needs – Incumbent vs New entrant*

Innovators continue to encounter dilemmas presented by legacy systems on the road to innovation. One such dilemma is the legacy method of spectrum allocation that caters for exclusive use and high cost of access. This entry and growth barrier is often seen as a block to innovation by new entrants within a fluid and fast changing environment. Existing players tend not to be interested in disruptive ideas especially if there is a threat to their revenues and profitability. It is therefore incumbent upon the policy makers to adopt transformative approaches to guide future spectrum policy development and encourage incremental innovation<sup>35</sup>. A critical consideration will be to avail a transparent, market-based mechanism for spectrum access and eliminate any service and technology restrictions that may have been imposed within existing spectrum licenses in the past – as these may not be valid within a converged environment and may restrict the emergence innovative ways that the spectrum can be put to use.

In an effort to find solutions to share existing spectrum, it is prudent to consider new approaches to spectrum licensing (or utilization within an exempt framework) that are flexible. As a result, some old certainties and assignment methods that were based on clear lines between licensed and license- exempt frameworks are beginning to blur – with potentially uncertain results.

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<sup>33</sup> GSMA, Mobile Policy Handbook, October 2014 at page 9

<sup>34</sup> Ibid. at v Foreword

<sup>35</sup> See sample proposals from The Aspen Institute, Communications and Society Program, “*Spectrum as a Resource for Enabling Innovation Policy*” Feb, 2013 (Available at: <http://csreports.aspeninstitute.org/documents/Spectrum-Resource-Enabling-Innovation-Policy.pdf>) (Accessed on May 4, 2015)

Perhaps more can be done at a spectrum policy level to provide a wider range of spectrum products<sup>36</sup>. One such idea is to enable a ‘staircase’ access to spectrum which is able to match spectrum access method with needs and funding constraints. This may in turn introduce spectrum access methods that allow low- to no-cost access to spectrum, reduce barriers to entry through entry of more flexible methods of allocating, clearing, using and/or sharing spectrum<sup>37</sup>. Additionally, database and sensing technologies are also driving opportunistic sharing, challenging current licensing conventions<sup>38</sup>.

The momentum around Dynamic Spectrum Access (DSA) technology continues to gather, and in most cases, it is initially targeted at the white spaces in TV spectrum. DSA is an efficient and optimized technique of using under-utilized frequency bands, by improving the way wireless devices access spectrum resources. In TV broadcast channels, for example, under-utilized spectrum resource--known as TV white spaces--can be used to extend bandwidth capacity for wireless devices<sup>39</sup>. Singapore, was one of the very early adopters of DSA technology in its search for more bandwidth to meet the need for more connectivity.

There are several on-going commercial trials and pilots world-wide – in the UK, Philippines, Ghana, Kenya, Botswana, Namibia etc. In Africa, Microsoft has exclusively focused on demonstrating the technical feasibility of using TV white space technology to extend affordable Internet in underserved areas, using solar power in off-grid areas<sup>40</sup>. Perspectives are not fully settled on adoption of new spectrum access methods such as DSA as while they have been deployed commercially in some countries, others have adopted a cautionary approach. Going forward, regulators will engage in a cost benefit analysis between using innovative means for spectrum access to bridge the digital divide and obtain national coverage against the implications of adopting fixed or variable (dynamic) power level approach when it comes to TV White Space regulation.

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<sup>36</sup> Ibid

<sup>37</sup> One such proposal from the United States President’s Council of Advisors on Science and Technology (PCAST)—published in mid-2012— PCAST recommendations was the adjustment of policy initiatives including maintaining the clearance and auctioning approach, to enable a “staircase” access to spectrum. This would allow start-ups with limited resources to initially test their ideas using an experimental license. They can then transition to early commercial service using free unlicensed access, perhaps in TV white space. Next, as business grows, they can move to shared licensed access to federal spectrum for a moderate fee. Finally, as the full potential of the business becomes clear, they can acquire spectrum at auction in a conventional manner.

The range of proposals is available at:

President’s Council of Advisors on Science and Technology, “Realizing the full potential of government-held spectrum to spur economic growth,” July 2012. Available at:

[http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast\\_spectrum\\_report\\_final\\_july\\_20\\_2012.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf). (Accessed on May 16, 2015)

<sup>38</sup> GSR 14 Discussion Paper: New frontiers in spectrum licensing, Alden et al. Available at: [http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2014/Discussion%20papers%20and%20presentations%20-%20GSR14/Session4\\_GSR14-DiscussionPaper-SpectrumLicensing.pdf](http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2014/Discussion%20papers%20and%20presentations%20-%20GSR14/Session4_GSR14-DiscussionPaper-SpectrumLicensing.pdf) ( Accessed on May 29, 2015)

<sup>40</sup> Microsoft Research: Pilots & Demonstrations. Available at: <http://research.microsoft.com/en-us/projects/spectrum/pilots.aspx> (Accessed on June 1, 2015)

### *Numbering and addressing resources*

One of the hallmarks of the digital golden age of mobile is connected living through the use of apps. Every device connected to the Internet requires a unique 'IP address' used to route data packets globally across the net. The current addressing system, called IP version 4 or 'IPv4', was deployed on 1 January 1983 and uses 32 digital bits to represent addresses, generating a theoretical total limit of 4.3 billion addresses. Given the significant growth of connections, numbering ranges will soon be in short supply<sup>41</sup> calling for the transition to IPv6<sup>42</sup>.

There is need for regulators to anticipate the requirement of huge quantities of numbering and addressing resources with the advent of the digital age, and provide the resources in advance.

#### **4.1.4 Protecting the Consumer**

The eruption of mobile services and apps has created tremendous choice for consumers, who can now use services from a variety of providers. These changes have come in the wake of disruption of old regulatory constructs and created a complex landscape for the consumer to manoeuvre through.

It is a primary role for the regulator to create consumer awareness. It is also critical for the regulator to act as a custodian for the consumer and set the scene for compliance with regulatory standards such as quality of service.

##### *Quality of service*

Consumers are also continually seeking enhanced user experiences online. High broadband upload rates facilitate a collaborative online environment by encouraging user contribution, while high download rates enhance the accessibility of content. High bit transfer rates enable interactive functions such as real time feedback and video calling. Some services such as telemedicine and e-learning, require access at up to 100 Mbps, while standard applications such as email and web browsing can function speeds as low as 0.5 Mbps.

Evolving consumer needs demand higher speeds and reliable quality of service in order to ensure the secure transmission of sensitive data, such as for m-banking and m-health services across networks and across borders. The step up of consumer needs is prompting the re-definition of public policy goals for universal service from basic voice to include

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<sup>41</sup> IPv4 and IPv6 Issues, World Telecommunications Policy Forum (May 2013) Available at: <http://www.itu.int/en/wtpf-13/Documents/background-er-wtpf-13-ipv4-ipv6-en.pdf> (Accessed on May 29, 2015)

<sup>42</sup> A detailed discussion on the Need for more IP addresses can be found at: [http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR\\_paper\\_theNeedforMoreIP%20Addresses\\_fin.pdf](http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR_paper_theNeedforMoreIP%20Addresses_fin.pdf)

Internet access<sup>43</sup> or broadband<sup>44,45</sup>. The quality of service on a wireless connection will depend on the use of others on the same access network and the backhaul capacity from the relevant base station to the core network. The need to uphold the quality of service is critical in order to foster diffusion, achieve seamless connectivity and optimal traffic management.

### *Compliance and Enforcement*

The success of regulatory initiatives depends entirely on achievement of compliance thresholds on the various parameters – quality of service, type approval, licensing, network rollout obligations, competition, consumer protection etc. The planning, compliance, monitoring and enforcement functions therefore constitute critical success drivers within the digital ecosystem. These regulatory functions are reliant on periodic returns made by service providers as part of their license conditions.

### *Promoting choice*

The ability of a consumer to be able to choose between one service provider over another for reason of better price, quality, etc. and be able to transition effectively is a hallmark of consumer enablement. Earlier efforts towards consumer protection tended to focus on provision of adequate information on service description, price and complaint mechanisms to the consumer. The digital ecosystem presents new opportunities and alongside them significant threats.

There are concerns on asymmetry of information between those who hold data and those who unintentionally or inadvertently supply it. It is therefore imperative for a consumer to be well aware of the impact of their engagement on the digital terrain to enable them on privacy and data protection concerns arising from the treatment and management of consumer information. Consumers are key stakeholders who are keen on obtaining value, are open to the benefits of innovation and are very useful in upholding performance within the digital ecosystem if they are aware of their rights and obligations as well as those of other pertinent parties.

Regulators have at their disposal certain mechanisms which they can put into place in order to promote consumer choice and competition. Implementation would in some cases involve re-examination of arrangements that had existed with the knowledge of the regulator previously but are found to be no longer tenable and others would involve adoption of new mechanisms to foster m-services and apps. This section discusses some of these mechanisms.

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<sup>43</sup> Kenya: The Kenya information and Communications (Universal Access and Service) Regulations, 2010. Accessed at: [http://www.ca.go.ke/images/downloads/sector\\_regulations/\(Universal%20Access%20and%20Services\)%20Regulations.%202010.pdf](http://www.ca.go.ke/images/downloads/sector_regulations/(Universal%20Access%20and%20Services)%20Regulations.%202010.pdf) on May 16, 2015

<sup>44</sup> Nigeria: [http://www.ijeit.com/vol%202/Issue%2012/IJEIT1412201306\\_22.pdf](http://www.ijeit.com/vol%202/Issue%2012/IJEIT1412201306_22.pdf) (Accessed on May 16, 2015)  
International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 12, June 2013 117

Sustaining Broadband Infrastructure Expansion through Universal Service Provision Fund (USPF) E. C. Arihilam, Okorie.Emeka, Nwakanma Mary N. at page 118

<sup>45</sup> India: [http://www.usof.gov.in/usof-cms/usof\\_roadmap.htm](http://www.usof.gov.in/usof-cms/usof_roadmap.htm) (Accessed on April 4, 2015)

### *Dealing with lock-in arrangements*

Today, a regulator will need to respond to situations where some service providers institutionalize lock-in mechanisms through imposition of long-term contracts with their customers and obligations to pay termination fees upon discontinuation. Other scenarios occur in the context of consumers being locked-in for the use of a particular m-service linked to a provider of m-services that may offer the service only to its customers (See Safaricom and M-Pesa situation discussed earlier). This makes it difficult for consumers to move their data and information from one provider to another.

Such unconscionable practices raise consumer protection and competition concerns as while it is important to ensure that consumers make informed decisions prior to signing up with a service provider, it is equally important for consumers to be able to switch from one provider to another. In responding to such concerns, in 2009, the EU Universal Service Directive was amended require EU Member States to ensure that customer contracts cannot exceed 24 months and that operators also offer contracts with a maximum duration of 12 months<sup>46</sup>.

### *Number portability*

Mobile telephony has re-defined 'connectedness' to an extent that calling a person is really calling a number because people and businesses become closely associated with their phone numbers. It therefore is a huge consumer and competition consideration for mechanisms for number portability to be provided and facilitated in order not to undermine consumer choice. Porting is a regulatory arrangement that would promote consumer choice and enable the consumer to move their number together with any m-services and apps that are tagged onto that number.

### *Standards and interoperability*

From traditional mobile voice services to m-health, m-education, m-agriculture, m-payments, m-investment, m-donations it is clear that we are now in the eras of m-of-everything! The ability for devices to connect to one another and 'speak' to one another continues to herald numerous possibilities<sup>47</sup>.

The proliferation of platforms, applications and services that cater to specific devices has the power to create isolated islands of devices in the absence of interoperability across these islands within the digital ecosystem<sup>48</sup>. There is a critical need to lift barriers that have traditionally been imposed for proprietary reasons to lock in commercial gain. Further,

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<sup>46</sup> EU, "DIRECTIVE 2009/136/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws," 2009, <http://eurlex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0136&from=EN>.

<sup>47</sup> *Your Building Has Data. What Is It Telling You?* Available at: <http://insights.wired.com/profiles/blogs/your-building-has-data-what-is-it-telling-you#axzz3arCbncM> (Accessed on May 22, 2015)

<sup>48</sup> Nakazawa & Edwards, A Bridging Framework for Universal Interoperability in Pervasive Systems at page 1. Available at: <http://www.cc.gatech.edu/~keith/pubs/icdcs06-bridging.pdf> (Accessed on May 22, 2015)

adoption of common standards and interoperability would set the stage for scaling and monetization of m-services and apps allowing for cheaper access, appropriation of benefits by broader segments of population and achievement of development goals.

Since the mobile standard is but one within the digital ecosystem, what is the role of the regulator in maintaining an open and level playing field through standards?

One of the critical pillars in driving a digital agenda is improved standard-setting procedures and increased interoperability. Legacy type approval regulatory processes need to be reviewed in order to assure an expanded space for mutual recognition through type acceptance. European public authorities are particularly active in promoting interoperability<sup>49</sup>. In commitment to this critical success factor, the digital agenda for Europe requires that all new IT devices, applications, data repositories and services interact seamlessly anywhere – just like the Internet<sup>50</sup>.

**Box 6: Pillar II: Interoperability & Standards<sup>51</sup>**

The Internet is a great example of interoperability – numerous devices and applications working together anywhere in the world. Europe must ensure that new IT devices, applications, data repositories and services interact seamlessly anywhere – just like the Internet. The Digital Agenda identifies improved standard-setting procedures and increased interoperability as the keys to success.

Many governments and regulators promote interoperability and open systems by enforcing anti-trust regulations and adopting open source software and open standards in their own digital activities<sup>52</sup>. French legislation, for example, mandates that when digital content is protected by proprietary digital rights management technologies, providers must give other software and hardware developers access to the necessary technical documentation to make their systems interoperable with it. Apple's iTunes is under scrutiny both in France and elsewhere in the EU<sup>53</sup>.

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<sup>49</sup> World Economic Forum, Digital Ecosystem Convergence between IT, Telecoms, Media and Entertainment: Scenarios to 2015

[http://www3.weforum.org/docs/WEF\\_DigitalEcosystem\\_Scenario2015\\_ExecutiveSummary\\_2010.pdf](http://www3.weforum.org/docs/WEF_DigitalEcosystem_Scenario2015_ExecutiveSummary_2010.pdf) at page 5 (Accessed on May 22, 2015)

<sup>50</sup> Digital Agenda for Europe. Available at: <http://ec.europa.eu/digital-agenda/en/our-goals/pillar-ii-interoperability-standards> (Accessed on May 22, 2015)

<sup>51</sup> Digital Agenda in the Europe 2020 Strategy. Available at: <http://ec.europa.eu/digital-agenda/en/our-goals> (Accessed on May 22, 2015)

<sup>52</sup> World Economic Forum, Digital Ecosystem Convergence between IT, Telecoms, Media and Entertainment: Scenarios to 2015

[http://www3.weforum.org/docs/WEF\\_DigitalEcosystem\\_Scenario2015\\_ExecutiveSummary\\_2010.pdf](http://www3.weforum.org/docs/WEF_DigitalEcosystem_Scenario2015_ExecutiveSummary_2010.pdf) at page 5 (Accessed on May 22, 2015)

<sup>53</sup> Ibid.



The recommendation to foster interoperability is often controversial as it proposes a sense of co-operation among competitors<sup>54</sup>. It suggests trade-offs that must be faced when trying to achieve cross-platform interoperability within a bridging framework for universal interoperability<sup>55</sup>. This proposition has often received equivocal support, leading to uncertainty about the strength of governments' commitment to fostering competitiveness in the digital ecosystem with the aim of growing the "knowledge economy."<sup>56</sup> Gains however continue to be made over time.

In June 2014, Tanzania MNOs became the first in Africa to enter into an interoperable mobile money pact<sup>57</sup>. This was achieved following months of negotiation and regulatory facilitation to adopt exchange 'interconnection' agreements akin to those typically used for voice calls and text messaging. This agreement will enable customers to send and receive money across networks and the e-money will go directly to the respective subscriber's e-wallet account.

#### **4.1.5 Infrastructure sharing**

The reach of an MNO network has in the past played greatly to determine profitability and even dominance within a market. Due to this efforts to encourage infrastructure sharing are often resisted by incumbent operators in an effort to retain a competitive advantage over newer entrants. This structural infrastructure arrangement would then mean that some m-services and apps can only be accessed by a consumer depending on the reach of their network.

One of the innovative regulatory approaches to address this would be to mandate infrastructure sharing so as to broaden the geographical reach of MNO networks and in this way enlarge the platform on which m-services and apps can ride on. This innovative approach would resonate particularly in the developing world as it would enable development into remote and uneconomical areas faster. It would also enable the

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<sup>54</sup> See contestation in Kenya between MNOs : Airtel had petitioned the Competition Authority of Kenya () to compel Safaricom, Kenya's biggest telco to open up its M-Pesa agency network. Available at: <http://www.businessdailyafrica.com/Corporate-News/Safaricom-wins-M-Pesa-charges-case/-/539550/2396726/-/v7sxibz/-/index.html> (Accessed on May 22, 2015)

<sup>55</sup> Nakazawa & Edwards, A Bridging Framework for Universal Interoperability in Pervasive Systems at page 1. Available at: <http://www.cc.gatech.edu/~keith/pubs/icdcs06-bridging.pdf> (Accessed on May 22, 2015)

<sup>56</sup> World Economic Forum, Digital Ecosystem Convergence between IT, Telecoms, Media and Entertainment: Scenarios to 2015 [http://www3.weforum.org/docs/WEF\\_DigitalEcosystem\\_Scenario2015\\_ExecutiveSummary\\_2010.pdf](http://www3.weforum.org/docs/WEF_DigitalEcosystem_Scenario2015_ExecutiveSummary_2010.pdf) at page 5 (Accessed on May 22, 2015)

<sup>57</sup> <http://www.theeastafrican.co.ke/business/Tanzania-telcos-in-Africa-first-interoperable-mobile-money-pact/-/2560/2337358/-/137voj6/-/index.html> (Accessed on May 22, 2015)

implementation of national broadband plans and network upgrades. In this way ICT infrastructure would be optimized as a 'utility' by all sectors in the provision of m-services and apps in sectors such as education, health, sport, transport and agricultural support<sup>58</sup>.

#### **4.1.6 Trust and confidence**

A lack of trust and confidence can act as a major barrier to growth in a data driven economy. Regulators should influence a step up in consumer protection by encouraging MNOs to enhance security of their networks through adoption of encryption technologies. This is a critical requirement to ensure that sensitive data being transferred over the network, relating to, m-payments, for example, is transmitted securely and seamlessly.<sup>59</sup>

Robust security measures are therefore critical for the whole value chain including device and chip manufacturers as well as software vendors. Reducing vulnerabilities in devices, applications and web services should be a priority for all parties within the digital ecosystem<sup>60</sup>. The centrality of trust and confidence to assure security, privacy and data management in the use of ICTs generally is recognized as one of the main pillars of the information society<sup>61</sup>.

More and more, regulators have been called upon to respond to numerous public security concerns – 'mobile menaces' where kidnapping, terrorism, drug trafficking and money laundering are committed through the agency of the mobile phone. This calls for regulatory action that will preserve the integrity of mobile services to prevent the loss of trust. In Kenya, this situation was dealt with through mandating MNOs through legislation to capture details of persons subscribing to telecommunications services in order to preserve trust and security of subscribers of telecommunication services<sup>62</sup>.

In view of this, development of comprehensive privacy and data protection legislation at the domestic level would boost data safety in the digital ecosystem and regulators should play a key role in shaping this going forward. The security and privacy of peoples' personal information however remains a challenge due to a patchwork of geographically bound privacy regulations.

#### **4.1.7 Regulating in a multi-sectoral environment**

It is evident, so far, that going forward, the ICT sector regulator cannot claim total scrutiny and authority in an environment that is fast converging and integrating to create a new landscape.

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<sup>58</sup> M-Powering Development Initiative Report 2015 at page xi. Available at: [http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative\\_Report2015.pdf](http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative_Report2015.pdf) (Accessed on May 28, 2015)

<sup>59</sup> GSMA Mobile Policy handbook, October 2014 at page 182

<sup>60</sup> GSMA, Mobile Policy Handbook, October 2014 at page 9

<sup>61</sup> World Summit on the Information Society, Geneva Action Plan, Action Line C5  
<http://www.itu.int/wsis/docs/geneva/official/poa.html> (Accessed on May 12, 2015)

<sup>62</sup> Kenya Information and Communications (Registration of SIM-Cards) Regulations, 2015.  
[http://www.ca.go.ke/images/downloads/sector\\_regulations/\(Registration%20of%20subscribers%20of%20Telecommunication%20services%20regulations\)%20Regulations,%202012.pdf](http://www.ca.go.ke/images/downloads/sector_regulations/(Registration%20of%20subscribers%20of%20Telecommunication%20services%20regulations)%20Regulations,%202012.pdf). These regulations are currently under review.

The reality is that multiple agencies will be called upon to address a mutual issue under consideration and to offer their expertise and give greater visibility and commitment to digital inclusion. The sector regulator will need to reach out to other regulators in collaboration and partnership.

This is the new normal.

#### *Emergence of stakeholder diversity*

The m-service and app ecosystem works on different business models and is capable of attracting any number of users. Due to this, regulators should be careful to conduct stakeholder identification on a case by case basis. In addition to the conventional telcom sector regulators, the cross sectoral effect will bring in a broad array of influencers – ranging from midwives and teachers in rural areas (for m-health and m-education services and apps) to city residents (for m-transport and smart metering services and apps). The content and context of each m-service and app will attract a unique range of stakeholders who have a stake in and would wish to influence the outcomes.

Stakeholder engagement assumes a new prominence within a cross sectoral environment. The ICT regulator would need to engage awareness creation across sectors in order to spark interest in commercial deployment of m-services and apps as a means of service and information delivery. It will be necessary for regulators to engage more resources to undertake the role of identification and engagement of stakeholders as an act of support for diffusion of m-services and apps. Now more than ever before, the regulator will be required to consult within a multi-stakeholder framework for feedback, communicate effectively and to aspire to articulate the wishes and aspirations of the stakeholders in order to foster diffusion of m-services and apps.

Below is an illustration of the broad range of stakeholders involved in the development and use of an m-Health service.

### Box 7: Bhutan Epilepsy Project

In the deep, remote valleys of the Kingdom of Bhutan, a small country in South Asia bordered by China to the north, a boy slips on a plastic headset that looks like a shower cap. This is how the boy will be diagnosed with epilepsy using fast-growing mobile health technology to bring improved medical care to underserved parts of the world. The readings will be taken through the headset on a new application on a cellphone.

Just how underserved is Bhutan?

It does not have a single neurologist, nor does it have any technology to diagnose epilepsy, one of the most common neurological disorders and one easily treated with medication. For a population of 730,000 Bhutan faces a high burden of epilepsy (estimated at 1 out of 1,000 people). Most Bhutanese live in rural, mountainous villages which prevents them from receiving trained help for seizure disorders.

What are the telecom statistics in Bhutan like?

Despite living in rural areas, the Bhutanese are extremely well connected — more than 90 percent own a cellphone — making the country an ideal setting for this project. The Bhutan Epilepsy project is analyzing the mobile electroencephalography, or EEG, versus the stationary EEG technology, which is the standard epilepsy diagnostic tool in American hospitals.

The long-term goal of the project is to train the Bhutanese research coordinators to become more skilled at EEG so they can provide that service, and to communicate with hospitals and health facilities in other places through the use of simple text and personalized messaging.

Source: The Boston Globe, May 22, 2015<sup>63</sup>



<sup>63</sup> Available at: <http://www.bostonglobe.com/business/2015/05/21/mobile-health-technology-helps-tackle-epilepsy-bhutan/c6vmO7XOznyDegla4BYSAM/story.html> (Accessed on June 3, 2015)

| Stakeholders identified   |   |
|---|---|
| Government<br>Mobile Network Operators<br>Hardware and software vendors<br>M-Health project team<br>Project funders<br>Health care professionals and associations<br>-Medical doctors<br>-Psychiatrists<br>-Neurologists<br>- Nurses<br>-Community workers / educators etc.<br>Data Readers<br>Programmers<br>NGOs<br>Child rights activists<br>Source: M-Powering Development Initiative Report 2015 at page 4 <sup>64</sup> . | Patients<br>Parents / Guardians (for minors and patients who lack capacity)<br>Regulatory authorities<br>-ICT Ministries / regulators<br>-Healthcare Ministries / regulators<br>Ministries handling social services<br>UN Specialized bodies<br>-ITU<br>-WHO<br>-UNICEF<br>-UNESCO<br>Application developers<br>Developers of healthcare related content<br>Media<br>Others |

Emerging trends point towards more cross sector collaboration and partnership in order to handle the multiple issues to be reconciled. It is also clear that for the digital ecosystem to thrive, all key stakeholders must pull together in order to reap the benefits in a fast evolving sector. The continuous identification, mapping and engagement of stakeholders assume prominence due to the characteristically short time frames within which to make gains and the cross-sectoral scanning for stakeholders.

Due to the disruptive nature of the digital economy, the sector regulator will often be presented with issues, while pertinent, are not in its area of expertise. The development of m-Banking, m-Agriculture, m-Health etc. means that the intimate interface between the ICT sector and another specialized sector would lead to a situation of dual jurisdiction on some issues.

### *Collaboration across sectors*

Regulators have adopted many approaches to handle issues of shared jurisdiction. Often, these scenarios arise from innovative initiatives, and may therefore not be anticipated and formally articulated. For example, there was no formal platform for collaboration between the CBK and the CCK during the M-pesa deliberations in Kenya. The absence of a formal arrangement to collaborate should deter best efforts particularly when the parties concerned recognize an idea whose time has come. Subsequently, steps were taken to formalize the collaboration.

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<sup>64</sup> Available at: [http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative\\_Report2015.pdf](http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Documents/m-PoweringDevelopmentInitiative_Report2015.pdf) (Accessed on June 3, 2015)

In order to collaborate with a third party, a regulator must be clear about the powers it has under the law in order to determine the limits of collaboration. To design an effective collaboration both parties should be clear about the strengths – driven by their mandates - that they are bringing into the arrangement and determine the manner of conducting their collaboration. ICT regulators have pursued collaborations for mutual gain with competition authorities and financial regulator driven by the initial innovations across these sectors. A lot more collaboration with other sectors is contemplated as m-services and apps continue to permeate in all areas of life.

Going forward, regulators should commit to proactively seeking out mutual opportunities to collaborate, not driven merely by the need to facilitate an innovative idea, but more structurally to identify gaps or barriers to innovation and bridge them in order to foster growth of the digital ecosystem. The following areas are illustrative of areas that a regulator should focus on as a priority, to collaborate for sustainability and the achievement of development goals.

#### *Collaboration to enable availability of big data*

Big data continues to transform the way we live and work and alter the relationships between government, citizens, businesses, and consumers in future. It sets a platform for the public and private sectors to maximize the benefits of big data while minimizing its risks. Articulation of public policy that identifies opportunities for big data to grow our economy would promote the development of scalable, replicable and commercially sustainable mobile applications and services.

However it has not been possible to seize this opportunity in some countries due to policy gaps. For example, in some countries, the Meteorological Departments have blocked MNOs from using private weather information, referencing the government monopoly on this type of information. This kind of barrier hinders the uptake and value propositions of mobile agriculture solutions and would require intervention in order to drive data monetization of mobile agricultural information and advisory services<sup>65</sup>. Regulators could consider partnering to unlock opportunities with great development potential and leverage the widespread use and availability of mobile networks and services.

#### *Collaboration to enable protection of Intellectual Property Rights*

In the digital economy, copyright continues to perform the critical function of encouraging new works but also has a wider impact, playing a significant role in fostering innovation<sup>66</sup>. The impact of copyright is therefore now much wider than the creative industry alone. Digital

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<sup>65</sup> GSMA Mobile Policy Handbook at page 36

<sup>66</sup> GSR 2011 Discussion Paper : “Intellectual property rights in today’s digital economy” by Adam Denton (Available at: <https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR11/documents/05-Intellectual-property-E.pdf>)

technologies, the companies that exploit them and the business models they facilitate are all potentially impacted by copyright.

Endemic copyright infringement facilitated by broadband infrastructure has drawn the MNOs and Internet communities into the debate on intellectual property rights. The film, music, software, publishing and television industries are putting pressure on the communication regulators to play a more active role in addressing both commercial copyright infringement and infringement by consumers – while at the same time encouraging investment and service innovation within the digital economy<sup>67</sup>. The ICT sector regulator needs to ensure that there is a balanced, proportionate and robust mechanism for players in the digital economy to flourish so that the societal benefits can be realized.

IPR issues fall out of the mandate of the ICT regulator. Pursuing the institutionalization of partnerships with the IP regulator will be mutual in encouraging development of relevant digital content and fostering an open and competitive digital environment.

#### *Collaboration for optimal taxation*

MNOs are a significant contributor to national economies and do stimulate activities in the wider economy further boosting GDP. A range of taxes are levied on MNOs and consumers such as excise duties on mobile handsets, sales tax on airtime usage and revenue share levies on mobile operators. These taxes contribute to a high tax burden which can prevent high consumer take-up of mobile services, discourage consumer usage and hinder investment in networks and services.

According to the ITU, although the telecommunication/ICT sector tax revenues play an important role in supporting national public services, this role must be weighed against the potentially adverse effects that taxation can bring to the growth of the telecommunication/ICT sector, broadband penetration, and national economic growth<sup>68</sup>. In this regard, the European Commission High Level Expert Group on Taxation of the Digital Economy has examined the best ways of taxing the digital economy in the EU, weighing up both the benefits and risks of various approaches<sup>69</sup>.

Adoption of an optimal taxation policy that balances government revenue, socio-economic development goals and international competitiveness would be imperative. The impact of both direct and indirect taxation on the ICT sector remains a continuing concern for governments, businesses and consumers alike. Due to the direct impact of affordability and access to mobile services, a key role should be played by the regulator on sector taxation matters to amplify the positive impacts that have arisen with adjustment of tax rates.

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<sup>67</sup> GSR 2011 Discussion Paper : “Intellectual property rights in today’s digital economy” by Adam Denton (Available at: <https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR11/documents/05-Intellectual-property-E.pdf>)

<sup>68</sup> Taxing telecommunication / ICT services: An overview (2013) Available at: <http://www.itu.int/en/ITU-D/Regulatory-Market/Documents/Taxation%20Study-final-en.pdf> (Accessed on May 20, 2015)

<sup>69</sup> 2014 Report of the Commission Expert Group on Taxation of the Digital Economy. Available at: [http://ec.europa.eu/taxation\\_customs/resources/documents/taxation/gen\\_info/good\\_governance\\_matters/digital/report\\_digital\\_economy.pdf](http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/good_governance_matters/digital/report_digital_economy.pdf) (Accessed on May 9, 2015)

**Box 8: Taxation: Fostering the digital ecosystem**

In Kenya, the removal of 16% VAT on mobile phone handsets in June 2009 saw handset purchases increased by more than 200% and mobile penetration increase from 50% to 70%. From 2009 – 2012, the prices of airtime fell by 70% and usage of mobile services rose by— 113%. Through increased handset circulation, a higher share of consumers has received access to high-value mobile services: M-Banking, M-Agriculture, M-Health.

## **5. Emergence of rights-based regulatory approaches and statutory recognition**

This paper encourages the adoption of light touch regulatory mechanisms to foster the diffusion of m-services and apps. It is however important to indicate that some countries have adopted statutory pathways – a more formal approach - to define obligations for diffusion and access to m-services and apps. As previously indicated, regulatory approaches cannot be addressed with uniformity as countries should have the freedom to address their own unique circumstances as they deem best. This aspect is important because in such situations, m-services and apps are fostered through mandatory requirements in response to unique national circumstances.

The trend towards rights-based regulatory approaches has been driven by the social inclusion theory. It has in recent time inspired legal challenges that have confirmed that Internet and broadband access is gaining recognition as a basic human right<sup>70</sup>. This is the view that all people must be able to access the Internet in order to exercise and enjoy their rights to freedom of expression and opinion and other fundamental human rights. This means that countries have a responsibility to ensure that Internet access is broadly available, and that countries may not unreasonably restrict an individual's access to the Internet<sup>71</sup> and therefore, to m-services and apps.

Internet access is recognized as a right by the laws of several countries among them – Costa Rica, France, Spain, Estonia, Finland and Greece. One of the benefits of this approach is that statutory recognition gives impetus to implementation of Internet or broadband access plans, hence accelerating access to m-services and apps. While these countries are the fore runners of this rights based approach, is it likely that other countries will follow suit? It remains to be seen.

Other countries have used statutory pathways to push for the adoption of specific m-services and apps to meet certain public policy goals. For example, in order to help mitigate the consequences of serious road accidents across the EU, the European Commission adopted two legislative proposals in June 2013 to ensure that by October 2015, cars will automatically call

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<sup>70</sup> <http://broadbandtoolkit.org/4.2>

<sup>71</sup> <http://muftinternet.com/policy/countries-with-right-to-internet-access-as-human-right/> (Accessed on May 18, 2015)



emergency services in case of a serious crash<sup>72</sup>. The "eCall" system automatically dials 112 - Europe's single emergency number - in the event of a serious accident<sup>73</sup>. The Commission proposed two pieces of legislation to help create and implement the system. The proposed legislation will focus on deployment of passenger vehicles through the type approval process<sup>74</sup>.

Other recent examples such as ERA GLONASS<sup>75</sup> and SIMRAV<sup>76</sup> would indicate that there is a growing preference of legislative fiat over voluntary approaches to introduce services into the market. ERA GLONASS in Russia came about because of recent legislation that requires installation of monitors and in-vehicle sensors for such events as airbag deployment to automatically transmit location details and summon assistance via emergency cellular service. The motivation for is the reduction of the consequences of road accidents in Russia particularly in dangerous goods transport services.

Similarly, the Brazilian government introduced legislation to tackle the very high levels of vehicle crime through a program called SIMRAV. This will be achieved by the mandatory fitment of telematics systems through imposition of a requirement in legislation to all new vehicles in Brazil as a part of SIMRAV. Around 25 million vehicles are anticipated to be equipped by the end of 2015 and Stolen Vehicle Recovery subscribers could exceed 2.5 million by 2013.

The emerging scenario means that the very contemplation and articulation of public policy has to be pragmatic in keeping with the innovative character of the sector. M-services and apps possess a pervasive character that will continue to impact how we communicate, learn, socialize and conduct business. M-services and apps are relentless and will continue to move into our phones, device, homes and cities. It is perhaps in order to say that we are yet to experience the profound influence that they will wield on regulation of civic, commercial and social engagements in society.

The regulatory approaches used need to be flexible enough to respond to harmonization efforts across sectors and even geographical regions to address issues of data flow within the digital ecosystem. It calls for clear consideration to ensure that the regulatory approach adopted is not a barrier to future innovation and progress. If in doubt – do not prescribe or regulate as innovation needs time and freedom to blossom.

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<sup>72</sup> [http://europa.eu/rapid/press-release\\_IP-13-534\\_en.htm](http://europa.eu/rapid/press-release_IP-13-534_en.htm), Press Release issued in Brussels on June 13, 2013

<sup>73</sup> The eCall system communicates the vehicle's location to emergency services, even if the driver is unconscious or unable to make a phone call. It is estimated that it could save up to 2500 lives a year.

<sup>74</sup> GSMA Mobile Policy handbook, October 2014 at page 11.

<sup>75</sup> <http://www.u-blox.com/en/ecall-era-glonass.html>: (Accessed on May 16, 2015).

<sup>76</sup> <http://www.gsma.com/connectedliving/wp-content/uploads/2012/05/m-Rodrigues-da-Luz-GSMA-LATAM-Summit-2012.pdf>: (Accessed on May 16, 2015)

## 6. Setting new regulatory objectives

The emerging digital ecosystem is generating many risks and challenges for government policies, as well as presenting new opportunities for creating social and economic value. Just as any healthy ecosystem enables its stakeholders to interact to the benefit of all, a healthy digital ecosystem should simultaneously enable investors to create economic value and deliver well-being to society. It will however be necessary to set new regulatory objectives to address the critical uncertainties present in this ecosystem.

Establishing an environment that fosters creativity and innovation, enables competition, and promotes consumer choice and exploits the transformative potential of digital technology fully means finding a delicate balance that both stimulates and protects all the different stakeholders. Having recognized the phenomenal opportunity that diffusion of m-services and apps can yield, governments and regulators could consider seeking technical assistance from specialized agencies such as the ITU to better understand the digital landscape and evaluate their existing frameworks in order to align them with appropriate policy and regulatory frameworks to foster diffusion<sup>77</sup>.

There is no simple response to articulate regulatory approaches that can be adopted to foster m-services and apps within the digital ecosystem. Indeed, countries have their own unique circumstances that call for different priorities. One running theme that is clear is that it is beyond the scope of the ICT regulators to resolve all of the challenges alone. It calls for a balanced approach in order to foster mutuality of purpose and foster regulation in a cross-sectoral environment. The disruptive nature of technologies has opened up a new platform in the digital ecosystem in which ICT regulators can, and should seize the moment to influence in order to promote m-services and apps.

The regulatory architecture of today should build a digital future we can be proud of. More than any other period in history, governments are suited to articulate public policy that will ensure that the digital ecosystem continues to work for individual empowerment and social good. The perspectives discussed in this paper have highlighted that a regulatory framework that is open, forward-looking, neutral and flexible to allow leveraging on new technologies, innovative services and new business practices ensures enhanced market competitiveness and maximization of economic opportunity.

With the changing environment, the old regulatory construct has been eroded and given way to new possibilities. Rules need to be re-written in some instances to accommodate the emerging realities. The paper recognizes that regulating in a fast changing sector is like aiming at a moving object – hence the need for a flexible, adaptable approach – to allow for changing

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<sup>77</sup> See Bhutan Project Report on Emerging Mobile Applications Opportunity June 2012 Available at: <http://www.itu.int/ITU-D/asp/CMS/Docs/Bhutan%20EV4.pdf> (Accessed on June 2, 2015)

positions. Overall, it has emerged that 'light touch' nurturing of the digital economy is a safer regulatory option over strong intervention in most cases.

But an innovative and effective regulatory environment does not develop in isolation. It needs inspiration. It needs collaboration. It needs diverse opinions from multiple perspectives to challenge a good idea and transform it into a great one.

## **7. LIST OF ACRONYMS**

|            |  |
|------------|--|
| App        | Application  |
| CA         | Competition Authority  |
| CAK        | Competition Authority of Kenya   |
| CBK        | Central Bank of Kenya  |
| CCK        | Communications Commission of Kenya   |
| DSA        | Dynamic Spectrum Access  |
| DRM        | Digital Rights Management  |
| EEG        | Electroencephalography   |
| EU         | European Union   |
| GDP        | Gross Domestic Product   |
| GNI        | Gross National Income  |
| GPS        | Global Positioning System  |
| GSMA       | GSM Association  |
| HIV/AIDS   | Human immunodeficiency virus infection and acquired immune deficiency syndrome |
| ICT        | Information and communication technology                                       |
| IDA        | Infocomm Development Authority of Singapore                                    |
| IP         | Internet Protocol  |
| ITU        | International Telecommunications Union   |
| IPR        | Intellectual Property Rights   |
| IFI        | International Financial Institution  |
| KYC        | Know your customer   |
| LTE        | Long Term Evolution  |
| MDG        | Millennium Development Goal  |
| M-services | Mobile services  |
| MNO        | Mobile Network Operator  |
| OECD       | Organization for Economic Co-operation and Development                         |
| SDG        | Sustainable Development Goals  |
| SMS        | Short Messaging Service  |
| TV         | Television   |
| TVWS       | Television White Spaces  |
| UHF        | Ultra High Frequency   |
| UN         | United Nations   |
| UNFPA      | United Nations Population Fund   |
| VHF        | Very High Frequency  |
| WiFi       | Wireless Local Area Network  |
| WIPO       | World Intellectual Property Organization                                       |
| 3G, 4G     | Third generation, Fourth Generation  |