REGIONAL INITIATIVES – AFRICA

The APP Economy in Africa: ECONOMIC BENEFITS AND REGULATORY DIRECTIONS

Report

Telecommunication Development Sector

The APP economy in Africa: economic benefits and regulatory directions

This report was prepared by the International Telecommunications Union (ITU) expert Mr Simon F. Molloy of Australian Economic Consultancy, Systems Knowledge Concepts Pty Ltd (www.skc.net.au) under the direction of the ITU Telecommunication Development Bureau (BDT). Inputs from Mr Scott Minehane and Ms Anthea McGurty of Windsor Place Consulting (www.windsor-place.com), and Derrick Kotze, CEO, MLAB, are also gratefully acknowledged. This study was first presented at the ITU Regional Economic and Financial Forum of Telecommunications/ICTs for Africa (Zimbabwe 30-31 January 2017)[1].

ISBN

978-92-61-25861-0 (paper version)

978-92-61-25871-9 (electronic version)

978-92-61-25881-8 (EPUB version)

978-92-61-25891-7 (Mobi version)

[1] www.itu.int/en/ITU-D/Regulatory-Market/Pages/Events2017/Zimbabwe/home.aspx

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Foreword

It is my pleasure to present this ITU report on the app economy in Africa: Economic benefits and regulatory directions prepared by the Telecommunication Development Bureau (BDT).

Technological change is one of the most powerful drivers of national economic development. It represents the crystallisation of new knowledge as it is employed to improve the utilisation of all resources and to improve human welfare. Governments and Telecommunication/ICT National Regulatory Authorities (NRAs) are playing an important role in this new phase of twenty-first century development of information and communications technology. This report identifies the analytical basis for the various types of regulatory responses to different types of app economy disruption, focusing on the opportunities and challenges of the app economy in Africa.

I trust that the findings of this report will serve as strategic guidance to assist all stakeholders in their discussions and decision making for the identification of the best approaches to regulating the app economy.

Brahima Sanou,

Director, Telecommunication Development Bureau

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1 Introduction to the app economy

What is the app economy? What is the current state of the app economy in Africa? What are the actual and potential economic benefits, and what policy and regulatory settings are likely to maximize the benefits the app economy creates for consumers and citizens?

This report provides an overview of the development of the app economy in Africa, in particular, for Ghana and South Africa, with some additional comments on Kenya. Reference will be made to other Africa region countries where these provide additional context and perspective. This report also provides a working definition of the app economy and assesses the current state of regulation with emphasis on instances of successful collaborative regulation.

Recommendations to policy makers and regulators are provided concerning tools for collaborative regulation that enhance consumer choice, promote affordable pricing and maintain a level playing field for all players.

An overview of market players along the app economy value chain is also provided with analysis of market performance and business models for the various ICT digital service players. The role of the app economy and ICT more generally in promoting economic and social development in Africa is also a key focus. These technologies will play an important role in the Africa region countries achieving the sustainable development goals.

1.1 The app economy ecosystem

The app economy has been described as *the sum of all activity, products and services required to deliver app functionality to end consumers*[1]. The component parts of the app economy are shown in Figure 1.

Figure 1: Component parts of the app economy

Source: Systems Knowledge Concepts (www.skc.net.au)

[1] Global Symposium of Regulators 2016 discussion paper: *The race for scale: market power, regulation and the app economy*: www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU_AppEconomy_GSR16.pdf

This definition is clear enough conceptually but the objective of measuring the size of the app economy remains challenging. This is because the app economy has emerged within and across multiple industries – the telecommunication industry, the software industry and the computing hardware industry – in a rapid evolutionary process that has quickly blurred the borderlines between them. In fact, from this perspective, the emergence of the app economy could be viewed as another aspect of the ongoing process of convergence between communications, software and media that has been occurring for several decades.

Not only does the app economy operate across traditional converged industries – media, communications and information technology – as its disruptive influences reaches additional industries such as finance, transportation and accommodation, it increasingly incorporates economic activity that occurred within these traditional industry classifications. This means that the national statistical collections compiled by governments around the world, which are based on traditional industry classifications, are being challenged because of the influence of the app economy. Because the app economy crosses so many of these traditional industry boundaries, it is difficult to collect information that would enable an accurate quantification of its economic size.

Even within types of activity that are clearly linked to the app economy, there are some complicated definitional or 'edge' issues in trying to measure its size: for example, if the total value of cloud computing activity, what proportion of that should be attributed to the app economy and what proportion to non-app cloud services?

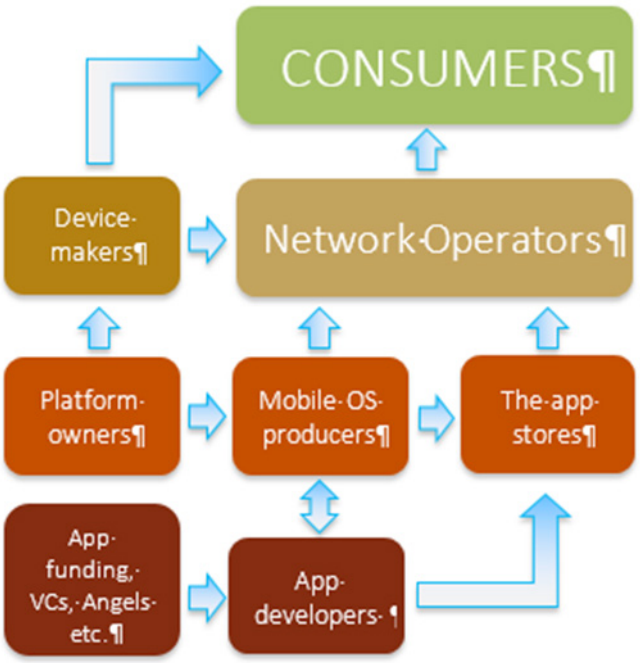
Despite these challenges in objectively determining the size and the progress of the app economy in a particular country, by understanding the app economy value chain, a range of data sources are identified that can provide useful indications of the progress and impact of the app economy in particular jurisdictions.

The final output of the app economy is a functioning app on a mobile device in the hands of businesses or individual consumers. Figure 2 shows the various sectors of the app economy and their relationship to final consumers. Note that final consumers' access to app services is mediated by telecommunication operators including access to app stores over either mobile or fixed broadband networks.

Figure 2 illustrates consumers, both business and individuals, as having a direct relationship with telecommunication operators and the sellers of mobile devices. Consumers use telecommunication operator services to update their mobile operating systems, search for apps, install and use them. Many apps require ongoing interaction between the end user mobile devices and the cloud, and telecommunication operators provide the services that enable these interactions.

Thus, telecommunication operators play a pivotal role in the app economy and its evolution has enormous consequences for this sector. One of the most important consequences for mobile operators, for example, is the app-driven shift to a world where 'everything is data'. Numerous apps such as Viber, WhatsApp, Apple FaceTime and Facebook Messenger offer communications services that directly compete with traditional operator voice and messaging offerings that have traditionally been relatively high margin components of the operator service offerings.

Figure 2: App economy ecosystem and value chain



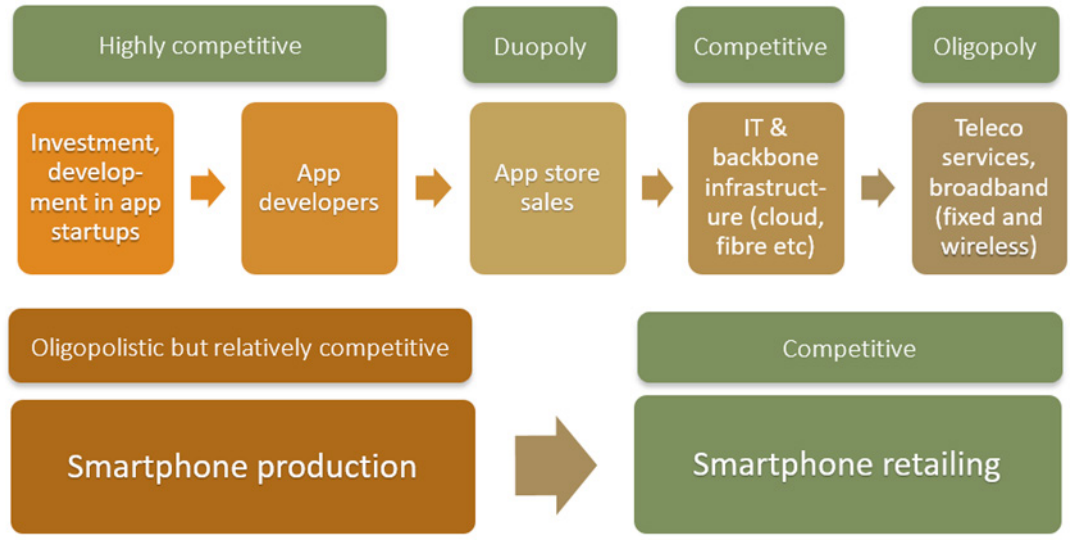
Source: Systems Knowledge Concepts (www.skc.net.au)

In the 'everything is data' world, the demand for mobile capacity is growing rapidly requiring substantial new investment in mobile infrastructure, while at the same time, operators are being driven by market forces to become commodity market mobile bandwidth suppliers. This arguably represents a significant decline in the market power previously enjoyed by such operators.

The combination of open-ended economies of scale in production, branding and marketing, coupled with powerful network effects, means that the most successful players in the app economy are increasingly in a position to develop significant market power (SMP)[2]. Figure 3 shows the app economy value chain and indicates, at a high level, the level of competitiveness in each segment.

[2] *The race for scale*: www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU_AppEconomy_GSR16.pdf

Figure 3: App economy value chain and competitiveness



Source: Systems Knowledge Concepts (www.skc.net.au)

The combination of the app economy capacity for business disruption with the existence of structurally uncompetitive markets raises issues relating to whether and how it should be regulated. To analyse the extent to which the app economy should be regulated and how it should be regulated, it is necessary first to understand the economic drivers of the rapid rise of the app economy and how new app-based businesses are able to so quickly and comprehensively challenge pre-existing business models.

1.2 The economics of disruption: How do apps disrupt existing business models?

1.2.1 Information costs, transactions costs and organization costs

The way that technological innovations impact commercial and business processes is overwhelmingly through the downward pressure they exert on costs. The underlying costs of providing goods and services shape what businesses are able to offer their consumers on an ongoing commercially viable basis, and innovations make existing products cheaper and/or better and enable new products to be brought to market.

Some technological innovations impact on the cost of physical inputs: for example, innovation in the design of internal combustion engines mean that consumers spend less on fuel per kilometre travelled. In the case of the app economy, innovations are primarily to do with the cost of acquiring, processing and communicating information. For example, consider the case of booking a taxi using the traditional telephone-based manual method and compare this with how app-based ridesharing companies such as Uber achieve a booking. The traditional method involves the customer placing a phone call, perhaps waiting on hold, providing details to the operator of their location and destination; the operator then radio-calls for drivers who are available and in the right location, and (perhaps) the operator communicates the result to the customer. In the app-based version, the user specifies a destination on the smartphone, the geo-aware phone knows the current location of the user, the software system broadcasts a call to drivers, and the location of the driver who wins the job is automatically communicated to the customer. Essentially, much of the process that was formerly manual is automated and this significantly lowers the cost of this component of the business process.

In fact, costs associated with processing information make up a far larger component of economic activity than most people recognise. The famous twentieth century economist, Ronald Coase, described the ubiquity and significance of *transactions costs* in all economic systems, and how changes

in these costs could lead to significant, and often counterintuitive, changes in industrial, commercial and economic structures. Transactions costs are, essentially, the costs associated with using the market to organise economic activity. If I'm a buyer, I must find the preferred seller, I need to research price, I need to research quality characteristics of the good or service that I want to buy, and, if I am purchasing a long-term service, I need to design, evaluate and manage a service contract.

Transactions costs are often highly significant; in some cases they may be greater than the value the buyer gets from the transaction itself, in which case the transaction will not proceed and, more generally, markets will not form (markets that could deliver significant benefits to buyers and sellers). But Coase pointed out that there are alternatives to using the market to organise economic activity. One solution is to organise activity within a firm. But organising activity within a business is also far from costless – the entire cost of the internal management, for example, could be characterised as such a cost. We could describe the costs of organising economic activity within a business as *organisation costs*.

The app economy can be considered in this context. Improvements in technology, particularly improvements in information technology, will lead to a decrease in both transactions costs and organisation costs. Thus, the changing relative costs of organising activity through the market, all within the firm, will drive changes to the viability of existing business models. If, for example, transaction costs fall more than organisation costs, then firms would be expected to shrink in size and conduct more activity in the marketplace: for example, to outsourcing and subcontracting. This represents therefore a significant driver of economic or industrial disruption.

Complicating this picture slightly, changes in information technology also lead to large increases in economies of scale, meaning that businesses can operate in a particular field at a much greater scale while lowering per unit costs of operation. In the case of the app economy, globe spanning companies enjoy enormous economies of scale in the collection, analysis and use of data.

Once these relationships between transaction costs in the marketplace, organisation costs within the firm and economies of scale are understood, the role of technological change in the process of business and industrial disruption can be more easily understood in a systematic manner.

1.2.2 Modes of digital disruption

Within the conceptual framework of information costs, transactions costs, organisation costs and economies of scale, digital disruption may take a number of forms:

Falling transactions costs creating new markets

Consider the problem of trying to develop a market for sellers of spare accommodation to temporary renters. Prior to the development of the Web and the app economy, it would have been technically possible to create a business that kept centralised records of spare accommodation in domestic residences around the world, which collected and maintained ratings for these properties and matched these with requests for such accommodation. Similarly, it would have been possible for any individual to call at random domestic residences at a particular holiday destination and attempt to negotiate an agreement for temporary accommodation. In the former case the organisation costs, and in the latter case the transactions costs, were prohibitively high and such a market simply did not develop. The AirBnB business innovation was to develop a scalable information technology system that enabled dispersed users to register available space, an interface for potential renters to find accommodation, a rating system for providers and users, and pro forma processes for reducing the costs of negotiation and payment. In effect, AirBnB used information technology to create a marketplace with massively lower transactions and organisation costs, and the significant investment for this system development is now amortised on a global basis, leading to relatively low unit organisation costs.

Retailing information rich products and the race for scale

Using scalable information technology systems, Apple was able to grow rapidly to become the world's biggest music distributor and Amazon did the same thing for books. Music and books are both complex 'information rich' products, it is difficult to evaluate the benefit they deliver until they are consumed. Consumers wish to discover new works that interest them and, because these goods are complex, they face relatively high transactions costs in finding what they want. Apple and Amazon have developed large and complex retail information systems that are globally scalable and that significantly reduce these transactions and operational costs. These systems enable such companies to specialise, on a global basis, on a particular type of retailing, displacing traditional bricks and mortar stores (Tower Records, which opened in 1968, and was the biggest music retailer in the United States, closed in 2006[3] and the Borders Group, which operated 511 superstores in the United States in 2010, closed its last stores in September 2011[4]). Once these systems are set up, and as they are improved over time, there is no limit to their scale – they become global shopping spaces. Because economies of scale are so significant, smaller firms will tend to fail and larger firms grow, leading to the potential for globe-spanning monopolies to develop. Within this context there will be smaller niche players.

Excising the information component of traditional businesses

The rise of Uber illustrates graphically how app economy entrepreneurs seek out the information components of traditional businesses and launch disruptive applications. The traditional taxi business can be thought of as consisting of two components: the physical business of moving passengers in cars from one geographic location to another, and the information business centre of receiving incoming calls from users, coordinating these requests with available taxis, dispatching taxis and managing a roster of drivers. To use the terminology often used by Nicholas Negroponte of the Massachusetts Institute of Technology, the taxi business has 'bits and atoms' components. Uber and other ridesharing applications provide an alternative means for operating the information component of the traditional taxi business. Figure 4 illustrates how Uber offers a disruptive new process by which customers and drivers, who both carry GPS capable devices, interact with Uber distributed broking software to generate automated efficient solutions that replace human dispatchers in the traditional taxi business.

Because the basic problem of geo-coordination and taxi despatching is similar all over the globe, Uber can use its application and back-end server infrastructure anywhere in the world where GPS signals are available on handheld consumer devices. Uber's innovations have enabled processes that previously operated inside firms to be taken outside into a newly created marketplace. Uber has also introduced demand-responsive pricing for ride services which arguably results in more efficient operation than traditional business models can provide. This is illustrated in Figure 4.

Traditionally, taxi businesses operate both the information and physical components within a single firm. The Uber software, its app and its cloud-based back-end, enable it to effectively 'excise' the information component and execute the business functions within this component more efficiently. The physical component is left to Uber drivers. One of the most noteworthy aspects of this app disruption is that Uber can essentially operate the information component of the taxi business at a global level. It therefore can enjoy enormous economies of scale in the production and use of its software systems.

As well as business disruption, such innovations also create regulatory disruption, and regulatory responses by authorities play a large role in determining the success or otherwise of these new app-based corporations. The taxi industry is heavily regulated for good reasons, primarily user safety. Regulatory systems, as economists have observed, are subject to regulatory capture over time resulting in the regulation serving, to some extent, the interests of the industry being regulated. Business disruption offers new opportunities to reset regulation so that it better serves consumer interests.

[3] www.theguardian.com/business/2006/oct/09/retail.usnews (accessed 27/12/2015)
[4] https://en.wikipedia.org/wiki/Borders_Group (accessed 27/12/2015)

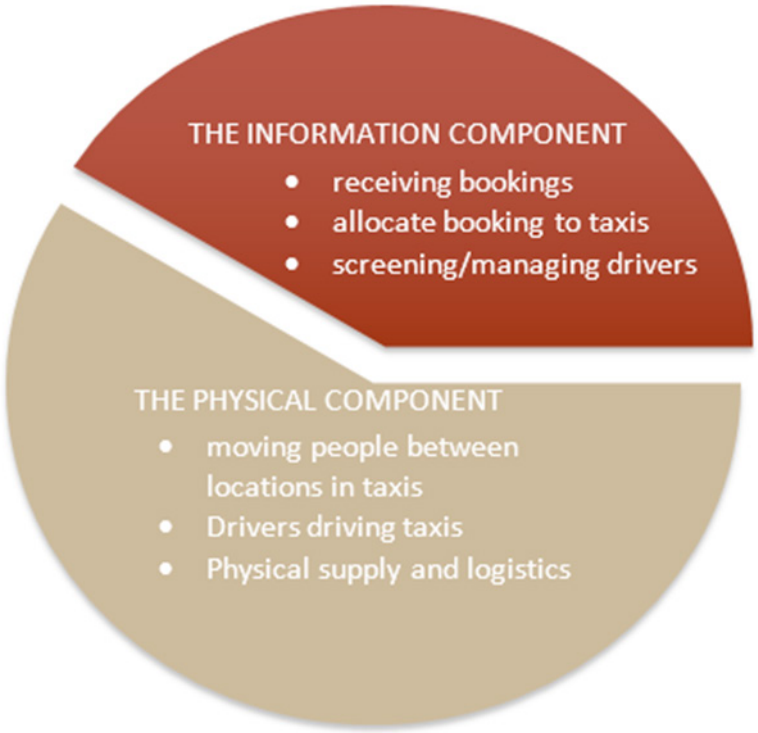
1.2.3 The race for scale and the future of market power

One of the early hopes of many, associated with the rise of the Internet, was for a democratisation of marketplaces in which many small-scale sellers could reach many buyers with unique niche preferences. Whilst this has happened, with companies like eBay providing small-scale marketplaces, and Google enabling advertisers to operate at any scale, as the Internet matures, there is a rise of globe-spanning technology companies operating international business models that show no signs of reaching a maximum efficient scale. Many of these companies have the means to exert significant market power (SMP) and have many characteristics of natural monopolies.

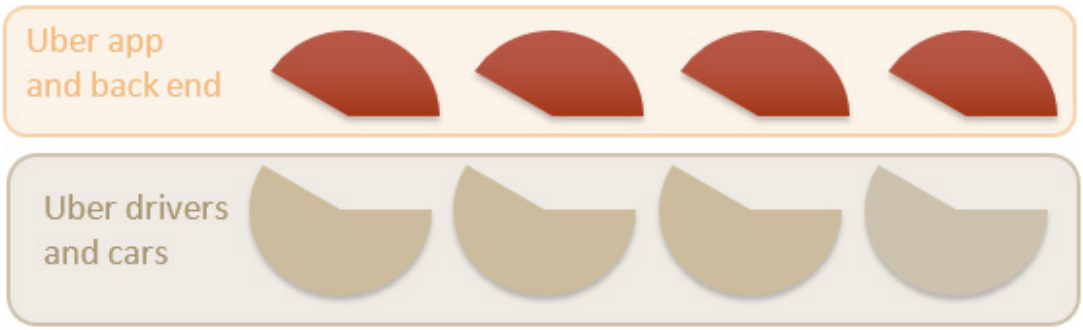
The rise of the app economy and ubiquity of smart mobile devices seems to create even greater opportunities for companies to offer global scale solutions and systems than the Internet alone.

Figure 4: Disrupting the taxi business

The pre-UBER taxi business: Physical and information components within a single firm



The post-UBER taxi business: UBER takes the information component, drivers take physical components



Source: Systems Knowledge Concepts (www.skc.net.au)

The outcomes of the interactions between falling transactions costs, falling organisation costs and increasing economies of scale are difficult to predict but some are of the view that these changes will ultimately make global corporations more powerful.

The history of competition regulation in the information technology industry suggests that recurring waves of technological change weaken the market power of dominant firms in the long run. Just as Microsoft unseated IBM in the 1980s, so Microsoft itself was unseated by the Internet itself and by Google as the Twenty-First Century began. Currently, Google is in ongoing negotiations with EU competition authorities regarding alleged use of its market power in the presentation of search results that favour its own products. The app economy itself provides a challenge to dominant firms of Internet search by enabling consumers with alternative pathways to the products and services that they seek[5]. Perhaps again the march of technological change will erode the market power of entrenched dominant firms. On the other hand, the Internet, in combination with the app-economy, offers companies new ways to dominate particular narrow niches:

As diseconomies of scale are destroyed, it becomes more and more practical to run a globally integrated firm -- indeed, a global monopoly -- provided, again, that the firm maintains a strong focus, picking one activity and doing all of it for the whole world. The picture that results is a large collection of focused monopolies, each of them taking a precision "slice" through the world economy by means of global computer networks and by the grace of the standardized world that it both depends upon and helps to create.[6]

Thus, while the emergence of the app economy has attracted significant interest from telecommunication regulators, it is also likely that it will attract the attention of general competition regulators as well.

2 Regulation and the app economy: general considerations

2.1 Introduction

Over the past year, new regulatory responses to app economy businesses have emerged. Several considerations come into play when contemplating the appropriate regulatory response to app economy disruption. These include:

- as a principal, regulation should only be imposed where it is clearly necessary and will generate benefits for consumers and citizens with appropriate consideration being given to unintended consequences of any regulatory intervention;
- it is desirable to facilitate technological innovation that delivers benefits to consumers and greater efficiencies in production;
- a level playing field is desirable to enable traditional players to compete effectively with disruptive new entrants.

There are several factors that drive the uptake of app businesses. One factor is the regulatory environment. Regulators, if they are to maximise economic benefits, need to find the best possible trade-offs between consumer protection, investment stimuli and innovation for the whole of society. Regulators around the world have endorsed a set of best practice guidelines to protect consumer interests while ensuring a level-playing field for traditional and new market players by fostering a light-touch

[5] www.nytimes.com/2015/08/28/technology/google-eu-competition.html?_r=0 (accessed 27/12/15)
[6] Phil Agre, The market logic of information, *Knowledge, Technology, and Policy* 13(3), 2000, pages 67-77.

regulatory approach (Figure 5). OECD also recognized the importance of the app economy implying the need for a relatively liberal approach to regulation in a 2013 report:[7]

Apps are one of the main new sources of innovation in the economy and remain an area of spectacular growth during this economic downturn. Mobile apps enable significant efficiency gains by improving the way people communicate, access information and obtain services. Apps extend the rich communication potential of the Internet beyond the traditional desktop computer and enable users to benefit from a myriad of information services practically anywhere or anytime they want. Economies rely on information to function effectively and the app economy represents a leap forward towards the goal of an informed and efficient knowledge-based society.

The app economy is extremely dynamic and evolving, and policy makers are keen to maximise its innovative potential and benefit for all sectors of the economy and society. Policy makers need to understand the mechanisms of the app economy in order to support innovation and ensure the maximum benefits possible for users.

During the 2015 ITU Global Symposium for Regulators (GSR), regulators from around the world discussed and adopted best practice guidelines on facilitating the uptake and widespread use of mobile applications and services through targeted regulation, Box 1 presents an extract of these guidelines.

Box 1: ITU Global Symposium for Regulators Best Practice Guidelines

For over 15 years, the ITU Global Symposium of Regulators (GSR) has brought together heads of national telecommunication/ICT regulatory authorities from around the world and has earned a reputation as the global annual venue for regulators to share their views and experiences. Every year, GSR adopts best practice guidelines on topical regulatory and policy issues.

In 2015, GSR adopted best practice guidelines to facilitate the widespread adoption and use of mobile applications and services through targeted regulation. They also urged regulators to simulate demand and protect consumers and suppliers, regulators recognized the importance of facilitating availability, access and use of m-services and digital apps by stating:

"*New generation networks are the foundation of innovation in the ICT sector and the engine for the development of m-services and applications. Therefore, we believe that unified rules for facilitating infrastructure deployment and open access to networks at national and regional level can strongly contribute towards stimulating the development of m-services and apps. Cooperation among all public authorities involved at the international, regional, national, and local levels is key to rapid, smooth and efficient implementation. Policy makers and regulators must be mindful of the importance of designing flexible, incentive based and market-oriented policy and regulatory frameworks with regard to spectrum allocation and assignment for mobile broadband services, so as to create trust and provide the necessary conditions for m-services and apps markets to thrive. The development of new markets and the industry for mobile devices need to be sustained through adequate regulatory measures, in particular in developing countries.*

Revisiting and reviewing, where necessary, current Government policies to make sure that they are still valid and appropriate for the new environment and ensuring privacy and security of government, business and consumer data may be necessary while open and collaborative regulatory frameworks are needed to promote the development of cross-cutting services such as m-commerce, m-banking and mobile money, as well as m-health. We recognize that creating a converged reference framework for competition, interconnection and interoperability can effectively facilitate the relationships among the various providers of infrastructure and services, as well as among them and apps and content providers.

[7] Working Party on the Information Economy, The App Economy, www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/ICCP/IE(2012)1/FINAL&docLanguage=En

Recognizing that it may be commercially attractive to share network elements between service providers to avoid duplication costs, and provide opportunities for more m-services to be made available, regulators may consider promoting network sharing practices in all network and value chain layers while maintaining healthy competition between network providers. We believe that innovative, out-of-the-box measures should be put in place to stimulate the take-up of m-services and the creation of locally-relevant apps in remote and rural areas.

Among other measures, universal service strategies can be defined and the appropriate mechanisms used to create ICT incubators or for funding local developers and locally-relevant apps. We call for regulatory measures, private initiatives and partnerships to reduce the cost of m-services and apps in order to ensure equal and universal access. We further recognize that acquiring digital skills is essential for the wide take-up and efficient use of m-services and apps, and inclusive training programmes for different target groups need to be established. We reiterate the relevance and value of the GSR13 Best practice guidelines on the evolving roles of both regulation and the regulators in a digital environment; and of the GSR14 Best practice guidelines on consumer protection in a digital world."

Source: GSR 2015 Best practice guidelines

In addition, as part of the GSR17 consultation process, regulators were invited to identify innovative and collaborative policy, regulatory and business measures[8] needed to lift the barriers and achieve affordable access to the digital world in the following areas:

- **Infrastructure and connectivity**: Innovative measures at the international, national and local levels.
- **Consumer access**: To ICT services (subscription, plans, platforms and apps) and devices (smartphones, tablets, computed-based, etc.).
- **Market and business opportunities**: Market access, sustainable models, cross-sectoral approaches and economic incentives.
- **Funding and financing**: Private funding, partnerships, public financing and regulatory incentives to support affordability and sustainability in uneconomic markets.

The 2017 GSR best practice guidelines recognized that regulation has a pivotal role to play in encouraging today's fast-evolving markets to thrive while shaping future markets for digital services that are innovative, balanced and inclusive. The guidelines emphasised that more inclusive, incentive-based and collaboration-driven regulation will not only benefit consumers and businesses, but will help fast-track a digital future for the billions who remain unconnected[9].

ITU-D Study Group 1, in its 2014-2017 study period addressed over the top services (OTTs) in Question 1/1 Policy, regulatory and technical aspects of the migration from existing networks to broadband networks in developing countries, including next-generation networks, m-services, OTT services and the implementation of IPv6. Chapter 3 of the final report[10] presents the development and deployment of IP-based services and applications (OTT) services, and identifies four main objectives:

- policy tools to facilitate the availability to consumers at the local and national levels of competitive IP-based services and applications;
- alternative successful business arrangements that have been used to meet growing demand and other changes in the market;

8 www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2017/GSR-17-Consultation.aspx
9 www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2017/GSR17_Best%20Practice%20guidelines_E.pdf
10 ITU-D Study Group Question 1/1: www.itu.int/net4/ITU-D/CDS/sg/index.asp?lg=1&sp=2014

- best practices and policies that create incentives for investment in IP-based services and applications; and
- evaluate the challenges and provide an overview of best practices and guidelines regarding legal frameworks.

In addition, ITU-T Study Group 3[11] on Tariff and accounting principles and international telecommunication/ICT economic and policy issues, is dealing with the economic and regulatory impact of the Internet, convergence (services or infrastructure) and new services, such as over the top (OTT), on international telecommunication services and networks, discussion are under way[12].

In 2015, the European Commission launched its consultation on Online Platforms, Cloud and Data, Liability of Intermediaries, and the Collaborative Economy[13]. The Consultation is part of the Commission's assessment of the role of online platforms, promised in its Communications on a Digital Single Market Strategy for Europe on 6 May 2015. The enquiry asks whether platforms should be left to market dynamics, self-regulated or subject to regulatory measures

The European Commission has summarised the scope of the Consultation as:

the social and economic role of online platforms, transparency (e.g. in search results), terms of use, ratings and reviews, the use of information by platforms, the relation between platforms and their suppliers, the conditions of switching between comparable services offered by platforms, and the role of online intermediaries, including ways to tackle illegal content on the Internet.[14]

The latter has already generated a substantial level of commentary and debate within Europe and no doubt this is but the start of a broader dialogue in that market and globally. Industry stakeholders are concerned that the review will lead to developing unnecessary regulations for the Internet economy. This debate will undoubtedly play out in 2016 and beyond.

Irrespective of the approach (top-down, industry by industry, by the courts, etc.), for the app economy to thrive, legal provisions are needed, and at the same time the applicable body of law must not hamper the spread of innovation and progress within the app economy. This is indeed a balancing act especially since most regulation is national (or regional, in the case of Europe) when the app economy is in many ways global. In formulating the optimal approach for the regulation of the app economy, there is a need to address governments, regulators including both ICT and non-ICT regulators, and key stakeholders.

2.2 A regulatory taxonomy of the app economy

The rapid emergence of the app economy, coupled with its highly disruptive nature, has left policymakers around the world uncertain about what regulatory responses are appropriate. A key reason that it is so difficult to get an analytical handle on the app economy in order to form regulatory responses, is that, in reality, the app economy is not one thing. From a technological perspective, it is true that all apps run on the technology troika of the smart mobile device, mobile network, and cloud computing. Apps themselves, however, represent a dizzying diversity of functions and characteristics that span multiple types of users and industries.

From a regulatory perspective and, in particular, from the perspective of telecommunication regulations, the following categorisation is useful in developing an analytically grounded response to the

11 ITU Telecommunication Standardization Sector: www.itu.int/en/ITU-T/studygroups/2017-2020/03/Pages/default.aspx
12 www.itu.int/en/ITU-T/studygroups/2017-2020/03/Pages/questions.aspx
13 https://ec.europa.eu/digital-single-market/en/news/public-consultation-regulatory-environment-platforms-online-intermediaries-data-and-cloud
14 www.lexology.com/library/detail.aspx?g=9e8cbf28-c3ab-456d-b32d-0050a1e422d1

phenomenon on of the app economy. This categorisation starts with a distinction between 'pure OTT' app and 'bits and atoms' apps.

- **Pure OTT apps** exist entirely or primarily in the network. They may be messaging or communications apps transmitting voice, messages, image, video or they may offer a package of service, which in the case of Facebook includes publishing, content and contact management, messaging, scheduling etc.
- **Bits and atoms apps** use the network specifically to achieve some outcome in the world outside the network, for example: Uber provides an app designed to connect users seeking rides with car operators to move them to their desired location for a fee; AirBnB seeks to connect providers and users of accommodation; digital money apps seek to enable low value financial transactions at much lower charges than traditional banking systems.

These different types of app imply different types of regulatory response. In addition, there is a different and broader type of regulatory response required to the app economy *en masse* and this has to do with the competition and taxation implications of the rise of app economy companies with their sophisticated corporate structures. This is not specifically an app economy issue but is one that is exacerbated by hugely increasing value of economic activity in the app economy.

App economy companies are also characterised by the large role that intellectual property plays in their value creation. The ephemeral nature of intellectual property provides these companies with a great deal of flexibility regarding the geographic location of the value creation centres and therefore significant discretion regarding payment of taxation and duties. This is a concern to all governments as the app economy incorporates ever greater shares of economic activity.

Communications OTT apps

A communications OTT app is one that can be developed and deployed purely in software that runs on the user handset and in the cloud that primarily delivers communications services. A communications OTT app is one that provides communications services that compete directly with the offerings of the operators. There are many players in this category including: Viber, Line, WhatsApp, Wechat, Kakao Talk and Kik. Another is Skype, which, started on the desktop but has now migrated into the mobile handset as well.

Figure 5: Communications OTT players

Source: Wavestone, Challenges and impacts created by "over-the-top" (OTT) players In the African telecommunication sector, www.wavestone.com/app/uploads/2016/09/OTT_UK.pdf

Other OTT apps

There are a number of OTT apps that are not primarily providing communication services and are therefore not competing as directly with the operators as a communications app. There are dozens of social media apps[15] with most being relatively specialised, whereas a few of the bigger players such as Facebook and LinkedIn that not only offer messaging services, but continuously expand the functionality they offer their users, including communications features.

[15] See, for example, https://en.wikipedia.org/wiki/List_of_social_networking_websites

Given these trends, it is likely that there will be some future convergence between communications 'pure OTT' players and other 'pure OTT' players, particularly amongst the large-scale examples.

Industry specific *bits and atoms* apps

In contrast to the pure OTT apps, the bits and atoms players use apps and cloud-based systems to connect buyers and sellers for physical products. The leading examples in this category are AirBnB and Uber. These companies are using app-based software systems to achieve business processes in the physical world, such as providing taxi rides or accommodation services, in ways that are more efficient than the traditional business processes.

The reason that this category is distinctive from a regulatory perspective is that the disruptive effects are concentrated in the industry that is being targeted by these app companies- in this case the taxi and accommodation industries- and it is in these industries that the regulatory responses, if any, will be required.

Cross-industry disrupters

In contrast to the industry specific bits and atoms apps, cross industry disrupters are effectively in the process of creating new industrial sectors by using communications and computing hardware and services to create new kinds of product categories.

A leading example in this category are the video streaming players such as Netflix, Hulu, Amazon Instant Video, Sling Orange. These companies are having a massive disruptive effect on traditional broadcast and cable television companies and, on the production side, the Hollywood studio system. Again, these systems started life in the lounge room but they are now very much 'any device' offerings. Increasingly, television is becoming a 'big tablet' and a mobile phone a small television. These players have created a new kind of video service product that does away with the two-part, advertiser funded traditional model of free to air television, that also does away with time-based 'appointment viewing' and, through global scale in content production and management, delivers unprecedented consumer choice on a global scale. However, geographical restrictions still exist to protect certain business models and revenue streams, and policy and regulatory questions arise as to the regulation of such services and their content.

This is a category of app-based activity that clearly requires regulatory responses to be developed – preferably collaboratively- by broadcast, media and telecommunication regulators to be comprehensive and effective.

Another example of app-based cross industry disruption is the fintech sector (financial technology) including mobile money, which has emerged rapidly in Africa. Using communications networks to develop new businesses and systems for delivering a broad range of financial products is a significant growth sector in the app economy. Figure 6 groups fintech companies by the type of financial service being offered.

Again, the experience of M-PESA is of interest in relation to the need for 'collaborative regulation'. According to one member of the team that was responsible for setting up M-PESA[16], the Kenyan financial regulators were initially not very supportive of the concept even though their participation was encouraged. It's reasonable to assert that M-PESA was established in spite of collaborative regulation, not because of it, and the system would likely have been better implemented and more quickly adopted if financial and telecommunications regulators had collaborated earlier[17] (see Paul Makin's article in particular for a fascinating insider's account[18]).

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16 Regulatory Issues Around Mobile Banking, New initiatives to bank the poor are straining the world's financial regulatory systems, Paul Makin, OECD, http://www.oecd.org/ict/4d/43631885.pdf

17 ibid

18 ibid

Figure 6: Fintech companies and type of financial service

Source: BBVA presentation at the BoAML Digital Conference May, 2015, www.growadvisors.com/blog/fintech-innovation-forum-2015-innovating-business-in-asia

Mobile money apps are probably of such great significance that they justify their own category. This discussion also emphasises the importance of 'regulatory precursors', the pre-existing regulatory environment into which M-PESA was launched. For example, the fact that Kenya had a pre-existing identity card system greatly facilitated the 'know your customer' (KYC) regulatory requirement for providing financial services. The conclusion that can be drawn from such experience is that initial conditions are critical success factors (and they may not be apparent or obvious at the outset) and collaborative regulation will also contribute to success.

Types of app disruption and regulatory issues

There are some key regulatory elements and issues at the core of policy and regulatory debates along with critical questions including: [19]

1. **Net neutrality**: The open Internet net neutrality principle, which asks operators to treat all data equally, and not intentionally block or slow down traffic that competes with their own services. Net neutrality is also relevant to traffic management policies. Zero rating (when end customers are not charged for data used for specific Internet applications or services in capped data plans) is also currently a topic that is being discussed among regulators.
2. **Zero rating**: The practice of some mobile network operators not charging end customers for data used by specific applications or Internet services in capped data plans. Should mobile network operators (MNOs) be allowed this practice? Should regulators continue to apply a hands-off approach to business practices and commercial agreements between MNOs and other partners? Are there certain circumstances under which zero rating should be encouraged for example, programmes in which the ISP neither receives payment from the content provider nor charges the consumer for accessing content, programmes that are open to any content that meets the same technical criteria, or those designed to address a specific social need (such as connecting the public with government services)?

[19] GSR-17 discussion paper on communications regulation in the brave new world of the app economy also discussed these issues: www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2017/default.aspx

3. **Market reviews**: When competition is considered not effective, regulatory measures aiming to address market failure can be imposed on dominant firms by national regulatory authorities (NRAs) after conducting a thorough market review.
4. **Consumer rights**: Certainly challenging for consumers to understand the impact of traffic management on their Internet use as it becomes more complex and widely used.
5. **Feasibility**: Telecommunication operator business model sustainability takes into account decreasing revenues and constant investment for increased bandwidth. For example, the European Union political (digital) agenda has demanding objectives.
6. **Competition**: Ensuring a level playing field between telecommunication operators and online service providers, and preventing anti-competitive behaviour, taking into account the market power.
7. **Innovation**: Online service providers provide innovative services for consumers. Heightened regulation risks destroying these benefits.
8. **Lowering the regulatory burden on traditional telecommunication operators:** Regulators should consider lowering the regulatory burden on telecommunication operators where other general consumer protection or other laws already cover the behaviour at issue.

2.2.1 Competition and macro level regulatory issues

The app economy has significant implications for each national economy, perhaps even more so in developing countries, the app economy has a critical role to play in economic growth and development. This is because the app economy can facilitate the development of markets and institutions more rapidly and at lower costs that is possible compared with the historical development processes that have occurred in some countries.

Along with these positive potentials for growth and development come significant regulatory challenges. These include the rising market power of companies in the app economy ecosystem, the discretion that transnational companies have in setting up structures that minimise taxation (where value creation is based on intellectual property), and the question of how best to facilitate the growth of the app economy within national borders while avoiding the risks and downsides.

2.2.2 Platform wars

The preceding discussion concerns regulatory responses to individual businesses or groups of businesses undertaking similar activities. At a larger scale, a number of issues related to but not exclusive to the app economy will very likely be of increasing focus in the years ahead.

One prominent example is the high-stakes ‘platform wars’ between companies such as Apple and Google (now Alphabet) or between Samsung and Apple. This is a contest that takes place on many fronts including: handset features, operating system features, the app ecosystem for each platform and so on. Box 2 provides an example of this ongoing contest between platforms.

Box 2: Platform wars

Google Voice is an app that adds certain calling features to phones. Google provides users with a distinct phone number and then redirects calls to other numbers of the user's choosing when calls arrive.

On 31 July 2009, the Federal Communications Commission (FCC) sent Apple, Google and AT&T letters of inquiry. The FCC inquiry focused on potential anticompetitive behaviour relating to an application that Google submitted for approval to the Apple App Store. Apple allegedly rejected the Google application and removed related third party software that used the Google Voice service.

- The FCC wanted to understand the reasoning behind the removal of the third-party software and the alleged rejection of the Google Voice application.
- The FCC required Apple to disclose specific details as to why it rejected the Google Voice application while allowing other applications with virtually identical features.

The matter was eventually resolved and the Google Voice app is now available

2.2.3 Market power and competition

Market power is shifting on a continuous basis and perhaps more rapidly than ever before. Apple, Google, Microsoft, and Amazon are, in some cases, an order of magnitude larger by market capitalisation than telecommunication operators around the globe, and changes to net neutrality rules will affect a wide range of negotiations between app economy, OTT and telecommunication companies.

Google faced anti-competitive objections from the EU 2015 for biases in search results. In July 2016, the EU alleged that Google was favouring its own comparison shopping services in search results and that results from its 'AdSense for Search' are also biased. The EU is also investigating whether Google gives preferential treatment to its own products, including Google Search and Chrome, in its Android operating system. The EU observes that "Device manufacturers are obliged to place Google Search and Chrome on the primary home screen of Android devices, as well as other Google apps, if they want to provide access to the Google Play Store- the single largest source of third-party Android apps"[20].

Even the largest jurisdictions in the world face significant challenges in bringing actions against companies the size of Apple and Google. It is difficult to imagine that much smaller jurisdictions in Africa will be able to exert a decisive influence on the behaviour of these companies.

2.2.4 Transnational corporate structures and taxation

Although the app economy has the potential to stimulate economic growth and create jobs and wealth, it comes with significant consequences in terms of taxation revenue national jurisdictions. One way in which taxation is lost can be seen by considering the way Uber, for example, affects the taxi business. When a driver acts as a driver for Uber, a commission on every fare is paid to the company. This payment is, in effect, for Uber services in coordinating drivers and passengers using its app and back-end systems. From a national accounting perspective, the Uber service represents an import of services and, to the extent that this replaces domestic economic activity, this represents a loss of a value added taxable activity in that country.

[20] European commission files third antitrust charge against Google, www.theguardian.com/technology/2016/jul/14/european-commission-files-third-antitrust-charge-against-google

This mechanism would not be of such concern except that transnational technology companies have enormous discretion in setting up their affairs so that they minimise tax payments, i.e. once economic activity is lost to the transnational, it is lost from the domestic economy tax base. It is only since 2009, following initial concerted action by G20 nations, that a broad-based effort to address taxation issues for transnational companies has really begun to gather momentum. The OECD Global Forum on Transparency and Exchange of Information for Tax Purposes now has 138 members and has positioned itself as the premier international body for ensuring the implementation of the internationally agreed standards of transparency and exchange of information in the area of taxation. The effort to address taxation of transnational technology companies is obviously one that cannot be undertaken except through extensive international cooperation.

There are clear signs that leading jurisdictions are becoming more aggressive on the taxation front, for example, the EU is currently in a protracted and complex action involving Ireland and Apple. The EU is claiming that it is owed around EUR 13 billion in tax concessions granted by Ireland to Apple.

The United Nations Second Committee (Economic and Financial) and the Economic and Social Council meeting in 2015 emphasised that developing countries are more vulnerable to economic and social losses due to tax avoidance than countries that have much larger and deeper tax bases. At the meeting Eric Mensah, Assistant Commissioner of Ghana Revenue Authority and Member of the United Nations Committee of Experts on International Cooperation in Tax Matters said that:

"… capacity-building was necessary in the areas of tax audit, transfer pricing and treaty negotiations, as developing countries needed the technical capacity to engage in international tax matters with the players on the international tax scene. From personal experience, he and his team of treaty negotiators had 'stumbled from one negotiation to the other, literally giving away taxing rights on a silver platter', but had benefited from capacity-building programmes by the international tax community, and were thus more able to effectively engage the system."[21]

The developing nations of Africa can contribute to the problem of international tax avoidance by participating in international forums that target transnational tax avoidance and by building the expertise of our public servants.

There is enormous pressure to find taxation revenue in the developing world and this pressure occurs in a context of underdeveloped taxation collection mechanisms and relatively poorly developed accounting systems in the public and private sectors. Under these circumstances there is a strong temptation to tax those products or services that are simply easy to tax. But a tax that is easy to levy from the perspective of government is not necessarily an efficient tax from a wider perspective.

Some countries in Africa, such as Congo, Ghana, Gabon, and Senegal, have taxed or are taxing inbound international calls in the form of a surtax on international inbound termination rates. This is an easy tax to impose because all such calls are recorded by operators and therefore the calculation of tax liability is simple.

A study by Deloitte[22] points to the consequences of this type of tax: reduced call volumes from overseas, lost export opportunities, reduced competitiveness, higher local business operating costs and so on. Such taxes are ultimately self-defeating because they discourage the growth economic activity and investment therefore leading, over time, to the economy and therefore the tax base being smaller than it otherwise would be. It is critical that all governments seek sources of revenue that are as efficient as possible and not on the basis of whether they are easy for government to collect or not.

In many cases, the app companies that disrupt traditional industries are transnational companies, and increasingly, particularly in the information technology sector, these companies have complex

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21 Combating Tax Evasion Especially Critical for Developing States, Second Committee, Economic and Social Council Meeting on Domestic Resource Mobilization, www.un.org/press/en/2015/gaef3438.doc.htm

22 Mobile taxation: Surtaxes on international incoming traffic, www.gsma.com/mobilefordevelopment/wp-content/uploads/2011/09/Mobile-taxation-Surtaxes-on-international-incoming-traffic-Executive-Summary-English.pdf

corporate structures designed to minimise taxation liabilities by providing great flexibility in determining where profits are realised. When such a company disrupts an existing industry, at least part of this industry is inadvertently 'internationalised' in the process. Take the example of Uber once again. Prior to Uber, taxi businesses tended to be local with 100 per cent of the value-added economic activity being local and these entities paying tax according to national laws. When Uber enters a country, that country in effect begins importing 'software mediated taxi logistical services' from Uber and some proportion of the country's tax base is lost to that national jurisdiction.

As information technology continues to account for an increasing proportion of national economic activity, national governments are losing their ability to tax such activity. Increasingly, these companies derive their value from intangibles such as patents and software, and this increases the flexibility in constructing centres of value in whatever jurisdictions they find most advantageous. This is not a problem peculiar to the app economy, but certainly the capacity that the app economy has demonstrated to draw ever greater domains of economic activity into the realm of software will certainly accelerate this phenomenon.

An earlier ITU GSR 2015 discussion paper on the impact of taxation on the digital economy identified the distortive effect of taxes in the digital eco-system on three levels: (i) Potential disparity in tax burdens imposed on telecommunication operators when compared to other operators of the digital eco-system (for example, digital advertisers, social networks); (ii) Taxes on asymmetry among global players in the digital sector and (iii) In country taxation asymmetry between the telecommunication sector and other providers of other goods and services[23]. This paper also recommends that, considering the impact of digital technologies on the economy, by increasing efficiency of production processes, facilitating the circulation of goods, creating new businesses, etc. the taxation of digital goods and services should be approached with care, preventing any erosion of their spill-over contribution to GDP growth. It has been shown that excessive taxing digital goods and services could limit adoption, restricting the positive contribution to GDP. Thus, the tax collected is outweighed by tax foregone on 'lost' GDP. In this sense, in developing fiscal policies, governments need to consider the trade-offs between revenue generation and the potential negative impact of the development of the digital sector.

2.3 Regulatory responses to the app economy

The app economy is incredibly diverse and an app economy taxonomy provides a more analytical basis for considering regulatory responses. Table 1 highlights the nature of regulatory issues for each type of app and the characteristics of appropriate regulatory responses.

Table 1: An app taxonomy and regulatory approaches

App type	Regulatory issues	Regulatory approaches
OTT Communications (e.g.: Whatsapp, Viber, Skype)	– falling margins and weakened market power for telecom operators – rising market power of OTT players – congestion of existing infrastructure – reduced telco margins and capacity for investment – OTT players don't pay taxes	– collaboration between telco regulators and other relevant government agencies such as those responsible for innovation – agencies for social inclusion and empowerment
Other OTT (e.g.: Facebook, LinkedIn, Google+)	– consumer protection, privacy, use of consumer data, the right to be forgotten, harassment and/or bullying on social media	– collaboration between consumer protection and telco regulators

[23] www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2015/GSR15-discussion-paper.aspx

App type	Regulatory issues	Regulatory approaches
Bits and atoms (e.g.: Uber, AirBnB,	– maintenance of consumer protection standards in affected industries e.g. accommodation, taxi services – complex issues of finding a level playing field for providers with significantly different business models	– primarily responsibilities of regulators of affected industries but consultation with telco regulators likely to enhance regulatory outcomes
Cross-industry disrupters (e.g.: Netflix, M-PESA)	– financial stability, integrity of monetary policy – management of consumer funds, – protection of identity, know your customer requirements, prevention of illegal use, money laundering – encouraging production of local content and services over streaming channels	– collaboration between financial and telco regulators essential and also competition regulators – collaboration between telco regulators and media/broadcasting regulators
Competition and macro level	– Industrial disruption causing increases in market power within particular industries – competition issues arising from global reach of disrupters – taxation issues arising within particular industries due to disruption – nation and global level taxation issues arising from opportunistic corporate structures by global firms	– collaboration between competition authorities and taxation departments is critical – responses will include policy and legislative changes at the highest political level – international collaboration and agreement between policy makers and at the political level will be critical

Source: Systems Knowledge Concepts (www.skc.net.au)

The objective of this taxonomy is to provide some analytical framework for the various regulatory approaches that are most likely to be appropriate for each type of app economy disruption. For example, if a particular app appears to fit into the 'bits and atoms' category (see section 2.2), it is likely that the most effective regulatory responses to app-driven disruption will be from traditional industry regulators, for example, local city councils in the case of the accommodation industry. In contrast, in the case of cross industry disruptors, there is clearly a need for telecommunication regulators to collaborate with regulators of affected industries.

Perhaps the most obvious example where there is a need for comprehensive and widespread regulatory collaboration is the case of mobile money and, more generally, mobile financial services. As such, mobile money illustrates the challenges to achieving the regulatory innovation required to deliver the benefits of the app-economy.

The following section uses the example of mobile money to provide a specific example of the regulatory collaboration required to deliver an effective solution. There is widespread acceptance that regulation needs to be as light-touch as possible, flexible and adaptive and that collaborative regulation will be a necessary part of the mix of regulatory responses to the app economy. These are valid generalisations that there is a need for a more analytical approach in order to craft the range of variable regulatory responses that will be required to respond effectively to the diversity of the app economy.

The app economy is also highly dynamic. Regulatory frameworks must evolve as markets evolve – it is not possible to regulate the future into the past. In addition to technology neutrality, regulatory frameworks must also be as future-proofed as possible. Flexibility is arguably the key but there is little doubt that new arrangements, approaches and tools are likely to be necessary. As highlighted

above, some of those frameworks may need to be temporary and transitional, even experimental and tentative.

Supporting innovation is not, however, the only goal. There are some elements of regulation that ought to be immutable. These pillars include the need for effective competition policy – both between competing substitutable services and in the supply of connectivity, consumer protection, data protection and privacy, and that the services supplied especially to consumers of are merchantable quality.[24] Many systems of regulation have been in place and developed over long periods to protect consumers whether they be taxi passengers or the users of accommodation services or tenants entitled to the quiet enjoyment of their shared apartment buildings. These protections should not be allowed to be eroded because of the appearance of new intermediaries and new markets facilitated by apps however innovative those apps and markets may be. Taxation and the application of domestic laws on the international supply of services and content further highlight the complexity of this new environment and the upcoming challenges. The optimal approach to the app economy does not mean more regulation but better and flexible regulation.

2.3.1 Regulatory responses to OTT communications apps

OTT communications apps are radically disrupting the traditional economics and business of telecommunications, including in Africa. Telecommunications operators are alarmed at the impact on their relatively high margin services of voice and SMS revenues due to consumer uptake of OTT services. It is the communications OTT apps that present the most direct challenge to the traditional operators.

In considering regulatory responses to OTT services a useful starting point is the objective that underlies all telecommunication regulation: the long-term interest of end users (LTIE). In telecommunication regulation, the LTIE concept was defined in terms of traditional 'carriage services', a concept which is already obsolete. Nonetheless, regulatory decisions in relation to OTT services need to be formed in the context of maximising benefits for consumers and citizens. In all the debate concerning regulation of OTT services, none has made the claim that consumers do not benefit from the increasing sophistication and availability. Thus, the default regulatory position should be not to needlessly suppress the development and growth of OTT services. While the and immediate consumer benefits are clear, it is reasonable to be concerned that in the longer run, loss of revenues and margins for premium telco services may lead to decreased willingness or capacity to invest in new infrastructure. The counter to this argument is that operators are experiencing an explosion in demand for mobile bandwidth that is generated largely by OTT services.

From a more general perspective, the question arises to what extent any regulator or government should seek to accommodate or compensate incumbents in the face of technological or more generally, economic change. It is likely that any such accommodation will slow the process of change, which in turn is likely to limit productivity benefits and benefits to consumers, and which will eventually lead to a loss of national competitiveness and lower economic growth. Notwithstanding this perspective, telecommunication operators have called for a 'level playing field' and have argued that OTT players should not be exempt from regulatory impositions. Figure 7 shows that telecommunication regulation is complex and multifaceted and illustrates the significant differences in treatment between operators and OTT players.

Telecommunications is still relatively heavily regulated in most countries in the Africa region, and it is understandable that calls for some relief of regulatory burden in response to the emergence of OTT services. It is worth noting that in the taxi sector, which is also relatively highly legislated, changes in

[24] In other words, "*when the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, so as to show that the buyer relies on the seller's skill or judgment, and the goods are of a description which it is in the course of the seller's business to supply (whether the seller is the manufacturer or not), there is an implied condition that the goods shall be reasonably fit for such purpose.*" See Sale of Goods Act, Queensland, 1896, section 17: www.austlii.edu.au/au/legis/qld/consol_act/soga1896128/s17.htm l

policy to accommodate ridesharing disrupters such as Uber have included compensation payments to the holders of existing taxi licences that have been substantially devalued.

The alternative perspective to the demands for a level playing field is one that suggests the telecommunication sector needs to accommodate current disruption and that existing telecommunication companies need to devise appropriate commercial responses. As noted above, telecommunication operators are seeing very rapid growth in demand for mobile data. In addition, new technologies such as LTE and voice-over LTE (VoLTE) reduce operating costs and allow high definition audio voice calls and therefore the ability to compete with OTT services on a quality basis. Box 3 suggests that significant growth is ahead for the South Africa telecommunication market.

Figure 7: Regulatory disparities between network operators and OTT

Area of Regulation	Network Operators	OTT
Licensing (ECS/ECNS) including annual fees, licence obligations and spectrum licence obligations	Yes	No
Interconnection and interoperability	Yes	No: OTT providers are per definition "over the top" of the network, and don't require interconnection.
Quality of Services (QoS)	Yes: End-User and Subscriber Service Charter	No: OTT QoS problems generally blamed on network provider, not the OTT
Universal Service Obligations (USO)	Yes, usually a license obligation.	No
Provision of legal intercept	Yes	No: OTT content often encrypted and cannot be intercepted. E.g. WhatsApp does not comply with South African RICA laws.
Financial reporting and taxation	Yes: All related laws and obligations apply	No: Offshore operators not obliged to adhere to national accounting standards, financial reporting systems. Most revenue realised outside of the country.
National ownership rules	Yes: National ownership and company structures designed to reverse historical injustices apply.	No: Offshore OTT operators not obliged to adhere to South Africa's company ownership rules and their transformative objectives
Consumer Protection Act, other National Socioeconomic obligations	Yes: Local operators and services providers must adhere to all personal and public protection laws and other social obligations.	No: Offshore OTT operators are not obliged to adhere to any of these laws and related social obligations such as labour laws, skills development levies, etc.

Source: Industry Briefing on Over the Top (OTT) Services in South Africa, Portfolio Committee on telecommunications and postal services, 26 January 2016

Box 3: PwC forecasts for the South Africa telecommunication market 2014-2018

According to PwC Annual Report on Entertainment and Media Outlook 2014 – 2018:

- Internet access in South Africa will generate more consumer spend than any other media product or service in the next five years.
- South Africa Internet access market is dominated by the mobile platform.
- 72 per cent of South Africa mobile phone users by the end of 2018 will be mobile Internet users (35.2 million people).
- A growing number of South Africans are able to be connected through mobile Internet connections including WiFi.
- It is expected that by the end of 2018 there will be an estimated 53.7 million HSPA subscriptions in South Africa. 3G and 3.5G will drive Internet growth as legacy GSM is phased out.
- Globally, mobile will generate 60 per cent of every dollar spent on Internet access by 2018.
- Increasing affordability of mobile broadband devices will contribute to the growth of the Internet market.

Source: Industry Briefing on Over the Top (OTT) Services in South Africa, Portfolio Committee on telecommunications and postal services, 26 January 2016

The South African Portfolio Committee articulated the following points which are reasonably widely shared among national regulators:

- OTT technologies, products and services are disruptive innovations that make the same product more affordable and accessible so that a far larger population can afford it, want it, and be able to use it.
- Disruptive Innovations are a natural and highly desirable consequence of technological evolution.
- They present new entrants and incumbents with new opportunities to create new products and services, and enable improvements and cost reductions of existing products and services thereby driving user demand and satisfaction upwards.
- They encourage traditional operators and service providers to leave their comfort zones of past successes, to become highly competitive innovators of new products and services.

In May 2016, Ghana Deputy Minister of Communication, Mr Ato Sarpong, announced that the Government, "*has no intention whatsoever of regulating the operations of over-the-top (OTT) in the country*"[25]. According to him the government wants new technologies to flourish in Ghana and so cannot implement policies to regulate its operations. Although the telecommunication sector had argued "the National Communication Authority and the Government should move in to regulate the operations of over- the- top (OTT) services in Ghana to enable players within the telecom industry stay in business."[26]

South Africa and Ghana have established a relatively liberal approach to regulating communications OTT services, at least for the time being. It may be, however, that as the situation evolves some of the outstanding and unresolved regulatory issues to do with security and privacy, among others, will need more proactive intervention in the operations of OTT players. It is also likely that in addition to some regulation of OTT players that some reduction in regulatory intervention for traditional operators

[25] www.biztechafrica.com/article/government-rules-out-ott-regulation-ghana/11345/
[26] ibid

may be deemed appropriate by regulators. This could include, for example, changes to or even the abolition of universal service obligations and/or quality of service requirements. As the Australian Media and Communications Authority comments in 2014:

"*Concepts such as a service provider of last resort underpin the traditional regulatory obligations of telecommunications universal service. For example, the universal service obligation requires the universal service provider to make a standard telephone service and/or payphone reasonably accessible to all Australians. This obligation is designed to achieve the social and economic good of all Australians being able to connect to each other and to emergency services, public services and general information services. There is potential in this emerging OTT service environment— where alternative network and service pathways can be established by an individual consumer—for this obligation to be achieved in ways other than a regulated service.*"[27]

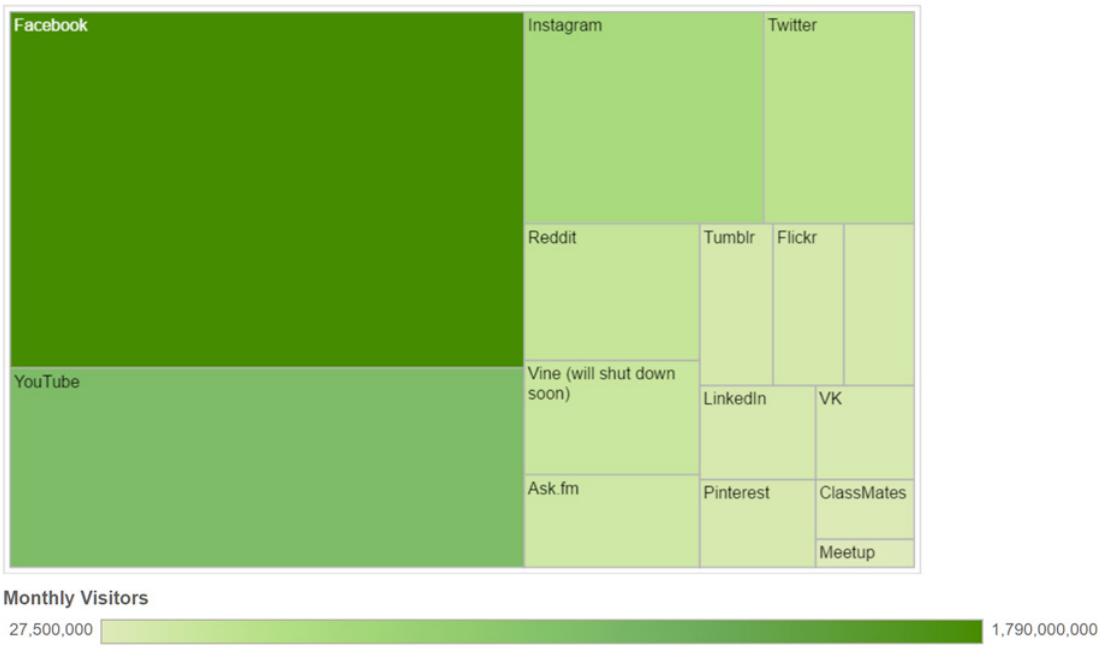
Perhaps the area in which the 'regulatory disparity' is most significant is in the areas of financial reporting and taxation. This issue is dealt with below under the heading of macro issues.

2.3.2 Regulatory responses to other OTT players

The main type of app in the 'other OTT player' category is undoubtedly social media companies. With Facebook recently becoming one of the top 10 largest publicly traded companies in the world, the regulation of social media cannot be regarded as a 'fringe issue' any longer.

The social media landscape is completely dominated by Facebook but other players such as LinkedIn, Pinterest, Instagram, Tumblr, Google+ attract users in the millions. As Figure 8 shows, Facebook monthly visits are in the billions.

Figure 8: Social media companies and their relative size in terms of user visits



Source: DreamGrow, Content Marketing & Social Media Information, www.dreamgrow.com/top-15-most-popular-social-networking-sites/

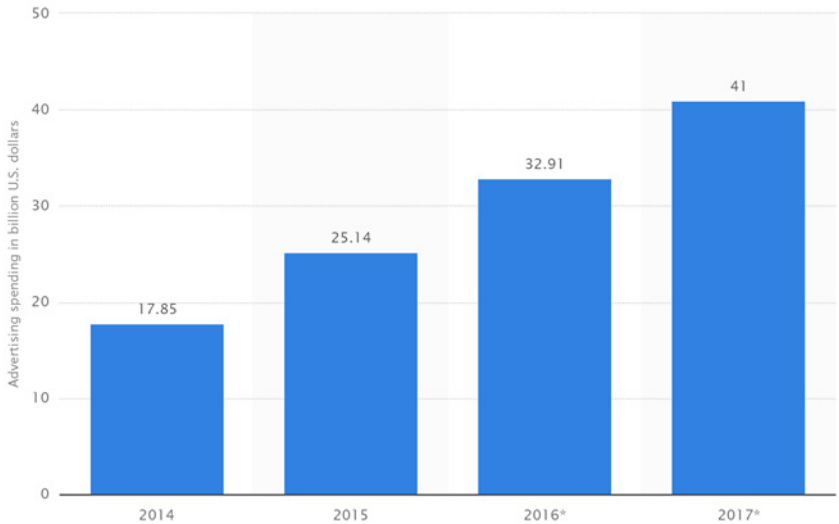
[27] ACMA, Six emerging trends in media and communications, Occasional paper November 2014, www.acma.gov.au/~/media/Research%20and%20Analysis/Research/pdf/Six%20emerging%20trends%20in%20media%20and%20communications_Final%20pdf.pdf

Forrester Consulting identifies five main areas of regulatory concerns with respect to social media:

1. Data protection and privacy: Laws and regulations that ensure customer rights to privacy are covered (and appropriately stated in public privacy statements) when organizations collect, store, and use social media data. Example regulation: The proposed EU General Data Protection Regulation, including the "right to be forgotten" provision.
2. Employee rights: Guidelines that dictate how companies can construct social media policies as well as to what extent they can monitor the activity of current employees and prospective hires. Example regulation: The National Labor Relations Act, which the National Labor Relations Board has cited to push companies such as Target and Costco to rewrite their social media rules.
3. Disclosure and third-party endorsement: Proper protocols for product marketing, endorsements, and disclosure of corporate financial information, ensuring these activities take place in a "clear and conspicuous" manner on social media, and that social features, such as Facebook "likes" and Twitter "re-tweets," are appropriate. Example regulation: The Federal Trade Commission updated .COM Disclosures Guidance.
4. Governance and oversight: Rules that require companies to establish proper processes, controls, and monitoring for worker business use of social media. Example regulation: Federal Financial Institutions Examination Council proposed Social Media Consumer Compliance Risk Management Guidance.
5. Information archiving and retention: Parameters that specify how and in what circumstances organizations should capture and retain social media conversations for the purposes of legal holds and investigations, treating social media as another form of electronic communications. Example regulation: Financial Industry Regulatory Authority Regulatory Notices 10-06 and 11-39.[28]

This regulatory agenda clearly requires participation from a wide range of regulatory agencies and a collaborative regulation approach is likely to minimise the complexity and maximise the effectiveness of regulatory responses. In addition to these regulatory concerns, it is likely that the larger social media players will eventually attract the attention of competition authorities. Social media advertising revenue continues to grow rapidly reaching an estimated USD 41 billion in 2017 (see Figure 9), and the industry is relatively concentrated with Facebook being clearly dominant.

Figure 9: Social network advertising revenue from 2014 to 2017 (USD billions)



Source: Statista, www.statista.com/statistics/271406/advertising-revenue-of-social-networks-worldwide/

[28] Five Common Legal & Regulatory Challenges With Social Media Posted by Nick Hayes, http://blogs.forrester.com/nick_hayes/13-07-31-five_common_legal_regulatory_challenges_with_social_media

2.3.3 Regulatory responses to bits and atoms apps

As described in the taxonomy above, bits and atoms apps use the infrastructure of the app economy to create new forms of intermediation between buyers and sellers creating new markets, and new sources of supply that tend to undercut and disrupt traditional businesses that occupy these markets. There are hundreds of examples that exploit numerous niches creating ever more specialised submarkets including sharing of garden tools, sharing car with neighbours, finding people to do odd jobs, bicycle sharing and so on.

Many, if not most, of these enterprises fall beneath the radar of regulators and it is difficult to generalise about when regulatory intervention may or may not be appropriate given their number and diversity. One generalisation that is likely to be valid, however, is that if such enterprises do need some form of regulatory intervention that primary responsibility will be with the regulators who are already concerned with the industry.

To use the example of Uber and AirBnB once again, regulators of the taxi industry are primarily concerned with the Uber and the other ride-sharing companies. The impacts of AirBnB on local communities have drawn responses from local city councils.

Last month Airbnb abandoned legal action against the City and State of New York and lost a major court case in San Francisco. Berlin has banned holiday letting in residential apartments, Barcelona has fined them twice for breaching tourism laws, Amsterdam has imposed a whole-home limit of 60 nights per year and Vienna has demanded that Airbnb hosts pay tourist tax. Even Queenstown in New Zealand is getting in on the act, raising council rates by 25 per cent for 800 holiday letting hosts. On a much larger scale, in London, Airbnb agreed to restrict listings to 90 nights per year if the properties do not have planning permission, at an estimated potential cost of USD 500 million a year in lost revenue. [29]

Because the bits and atoms app players do not compete directly with the telecommunication operators, regulatory issues in telecommunications are generally not raised by their existence and growth.

2.3.4 Regulatory responses to cross industry disrupters

Cross industry disrupters are using the telecommunication system to create new business models using new telecommunication based communications and delivery systems. They are different to the bits and atoms apps in that they do not just take an existing service and decrease transactions costs thereby expanding the market (although this is part of what they do), rather, they create new types of activity bringing services to new consumers usually at dramatically lower costs compared with substitute products. Since they make such intense use of telecommunication services and disrupt traditional industries, regulatory responses need to be distinctly collaborative in order to formulate effective responses. In the Africa context, there is little doubt that the emergence of mobile money services represents the most important development in this category. See Box 4 for main points from a recent ITU paper on mobile money on the need for mobile money systems and associated barriers.

[29] Murray Cox: The Australian pricking Airbnb's global bubble, www.domain.com.au/news/murray-cox-the-australian-pricking-airbnbs-global-bubble-20170120-gtulnp/

Box 4: Key points on need for mobile money solutions and barriers

Digital financial services: Regulating for financial inclusion- an ICT perspective

Access to financial services is a crucial enabler of economic and social development. Until recently, policy efforts to develop financial services focused on the formal banking sector and its intermediating function in converting savings into investment. This meant that the wealthy, urban population enjoyed access to financial services while financial institutions neglected low income population segments (who generated low or negative returns) and rural areas (which required costly bricks and mortar branches).

Barriers to financial inclusion on the demand side include:

- affordability, such as high interest rates on loans, high premiums on insurance products, minimum balances on accounts and high deposit account fees;
- awareness and understanding, both as to availability of products and how they are structured, priced and used;
- accessibility, with financial products typically offered in urban centres and near high income users, and subject to heavy bureaucratic processes; and
- desirability, with many products not designed for the needs of low income users.

Many would save through hiding cash, and borrow from friends and family or unlicensed money lenders – with all of their implications of limited capacity, security risks and high costs. A minority of the population in developing countries have held bank accounts. Banks have traditionally not pursued low income and rural populations, as returns would not justify the capital and operating costs of a brick and mortar branch and ATM networks. Traditional lending involves substantial costs including due diligence and credit risk assessment, as well as arranging collateral, which also faces delays and legal uncertainties in many countries.

Source: www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.REG_OUT02-2016-PDF-E.pdf

2.4 Mobile money

It sounds like a simple enough idea: enable mobile phone users to transfer money between each other using their phones. And while it is true that the concept is relatively straightforward, the reality is that the regulatory demands are relatively high for this new type of financial service.

It is a simple observation to say that the disruptive power of the app economy arises from the technology providing consumers with new ways to do old things. But these new approaches often create new regulatory challenges. Mobile money potentially has profound economic consequences for Africa and this means considerable effort should be focused on creating the regulatory environment that facilitates its growth and development. This does not mean the risks and needs for regulatory intervention should be ignored but that regulatory responses should be measured and directed towards facilitation rather than blocking mobile money initiatives.

Activities such as managing bank accounts, transferring money and accessing credit have been evolving for hundreds of years and while these services are available to everyone in advanced economies, many of the world's poor do not have access to banking services. Mobile money services provide access to these traditional banking functions but at much reduced transaction costs per user and per transaction. Given the existence of mobile coverage and relatively high mobile device penetration, mobile money systems can be deployed relatively easily, at least compared with the real-world alternative of physical bank branches and the larger traditional banking system. Nonetheless, the

developers of mobile money systems are, to some degree, taking on the functions of a bank, which means engaging with the significant regulatory landscape that surrounds banking. This last point emphasises the fact that the term 'bank' it is not an absolute. Rather, there are a range of functions undertaken by a range of entities. In fact, the various types of activities undertaken by financial entities and the regulatory constraints that apply to them is the basis for significant differentiation in financial services and financial activities that occur in advanced economies.

The emergence of mobile money in developing economies can be viewed as a technologically enabled response to the demand for banking services that cannot be provided to lower income populations on a commercially viable basis using old technologies and methods. Thus, the first point to make about regulatory issues in mobile money is that regulatory responses need to be commensurate with the type and level of services that are being offered through mobile money systems. Put in another way, it is inappropriate to impose on a mobile money system that provides simple account management and transfers, the full weight of regulatory requirements that would be imposed on a full service bank. Such heavy-handed regulatory impositions will only undercut the viability of mobile money initiatives therefore depriving lower income consumers of these important banking services.

2.4.1 Regulatory collaboration and the M-PESA experience

Returning to the example of M-PESA provides insights about what types of regulatory approaches will either facilitate or inhibit the development of mobile money systems and how these regulatory approaches can be put in place. Paul Makin, writing for the OECD[30]

"Many of the mobile initiatives are partially – in some cases wholly – led by non-bank organisations that are traditionally outside the scope of financial regulation, and with whom the financial regulator has traditionally had little or no contact. This has naturally led to concern amongst [financial] regulators, and, for good or bad, threatens to disrupt the regulation of the financial sector in many of these countries."

Makin points out that financial regulators are responsible for the security of the national financial system, a role that is tremendously important for economic stability and the welfare of citizens. While the financial regulators of developing economies also understand that extending the reach of financial services is critical for development, they typically regard this goal as substantially subservient to the broader economic goals. Traditional financial regulators tend to be careful towards innovation largely because of unfamiliarity.

"A lack of familiarity with non-bank institutions has also been raised. Generally, regulators feel comfortable with their existing relationships with the banks and other financial institutions they regulate – they know what figures and reports to look at, and they are familiar with the levers available to them to influence those institutions' operations. Of course, there is no reason why any other institution should not be able to provide similar satisfactory mechanisms, but this is a question of familiarity."[31]

Makin who was involved with the conception and development of M-PESA, describes the initial resistance of the financial community in Kenya:

"Notable by its absence from the list of partners in M-PESA is any member of the Kenyan financial community, with the exception of the Commercial Bank of Africa (CBA), who provide commercial banking services to M-PESA. This absence has caused something approaching outrage in some of the regulators we have spoken to. This was not for want of trying. The M-PESA team spent many hours, over a period of weeks, talking to as many high-profile members of the Kenyan financial community as possible, in the hope of recruiting a partner. Perhaps they were suspicious of becoming involved with a mobile operator, or perhaps they felt that the proposal was too radical, and doomed to fail.

[30] Regulatory Issues Around Mobile Banking: New initiatives to bank the poor are straining the world's financial regulatory systems, Paul Makin; www.oecd.org/ict/4d/43631885.pdf

[31] ibid

Whatever the reason, no suitable financial sector partner could be found, and so eventually Vodafone and Safaricom decided to go ahead without one."[32]

While this lack of financial partners is not optimal, it is nonetheless unsurprising. The boards of traditional banks face difficult decisions in responding to app driven disruption of their markets. Even though banks have few customers among the very poor, they may nonetheless perceive that they may lose future, or even existing, customers to new financial service offerings. This resistance may be one of the significant barriers to such deployments and innovation.

In the case of M-PESA, the financial regulators at least were supportive:

"In this regard, the [M-PESA development] team were very fortunate to have a regulator who was not only careful to ensure that his responsibilities to the Kenyan economy in general, and to the financial sector in particular, were fully satisfied, but who also viewed the aim of "extending the reach and depth of financial services" as a high priority, and to that end was willing to explore new ideas, and listen to potential new market entrants."[33]

Some of the factors in the development of M-PESA that were critical in winning the support of financial regulator included:

- comprehensive reporting and management tools on the system side enabling detailed reporting of every transaction;
- full compliance with the Kenya anti-money laundering legislation, which was, at the time, still in draft form;
- although not offering a full range of financial services, M-PESA sought to behave like a fully-regulated financial institution;
- the pre-existing Kenya identity card scheme.

This last factor was particularly important:

"*The M-PESA team were lucky in Kenya – there is an established national ID card scheme in place, and so M-PESA is able to rely on that (as an aside, many have suggested that the Kenyan ID card scheme is less than perfect. It doesn't matter; it's a national ID scheme, and the Kenyan Government stands behind it, and that's sufficient). The advantage this confers on a scheme becomes obvious when the difficulties experienced by schemes launched in other countries without ID cards are examined, such as M-PESA's own launch in Tanzania."*[34]

In summary, the experience of the development of M-PESA provides useful lessons regarding current and future mobile money systems and for the development and regulation of app driven services in other industries. Figure 10 illustrates the regulatory issues and relevant regulatory agencies in responding to mobile money innovation.

[32] ibid
[33] ibid
[34] ibid

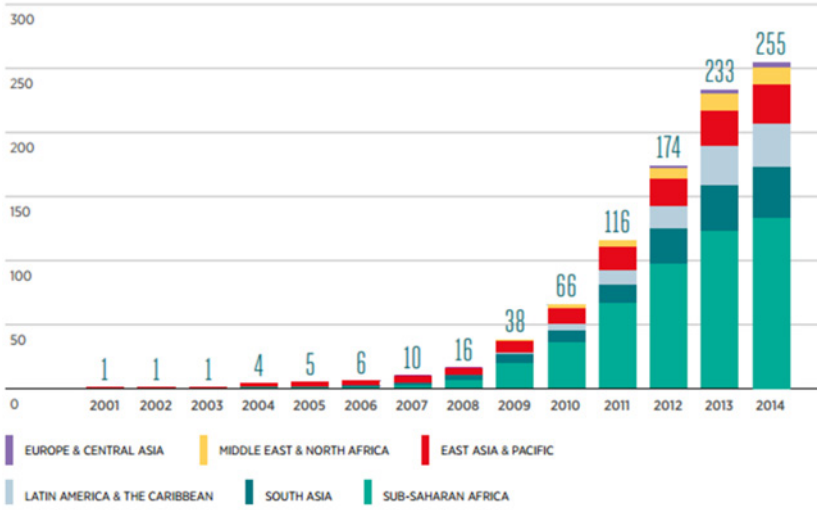
Figure 10: Mobile money regulatory issues and areas for regulatory collaboration

Source: Systems Knowledge Concepts (www.skc.net.au)

2.4.2 Further progress in mobile money

The success of M-PESA has encouraged the deployment of many mobile money systems around the world. Figure 11 illustrates the growth in mobile money services by region from 2001 to 2014. By 2014, there were over 250 live mobile money services in almost 90 countries with the number of mobile accounts reaching almost 300 million supported by about 2.3 million mobile money outlets[35].

Figure 11: Mobile money services by region (2001-2014)



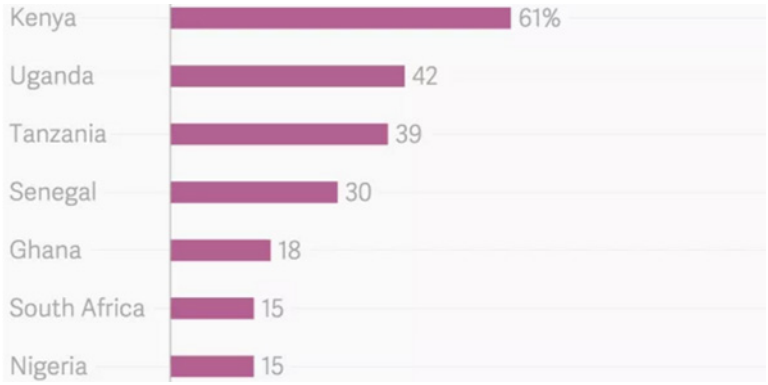
Source: GSMA, Mobile Money: Landscape, Regulation, & Sustainability, presentation at Axiata Group Regulatory Meeting 8 October, 2015

[35] *"In the case of mobile money, an agent outlet is a location where one or several mobile money agents are contracted to facilitate transactions for users. The most important of these are cash-in and cash-out (i.e. loading value into the mobile money system, and then converting it back out again); in many instances, agents register new customers too. Agents usually earn commissions for performing these services."* www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/04/SOTIR_2015.pdf

Figure 12 shows the proportion of African cell phone users of mobile payments. It indicates significant progress with the majority of Kenyans having mobile accounts, and six other Africa region countries making significant progress.

The existence of accounts per se, however, is not sufficient for mobile money to have a significant effect on financial empowerment and positive impacts on economic activity. Accounts need to be supported by a sufficient number of mobile money outlets and their needs to be a sufficient number of individuals, businesses and government agencies willing to conduct transactions mobile payments

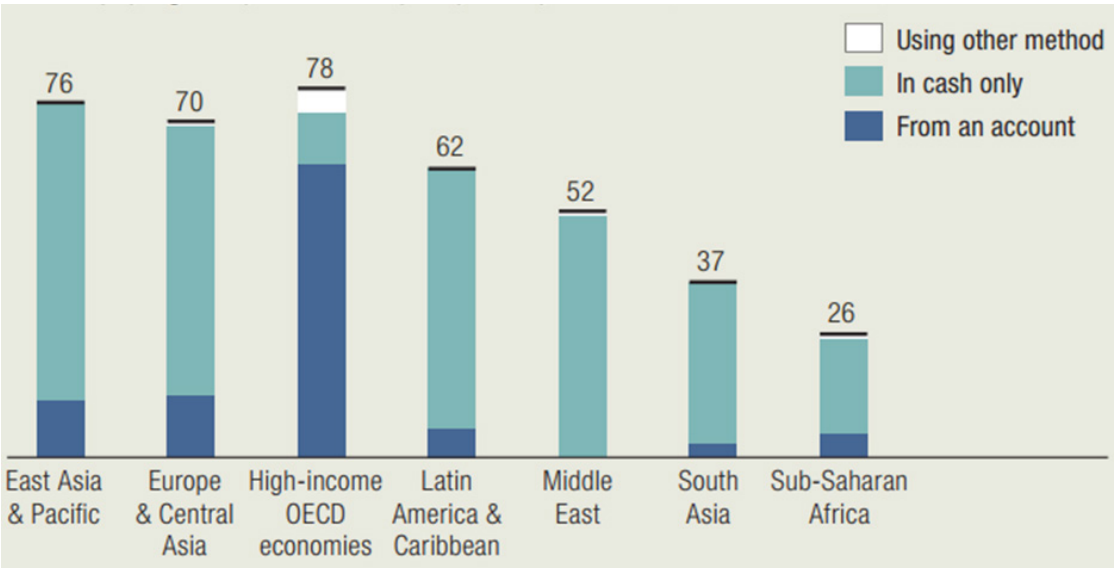
Figure 12: Where cell phone owners use mobile phones for payments (Africa 2014)



Source: www.africanbusinesscentral.com/2015/04/16/the-top-7-african-countries-for-mobile-money-infographics/

Figure 13 shows that, in sub-Sahara Africa, cash is still by far the dominant form of payment for utilities. The contrast between high income OECD countries and sub-Sahara Africa is stark. Only South Asia and the Middle East make a lower proportion of utility payments from an account[36].

Figure 13: How utilities are paid: Adults paying utility bills in the past year, by method (as per cent of all adults), 2014



Source: The World Bank, Development Research Group, Finance and Private Sector Development Team, April 2015, Policy Research Working Paper 7255, The Global Findex Database 2014, Measuring Financial Inclusion around the World

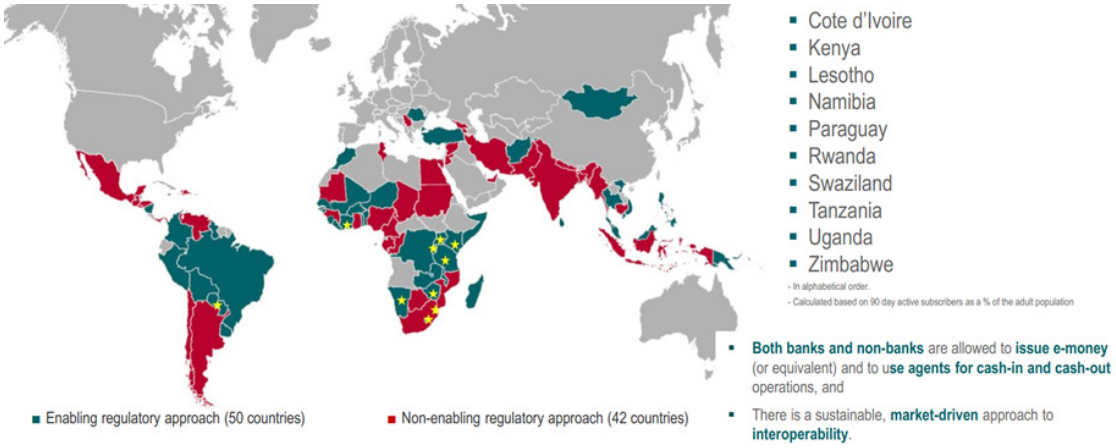
[36] An account at a bank or another type of financial institution or with a mobile money provider.

Notwithstanding the success of M-PESA, mobile money systems are still developing in many countries, and it success varies widely between different countries, with many countries yet to adopt mobile money, and even among those that have, growth has faltered and sputtered in many. The number of substantial revenue generating mobile money operators is limited, even if it is growing. Only 15 mobile money providers had monthly revenues greater than USD 1 million in 2015, three of these were not MNOs, and only twelve had over one million 'active accounts.' For all the waiting time saved paying utilities by mobile money instead of cash, even these are still largely paid in cash. Cash remains predominant even in Kenya, where M-Pesa has been deeply integrated into daily economic life (though where payment is made electronically, the main means is mobile money)[37].

In South Africa, in May 2016, Vodacom decided to close down its South Africa implementation of M-PESA.[38] The reasons discussed for the failure in South Africa included the different demographic of South Africa compared with Kenya, a pre-existing higher-level of financial inclusion in South Africa, the fact that the South Africa telecommunication market is more competitive, and that banking regulations in South Africa are stricter than in Kenya. No doubt the factors are complex but it is highly likely that South Africa banking regulation played a part in M-PESA not succeeding.

In contrast to the South Africa experience, in Ghana, in 2015, the bank of Ghana published new guidelines aimed at providing mobile money operators increase freedom to set up their systems. This change enabled mobile operators to set up their own mobile money systems without requiring them to have traditional banks as partners. The changes also included simpler registration processes for customers. The difficulty or otherwise of registration and identification processes is another important regulatory variable. As noted above, the pre-existing Kenya identity card system was regarded as an important factor in the success of M-PESA in Kenya. Figure 14 shows that the countries where mobile money is most successful are those where both banks and nonbanks are allowed to issue e-money and use agents for cash-in and cash-out operations and where there is a market driven approach to interoperability between mobile money systems.

Figure 14: The top 10 markets with the highest mobile money penetration have a very similar regulatory approach



Source: Mobile Money: Landscape, Regulation, & Sustainability Axiata Group Regulatory Meeting 8 October, 2015

[37] GDDFI discussion paper, Digital financial services: regulating for financial inclusion an ICT perspective, Macmillan Keck Attorneys & Solicitors.

[38] Why M-Pesa 'will never work in South Africa', Sunday Times, www.timeslive.co.za/sundaytimes/businesstimes/2016/06/05/Why-M-Pesa-will-never-work-in-South-Africa

Mobile money has been in operation now for long enough for longitudinal statistical analysis to be viable. A recent article titled *The long-run poverty and gender impacts of mobile money*, concludes that:

"… access to the Kenyan mobile money system M-PESA increased per capita consumption levels and lifted 194,000 households, or 2% of Kenyan households, out of poverty. The impacts, which are more pronounced for female-headed households, appear to be driven by changes in financial behavior—in particular, increased financial resilience and saving—and labor market outcomes, such as occupational choice, especially for women, who moved out of agriculture and into business. Mobile money has therefore increased the efficiency of the allocation of consumption over time while allowing a more efficient allocation of labor, resulting in a meaningful reduction of poverty in Kenya."[39]

This analysis points to the value of mobile money systems and underscores the importance of adopting appropriate regulatory settings to promote its long-term and multidimensional success. The important conclusions are that:

- pre-existing regulatory and institutional arrangements will have a significant bearing on the success of mobile money systems (e.g. a pre-existing citizen identification system, a relatively liberal banking legislation);
- new mobile money operators that provide simple financial services such as account balances and funds transfer should not be treated as if they are banks because they do not undertake the more sophisticated banking functions such as lending, undertaking complex investments, and offering a variety of sophisticated financial products to depositors;
- regulatory responses need to be measured, for example, if there are concerns regarding money laundering these can be dealt with by imposing relatively low maximum daily transaction limits;
- many concerns about accountability can be addressed by ensuring that sophisticated software systems underpin mobile money systems that enable detailed scrutiny of individual transactions and provide tools for aggregate analysis.

The early success of M-PESA in Kenya and early successes elsewhere is encouraging for the growth of financial inclusion. It could still turn out, however, that mobile money systems end up being successful in fewer countries than would be the case if regulatory settings were more favourable. It should also be pointed out that 'success' is a multidimensional concept. Success means that account holders constitute a high proportion of the population, that they use mobile money services often for a significant proportion of their transactions, and, in general, use mobile money services in such a way that delivers them long-term economic benefits. All these dimensions of success need to be facilitated by the appropriate regulatory settings.

2.4.3 Video streaming services

One area of app economy activity that raises issues for broadcast and telecommunication regulators is video streaming. While video streaming is more about *bits* than it is about *atoms*, the video streaming industry is disrupting traditional broadcasting in ways quite similar to the disruptions by players such as Uber and AirBnB.

At a high level, the streaming phenomenon represents the shift of video content from the broadcasting distribution mechanism to digital transmission over telecommunication systems. Netflix, one of the largest players in this space has experienced very rapid growth. When the company added a record 7.05 million subscribers, it was almost two million more new viewers than even Netflix expected, with a fair number of them overseas, streaming services in 190 countries, and 47 per cent of its subscribers living somewhere other than the United States.[40]

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[39] Science 354 (6317), 1288-1292. [doi: 10.1126/science.aah5309] Tavneet Suri and William Jack (December 8, 2016) The long-run poverty and gender impacts of mobile money

[40] Wired, Netflix Is Killing It—Big Time—After Pouring Cash Into Original Shows, www.wired.com/2017/01/netflix-investing-original-shows-finally-pays-off/?mbid=nl_12017_p3&CNDID=44683374

In 2016, Netflix spent around USD 6 billion on original programming and this figure is expected to rise to USD 7 billion in 2017. Netflix is a prime example of the phenomenon of 'the race for scale' – as builds its subscriber base it can afford more original programming which makes it more attractive to subscribers while, at the same time, it can reduce its infrastructure costs per subscriber making it more efficient than its rivals. It is not, however, all plain sailing for Netflix. It has struggled to achieve uptake in some markets in Asia-Pacific region. It will take time for Netflix to establish content that is suitable for non-English speaking markets and markets that are culturally quite different to the United States market.

Broadcasting regulators have been concerned for decades with promoting local content in their broadcasting markets. While this has been relatively straightforward when broadcasting was wholly internal to particular jurisdictions, dealing with the global phenomenon of video streaming presents a different set of challenges. As traditional broadcasters see their advertising revenue decline, they are less able to fund local production leading to concerns about loss of domestic cultural identity.

Video is very demanding of telecommunication bandwidth and, in Africa where landline penetration is very low, it is likely that video streaming services are not as great a near term competitive threat to traditional broadcasters as it is in countries where landline penetration is high and xDSL or fibre is available to the home. As the rollout of 4G and LTE services continues and as more spectrum becomes available, streaming services over wireless broadband will inevitably compete more with traditional broadcasting.

2.5 Guidelines and recommendations on regulatory approaches to the app economy

Given the above, the suggested advice to businesses as well as to ICT policy makers and regulators in relation to future regulation for the app economy in particular relating to its intersection with the telecommunications/ICT sector is set out in Box 5 and Box 6.

Box 5: Suggested advice to businesses in addressing sector regulators and stakeholders

Be collaborative (rather than defensive) with regulators: The app economy is a new concept and as new business models are involved these may be unfamiliar to existing market players including regulators. Increasing understanding takes time. There is often an assumption that sharing economy firms are trying to make a profit by skirting the regulations 'traditional' industries face. Without explaining the nature of your firm clearly to regulators you will likely be regulated as a traditional market player not as say, an intermediary (providing a platform for consumers rather than providing services directly) resulting in higher taxes and requirements.

Be responsive to regulators' legitimate concerns: Many app economy business models do raise legitimate concerns about user safety, privacy and access. These need to be addressed such that entities proposing new models should make compelling arguments they would believe if they were regulators.

Use state of the art approaches to reaching out to government: The best practices in approaching government include, forming coalitions and industry associations to represent a shared point of view rather than each company approaching regulators independently and only in times of crisis. There is a need to be an active participant, taking part in open consultations, seeking place on the decision-making table, being open and transparent about one's expectations and the challenges ahead. Further, app economy firms should seek outside validation from external third party stakeholders.

Share your data: Data need not be made public in order to share it with Government, and can help your case by reducing regulator concerns.

Make a well-researched case for the value provided by your firm: Rather than relying on maxims about the usefulness of the app economy, it helps to have concrete data.

Find the best regulations out there and share them with the Government: Governments are often under-resourced and many existing rules are simply out-dated and are not relevant given the business model of app economy firms. There's no reason firms themselves cannot find the best rules out there and propose such optimal rules. Having said that, industry has specific (and often technical) knowledge and experience of business that they could contribute to the discussion – in order to avoid decisions and regulation not solidly grounded.

Source: ITU modified version of Sarah Cannon and Lawrence H Summers, *How Uber and the Sharing Economy can win over regulators*, Harvard Business Review, 13 October 2014.[1]

[1] https://hbr.org/2014/10/how-uber-and-the-sharing-economy-can-win-over-regulators/

Box 6: Suggested advice to government and telecommunications/ICT regulators

Undertake a review of the regulations applicable to network operators and OTT players: Assess whether such regulations are appropriate, whether forbearance should be applied to network operators, whether additional rules should apply to OTT providers and map how regulation of market participants – especially for substitute/competing services- should converge over time. Likewise review content regulation to ensure in a global market with greater levels of realism (e.g. virtual reality and similar) are appropriate and consistent with domestic conditions and cultural policy objectives. A key element of such a review is to consider market definitions and whether such definitions currently permit a differentiated regulatory treatment for OTT.

Update the licence conditions and as required provide deeming provisions for non-resident OTT providers etc.: Update analogue/legacy licence conditions so as to reflect the move to digital/IP services and as required enact legislative amendments to provide for deeming provisions (e.g. to be say, a special class licence) for non-resident OTT providers etc.

Assess and continually monitor the state of competition in the market. It is critical to assess and critically monitor the state of competition in ICT markets. Ensure there are no gaps in regulation between telecommunication regulators and general competition regulators including where services are offered from outside the jurisdiction. Promote competition whilst recognising that ICT services markets are no longer national and that there is a range of competing services which are domiciled domestically. Ensure that operators with significant market power do not foreclose or significantly dampen the innovative service offerings and OTT services. Further, acknowledge as outlined earlier in this paper that while initially they may have provided strong disruptive competition, as new digital businesses grow and scale almost exponentially, they may be tempted to exercise their market power. Regulators will need to be watchful that the digital economies of scale and scope are not exploited contrary to law.

Collaborate with tax authorities: Ensure that there is, to the extent possible a level playing field for competing services. Such analysis should include the applicable income and value added taxes applicable to competing services.

Promote and facilitate ubiquitous broadband: Recognising the political, economic and societal need for ubiquitous broadband formulate policies to facilitate nationwide broadband using a mix of cable/fibre, wireless, satellite and other technologies. In particular, given the growing importance of wireless broadband to the meeting of global broadband density targets that there is sufficient International Mobile Telecommunications (IMT) spectrum of at least 760 MHz but preferably 840 MHz IMT spectrum available and allocated to such services by 2020. In addition, to promote investment in backhaul transmission and higher speed broadband services in urban/economically viable regions.

Ensure adequate and up to date data protection, privacy and cyber security legislation based on global exemplars: Ensure that domestic legislation for data protection, privacy and cyber security is based on global exemplars and that agencies charged with ensuring compliance and promoting education are properly resourced and staffed by experts. The scope of such legislation should be wide and include legacy and new systems including the Internet of Things (IoT). It is also critical to enact digital identification (digital ID) legislation.

Establish co-ordination procedures between regulators: Establish co-ordination procedures between communications sector regulators and regulators of broadcasting/content (if separate), competition, financial services and privacy/data protection to ensure consistent regulation and comprehensive inter-working arrangements.

Engage in greater public awareness and advocacy campaigns in relation to digital/ICT services: It is important that the public including all sections and age groups in society are well-informed as to their digital rights and responsibilities.

Regulators must engage more broadly with education and training sector: As many skills needed in the future and indeed the jobs of the future are very different from today, there is a role for sector stakeholders lead by the regulator to engage with Education and training Ministries, universities, tertiary institutions, schools and other places of learning to ensure that curriculum and syllabus reflect the app economy and the move to a digital society.

Source: GSR-16 Discussion paper, The race for scale: market power, regulation and the app economy

3 Opportunities and challenges for the app economy in Africa

3.1 Opportunities and challenges

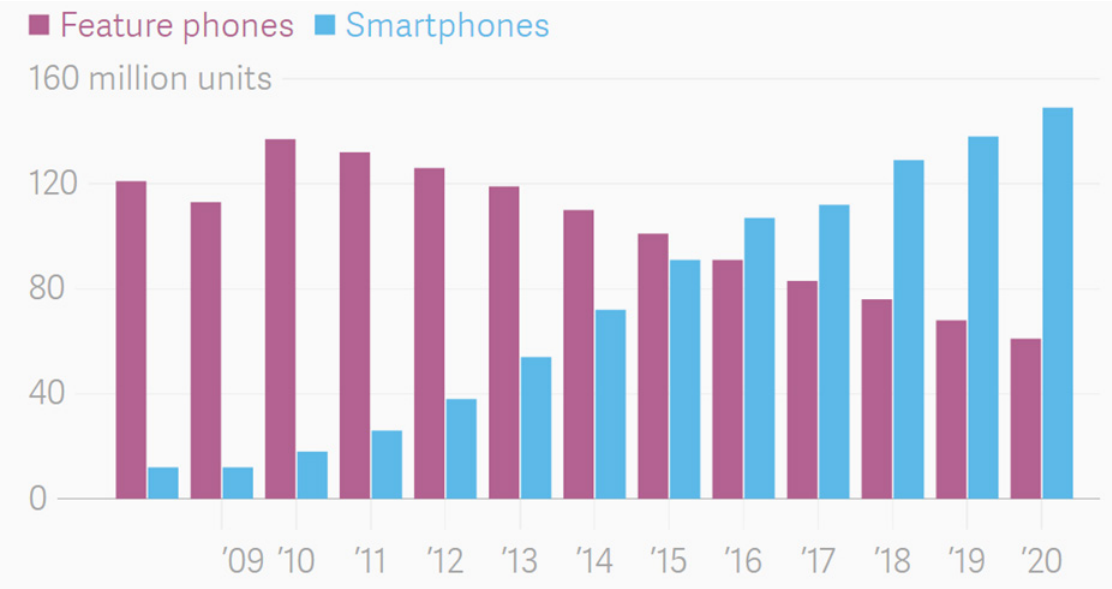
To say that Africa is both an opportunity and a challenge for app economy companies is both true and something of a cliché. It is an opportunity because there are many areas of large population with potentially high rates of economic growth that are starting from a relatively low level of income per capita and a low level of smartphone penetration. Since the demand for mobile services is income elastic, the demand for these services can be expected to grow very rapidly over the next decade or two as more economies develop in the Africa region.

Figure 15: Mobile network rollout in Africa

Source: Wavestone, Challenges and impacts created by "over-the-top" (OTT) players In the African telecommunication sector: www.wavestone.com/app/uploads/2016/09/OTT_UK.pdf

As Figure 15 shows, 4G rollouts are proceeding rapidly. Extensive mobile coverage and high smartphone ownership are the preconditions for app economy take-off, and the Africa region is moving quickly towards being an app-ready region. As Figure 16 shows, smartphone shipments have already overtaken those of feature phones. The projections by Statista show smart phones dominating by 2020 but even this scenario may be relatively conservative if the price of entry level smartphones continues to fall at current rates.

Figure 16: Annual mobile phone shipments in Africa



Source: Jefferies & Co via Statista | Projections from 2011 onwards http://qz.com/451844/africas-smartphone-market-is-on-the-rise-as-affordable-handsets-spur-growth/

On the other hand, Africa is coming late to the app economy party. The large players are already well-established, primarily in the United States, but also in Europe, China, and Japan, and these players are among the largest companies in the world by market capitalisation. To some extent, this closes off certain possibilities for app companies in Africa. Nonetheless, the experience of M-PESA points the way to the kind of development that is hugely valuable in the Africa region context and has created opportunities for many across the continent and beyond to participate in the digital economy. China has a unique online and app ecosystem show that significant opportunities arise within national borders for the app economy. While it is true that developments within China have much to do with restrictions on Internet traffic, it is also true that, with the app economy still less than 10 years old, there is a long way to go yet and it is likely that many more unique opportunities will arise in Africa.

3.2 The nature of the app economy opportunity

The mobile phone is driving social and economic transformation everywhere, not least in the Africa region and this positive perspective on the prospects for the app economy in Africa is based on several factors including:

- apps are relatively cheap to produce (compared with traditional desktop software) and the major platforms of Android and iOS provide commodity distribution services at very low cost to app developers;
- the cost of basic simple smartphones is falling rapidly and they will soon be within reach of the majority of people in the Africa region;
- mobile phone coverage in Africa is rapidly improving and in many areas rollouts may leapfrog quickly to LTE delivering high speeds and advanced functionality;
- there are many unique economic contexts within the Africa region that create opportunities for unique African solutions, and while these are not yet at the scale of companies such as Facebook or AirBnB, they nonetheless represent opportunities from which further development can take place in the future.

In essence, these factors mean that app-driven responses to a range of unique challenges faced by people in the Africa region because of poor infrastructure, underdeveloped markets and, in some cases, weak institutions, will create a large appetite for app solutions that address these problems.

The ethos pervading this new ecosystem — centred in Nairobi, Lagos and Johannesburg but with offshoots across Africa — was encapsulated recently by Mark Essien, creator of one of the first hotel booking websites in Nigeria. Far from being a handicap, the deficit in physical infrastructure such as landlines and indeed railways, provides the Africa region with a unique chance to step ahead, he argued at a recent Lagos conference, "*… the future of technology for Africa is not in playing catch-up. But in looking at the things we lack and using each of those gaps as an opportunity for us to invent something we can use to leapfrog the rest of the world*".

The first big leap came with the adoption of mobile phones. The next wave of technological advances are occurring as high speed Internet and smartphone handsets become more accessible. Already there is an app developed in Africa for almost everything: herding cattle in Kenya (i-Cow), private security in Ghana (hei julor!), remotely monitoring patients in Zimbabwe (Econet) and in Uganda, an Uber-like service (Yoza) connecting dirty laundry to mobile washerwomen. Married to this explosion of creative endeavour are the continent demographics — over 70 per cent of the fast urbanising population are under 30.

Another way of thinking about the potential of the app economy in Africa is from the perspective of a branch of economics called 'new institutional economics'. This is an area of economics that emphasises the importance of 'institutions' in the economic development of nations. Institutions can take the form of formal legal rules and regulation, and of informal social norms, as well as the central governance organisations such as the courts, universities, regulatory authorities, central banks and government itself. The concept of institutions in this body of economics includes, critically, well-functioning markets.

Institutions are a kind of 'invisible infrastructure' that, like physical infrastructure, enables societies and economies to function more efficiently. A country may have access to cutting-edge technology, but if it lacks efficient education systems and programmes, effective policy making, rule of law, or well-functioning markets, or if its political systems are unstable, it is unlikely it will prosper economically in the long-term. Good institutions provide effective laws and regulation, provide the certainty that supports investment and enable markets to function efficiently.

Over the past two decades there has been much discussion of the process of 'telecommunication leapfrogging' that has taken place around the developing world as new and improving mobile communications technologies have delivered mature services without the need to deploy expensive landlines.

Enhanced connectivity achieved through telecommunication technology, especially as it matures into the converged app economy, offers Africa not only the usual benefits of improved productivity and efficiency that are associated with advances in many technologies, but also new ways to develop and improve its institutions and potentially, leapfrog many of the institutional development processes that have occurred elsewhere over hundreds of years.

Consider a specific example. The development of the banking system entailed many processes including legislation and regulation, the growth of physical banking infrastructure – branches, offices etc. – and the development of regulatory organisations and administrative processes. In the app economy, the combination of cheap and ubiquitous smartphones, mobile coverage, and mobile money software applications have enabled the development of functioning banking systems more quickly at much lower cost and everywhere.

While there is no substitute for good governance and well-functioning political systems, mobile communications technologies combined with emerging software innovations such as blockchain (the technology that underlies bitcoin) have the potential to deliver institutional infrastructure and the associated economic development benefits far more quickly than has been possible in the past.

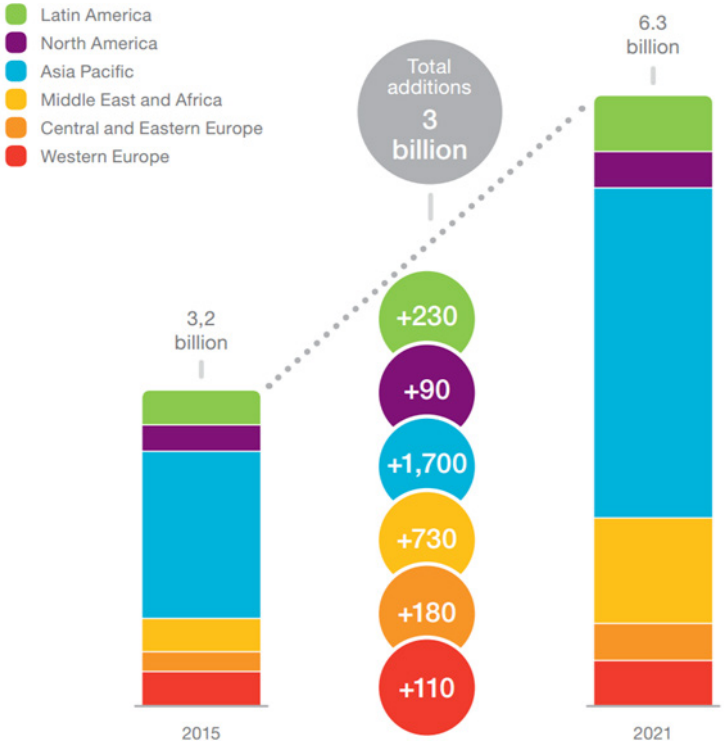
These changes can probably happen more quickly than most people believe. The Ericsson mobility report for 2016 estimates that mobile subscriptions in Africa are approaching one billion (see Figure 17). While there are obviously flaws in comparing the single nation subcontinent of India with the 54 heterogeneous nations of Africa, the two are in a remarkably similar phase of telecommunication development. Both have around 1 billion mobile subscribers and in the first quarter of 2016, India added 21 million new subscribers and Africa added 16 million. Mobile penetration rate for the two countries is almost identical with Africa at 81 per cent and India at 80 per cent.

Figure 17: Mobile subscriptions (millions)

Source: https://www.ericsson.com/res/docs/2016/ericsson-mobility-report-2016.pdf

Of course, the app economy runs better on smart phones than on the simple feature phones that are still common in Africa. A critical question for the development of the app economy is how quickly Africa can convert its stock of feature phones into smartphones. Again, the answer is, probably more quickly than most people expect. Ericsson expects there will be an increase of around 730 million smartphone subscriptions in the Africa and Middle East region by 2021 (see Figure 18).

Figure 18: Mobile subscriptions (millions)



Source: www.ericsson.com/res/docs/2016/ericsson-mobility-report-2016.pdf

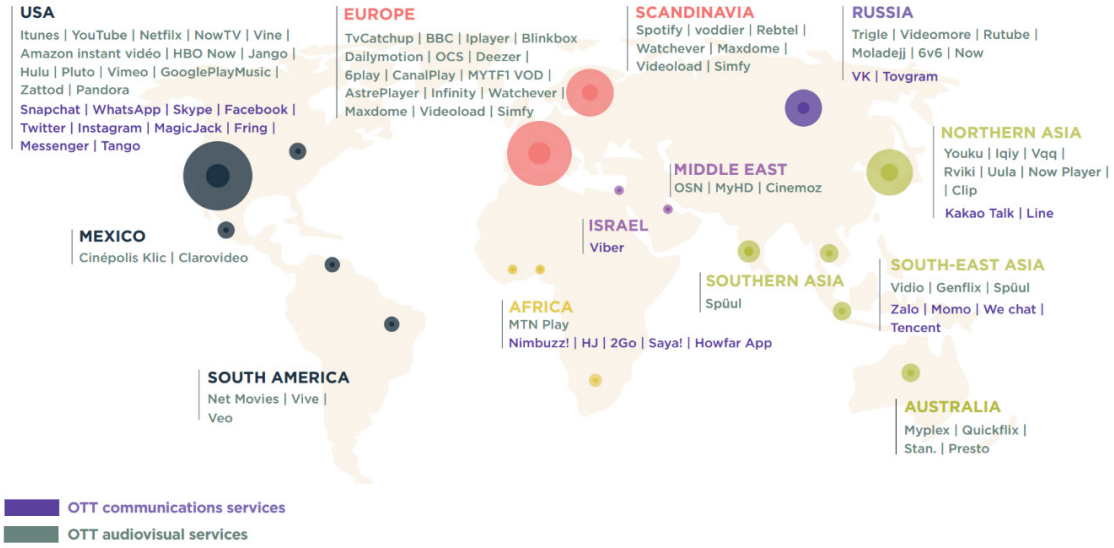
With entry-level smartphones below USD 50 now appearing in the marketplace[41], a smartphone in Africa today, in real terms, probably costs less than a feature phone did in Africa 10 years ago when the race to 1 billion subscriptions was just getting started. Thus, Africa has the culture, the need, mobile coverage and the affordable handsets that will enable it to become ubiquitously app-capable very soon. No doubt the app economy will deliver many economic benefits to Africa, but will it become a region of app consumers or will it take place in the global community of app developers?

3.3 Challenges for Africa in building the app economy

App development is taking place across the globe, but as Figure 19 shows, it is highly concentrated in the United States, Europe, China and Southeast Asia. Add to this the fact that the major platform owners, Apple and Alphabet, are United States based and it is easy to understand concerns that smaller, less economically developed countries may miss out on the benefits of being creators and producers in the app economy.

[41] https://www.techchange.org/2014/07/30/cheap-smartphones-under-50-dollars/

Figure 19: Global locations of app developers



Source: Wavestone, Challenges and impacts created by "over-the-top" (OTT) players In the African telecommunication sector, https://www.wavestone.com/app/uploads/2016/09/OTT_UK.pdf

Recent research to take a comparative development view on how well the global app economy serves developers and international trade flows, based on a survey of data from the Apple and Android app stores, sought to answer questions such as: Who is successfully making apps? Who is making money, and in what markets? How do the structure and design of the app stores affect value capture and trade? In broad terms, their analysis concludes:

"… despite its egalitarian appeal, developer participation in the app economy is heavily skewed toward the largest and richest economies, with the United States, Japan, and China dominant. Because the app markets function as winner-take-all markets, the top-ranked apps in the most-lucrative markets earn multiple orders of magnitude more revenue than low-ranked apps in markets of the Global South. The result is that 95% of the estimated industry value is being captured by just the top 10 producing countries. For lower-income countries, the outlook is relatively bleak: Most have very few developers, and even those who had significant numbers of developers—for example, India—earned very little revenue; as a group, the 19 lower-income countries in our sample earned an estimated 1% of global app economy revenues. Even the much-hyped "Silicon Savannah" of East Africa was mostly absent from the data."[42]

These conclusions are no doubt somewhat gloomy in terms of the potential for the app economy to contribute to economic development in less developed nations. The Caribou report examines the numbers of developers in various countries, the numbers of apps that they produce and, critically, the revenues associated with these apps.

Figure 20 shows the relatively small number of developers in Africa (that register in the top app store rankings) compared with Europe and, of course, the number of developers in the United States is greater again. The Caribou report also notes that the United States is still the dominant region of app development but that East Asia is rising in significance and that this represents a significant change from the preceding era of software development for the personal computer:

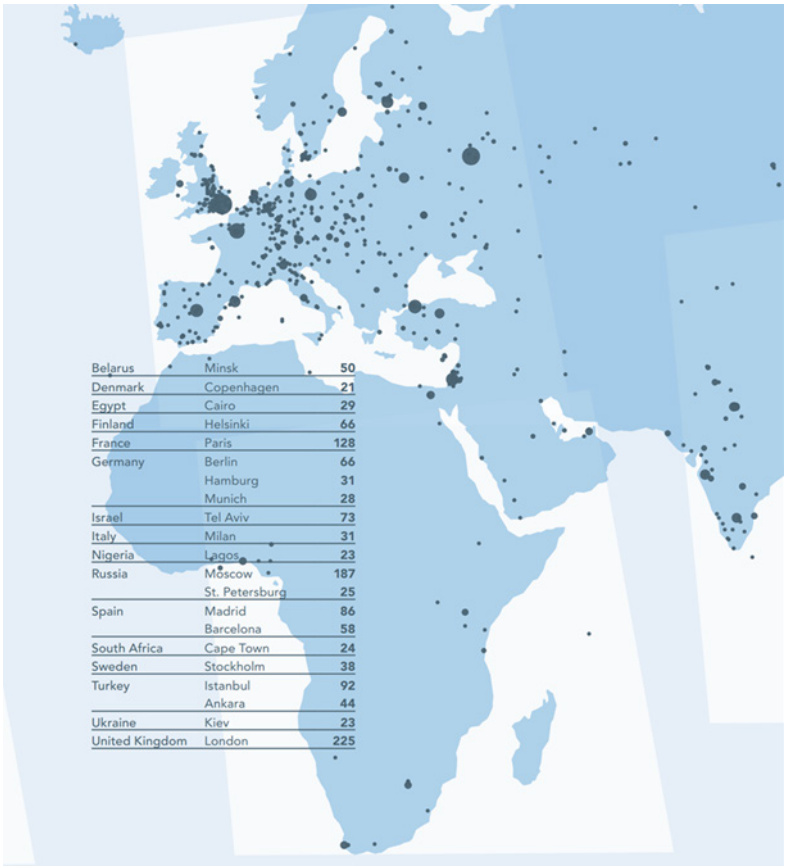
"Compared to the PC era of software development, the mobile app landscape shows a clear shift in gravity away from the West and toward East Asia. The United States is still the leader, which is

[42] *Winners & Losers in the Global App Economy*, Bryan Pon, Caribou Digital. http://cariboudigital.net/wp-content/uploads/2016/02/Caribou-Digital-Winners-and-Losers-in-the-Global-App-Economy-2016.pdf

unsurprising given its dominant historical role in computing and software development, but Western Europe in particular seems to be playing a lesser role compared to the large Asian economies. This landscape is strikingly different from the PC software sector, where as recently as 2011, 70 of the top 100 packaged software companies globally were American. Of the remaining 30 firms, 19 were from Europe, 4 were from Japan, 1 was from China. In the app economy, China (#2), South Korea (#4), and Japan (#6) have all become top-ranked countries in terms of commercially successful app developers."

This geographic shift is a significant phenomenon and worth considering in the context of possible future development paths for the app economy in Africa. One of the primary impacts of the two main app platforms and app stores is a hugely reduced cost of app development and app marketing distribution compared with the PC software market. This changing economics of software production and distribution means that apps can be developed to address far smaller niches, be they geographic, functional, age-related, or language-based or whatever other relatively narrow characteristic of the target market might be in the sights of niche app developers.

Figure 20: Where are the developers?



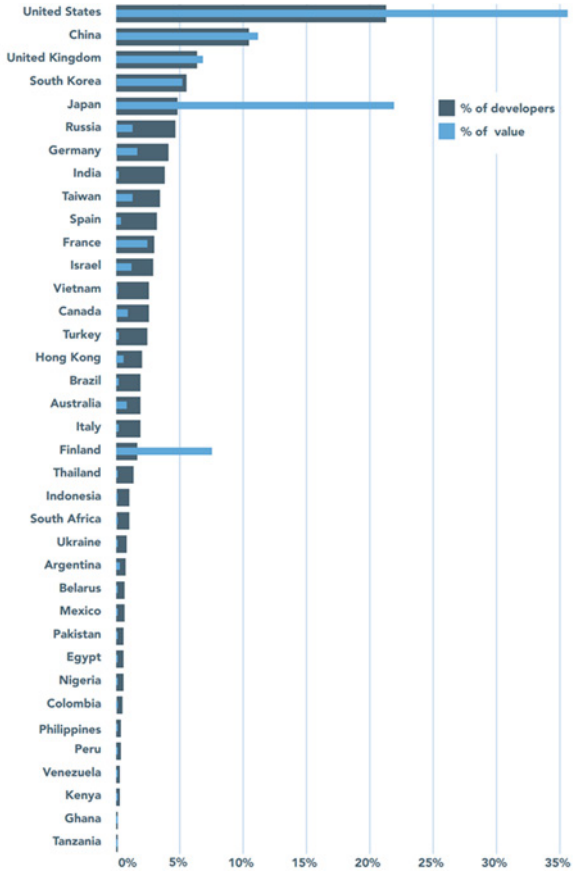
Source: Winners & Losers in the Global App Economy, Caribou Digital, 2016

This theme of local context and niche development will be treated later in this report. The other significant factor in app development is, of course, the much larger market for apps compared with PC software. As the Caribou report puts it:

"The more likely explanation for the large number of developers in these countries is the rapid increase in demand for apps, as large middle-class populations and relatively fast wireless networks have spurred rapid smartphone adoption. Because of their singular languages and other cultural preferences, this demand is most easily met by local producers, which further helps spur domestic production. In fact, we see that in general, the highest revenue-generating markets produce the highest number of successful developers."

The Caribou report also focuses on revenue flows and Figure 21 illustrates the fact that, there are large differences between each country's share of the number of app developers and its share of app revenues. The United States, for example, has around 22 per cent of the world's developers but earns about 36 per cent of global app revenue. Japan and Finland are other standout performers.

Figure 21: Relative share of developers and value capture across 37 markets.



Source: Winners & Losers in the Global App Economy, Caribou Digital, 2016

One of the important conclusions from this analysis from the Africa region perspective is that countries with smaller economies and lower income per capita tend to underperform in terms of value capture from the app economy. The underlying challenges of scale and market size are, in the case of many Africa region nations, exacerbated by policies particularly in the Google app store.

Google only allows developers in certain countries to monetize their products through the Google Play app store: Developers who want to earn revenue from Android apps on the Google Play app store are required to set up a merchant account, which is what links their bank account to Google so that they can receive funds from the app store. However, Google merchant accounts are not available in 74 countries, with half of sub-Sahara Africa and much of Latin America excluded. Again, according to the *Winners & Losers in the Global App Economy* 2016 report, Google employee described the process as "*very complex and [involving] business negotiations between Google and the government of the countries in question. It can involve additionally complex subjects such as tax laws, currency exchange, and export laws*." While not every developer is trying to directly commercialize apps, it is reasonable to assume that the inability to monetize an app directly through the app store is a deterrent for participation. This exclusion of particular countries from Google app store revenue is a significant problem and the governments of affected countries should be encouraged to actively seek arrangements with Google that will enable app developers to charge for their products on the app store.

4 The app economy in South Africa and Ghana

This section provides an overview of the app economy in the case study countries of Ghana and South Africa.

4.1 South Africa

4.1.1 App developers

The countries in sub-Sahara Africa all showed very similar patterns: apps developed in the United States dominate market share, with almost no local app production. US market share in this region was highest of all the non-English dominant regions. South Africa was highest on the list of countries in the Africa region to register developers, but the narrow width of its value flow indicates local South Africa apps were low-ranking.[43]

4.1.2 Phone/app use

South Africa is experiencing growth in smartphone penetration and mobile app usage with a Mobile Marketing Association South Africa report showing that 17.7 million of the 37.2 million adult population make use of mobile apps or access the Internet via their smartphones. The uptake of mobile per capita in South Africa is among the highest anywhere in the world and, despite security and educational challenges around the adoption of mobile apps, uptake is increasing.[44] The country also leads in mobile application downloads in sub-Sahara Africa.

Helped by the establishment of enabling regulatory and competitive environments that encourage investment, 4G is gaining traction in South Africa. In South Africa, the Vodacom 4G network now covers 40 per cent of the population, providing a solid platform for growth.[45]

While a specific monetary figure has not been determined for the size of the app economy, the presence of 29 million smart devices in the hands of South Africa consumers is cited as a significant indicator of the potential growth of apps and their use in the country. Most new phones bought by consumers are smartphones, as the price point of entry-level smartphones – ZAR 500 – has dropped sufficiently to put them within reach of any citizen who can afford a phone. The growth rate of the market is estimated at 20 per cent a year.[46]

Spending on mobile applications in South Africa could surge from 31 million this year to 220 million in 2017. This is according to a Pyramid research study that says growth in the adoption of smartphones, increasing availability of apps and various new payment methods could result in greater demand for mobile applications. Other factors potentially driving up mobile app demand include undersea broadband connections such as the West Africa Cable System (WACS) enabling higher bandwidth and lower data prices.[47]

4.1.3 App distribution

Google prohibits developers in South Africa from monetizing directly through its app store. This means that developers are either restricted to free apps on Google Play or have to work through partners registered as merchants on another continent.[48]

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43 "*84 developers, or on a per capita basis, 1.5/million*": Winners and Losers in the Global App Economy, 2016, Caribou Digital

44 www.smesouthafrica.co.za/16149/Why-you-should-take-advantage-of-SAs-mobile-app-usage-growth/

45 https://www.gsmaintelligence.com/research/?file=721eb3d4b80a36451202d0473b3c4a63&download

46 http://zappzone.co.za/status-south-africas-app-economy/

47 www.itwebafrica.com/mobile/320-south-africa/230360-sa-mobile-apps-spending-to-hit-220mn-in-2017

48 https://support.google.com/googleplay/android-developer/table/3539140?hl=en

4.1.4 Challenges for app developers

In South Africa, there is a tendency for enterprises to do much of their development abroad. While this is often unavoidable, sometimes due to the shortage of skills, this may mean that enterprises miss opportunities from better localisation of their apps through inability to work closely with developers.[49] There is a skills shortage for mobile app developers in South Africa, and this means that many companies charge very high rates to develop apps. It also means that many of the app development projects are outsourced to countries like India where labour is cheaper.[50]

One challenge is the unlikely problem of a significant amount of enterprise development funding being available to support South Africa developers – in this case, too much money weakens the app ecosystem. While funding is crucial to take an app from idea to implementation, funding in South Africa is currently available through a variety of dispersed funding mechanisms, with little control to ensure that only truly worthwhile ideas are supported through to completion. Enterprise development managers are not usually equipped to evaluate the viability of mobile applications, leading to lots of investment with few good outcomes.

Another challenge in South Africa is that the skills shortage in this arena will become more pronounced as the app economy grows. More developer skills will be needed, and we can expect to see new coding schools springing up across the country over the next few years. However, these are not the only skills needed in this new app ecosystem. Designing user experience and interfaces is an art, and demand will grow for people skilled at building intuitive, user-friendly interfaces. In addition, successfully taking new applications to market will require business acumen and entrepreneurship, so there will be growing demand for business and management skills in the developer ecosystem.[51]

4.1.5 Regulatory developments for the app economy in South Africa

In January 2016, the Portfolio Committee on Telecommunications and Postal Services, of the South Africa Parliament, published an Industry Briefing on Over the Top (OTT) Services in South Africa.[52] This briefing emphasized the wide range of differences in regulatory treatment between traditional operators and OTT players including: licensing and licensing fees, spectrum licence obligations, interconnection and interoperability, quality of service, universal service obligations, provision of legal intercept, financial reporting and taxation, national ownership rules and compliance with consumer protection and other national socio-economic obligations.

The briefing also nicely articulated the high level policy dilemma posed by disruptive innovation. Large successful corporations such as the major operators were described as vital for the nation's wealth, well-being and social stability and important because of their jobs creation and contribution to social development. On the other hand, particularly in the technology industries, continuous innovation is required in order to remain competitive. To some degree, the processes of innovation and disruption are inseparable and new innovative companies will capture at least some of the customers of the incumbents.

In September 2016, the South Africa Government published a major document, the National Integrated ICT Policy White Paper. This is a broad ranging document but it does address specifically the South Africa policy on OTT services as follows:

49 www.smesouthafrica.co.za/16149/Why-you-should-take-advantage-of-SAs-mobile-app-usage-growth/
50 https://dreamweavedigital.co.za/the-cost-of-app-development/
51 http://ventureburn.com/2015/06/ibm-hopes-catalyse-south-africas-app-economy/
52 http://pmg-assets.s3-website-eu-west-1.amazonaws.com/160126SACF.pdf

"The ITU's guidance on the regulatory approach to over the top (OTT) is instructive in considering the approach to these and other services and will inform the policy-maker and regulator's approach. It has stated that:

- *Proliferation of content and applications services is to be welcomed as they introduce choice and innovation to users.*
- *Change is inevitable. As network operators migrate to next generation networks, voice services will become software applications riding over the network. Policy-makers need to find ways to balance innovation, investment and competition during this transition period.*
- *Regulators cannot hold back innovation and change to maintain the status quo.*
- *These changes are disruptive and inconvenient for those with a stake in existing arrangements, but the benefits of change to users outweigh the costs.*

Government is of the view in line with this that there is no need to immediately regulate Over-The-Top (OTT) services but that this position should be regularly reviewed by the regulator, based on the considerations detailed above."[53]

This relatively open position on OTT services contrasts with the South Africa approach to Uber. South Africa is one of the jurisdictions where there have been incidents of violence between traditional taxi drivers and Uber drivers. In March 2016, the South Africa Cabinet approved a new transport bill that treats Uber operators in the same way as traditional taxi drivers. This means more onerous requirements on Uber drivers and Uber itself going forward.

In the case of AirBnB, Cape Town is its top market in Africa. As is the case in Barcelona, this type of popularity creates pressures, with apartments potentially rented in contravention of their tenancy agreements and the potential for local residents to have difficulty in finding long-term rental accommodation. Although there is some pressure from the local tourism industry for AirBnB to be regulated more heavily[54], at this stage there does not appear to be any particular regulatory initiatives in respect of AirBnB.

In the case of OTT Communications apps such as Viber, WhatsApp and Skype, there is little regulatory intervention at all. Further, it is difficult to envisage what governments can do, especially the governments of smaller countries, to influence the global providers of these apps. Short of banning the apps outright within national jurisdictions, it would be difficult to negotiate with these companies.

4.1.6 App companies in South Africa

South Africa would appear to be the leading app economy nation in Africa. The South Africa Government and private sector players sponsor a number of organisations designed to encourage technology driven start-ups. These include:

mLab: an organisation that is supported by The Ministry of Foreign Affairs of Finland, The South African Department of Science & Technology, The Innovation Hub, The V&A Waterfront and the World Bank infoDEV.

Grindstone Accelerator: sponsored by Knife Capital, provides support for: Entrepreneurial Development, Investment Readiness and Growth Strategy.

New Ventures Studio: is a young entrepreneur accelerator. It is a platform for young individuals who want to be successful entrepreneurs, but realize the importance of up skilling themselves before

[53] South African Department of Telecommunications and Postal Services, National Integrated ICT Policy White Paper, 28 September 2016 NO. 1212

[54] www.tourismupdate.co.za/article/111751/Should-government-regulate-AirBnB

venturing out into the unfamiliar territory of entrepreneurship. The Studio is sponsored by Salesian Life Choices, a non-profit organization and Caban Investments, a venture capital business.

Examples of app companies in South Africa include:

SnapScan: which provides point of sale solutions with very low barriers to entry for 30 000 vendors across South Africa (www.getsnapscan.com)

GoMetro: is a public transport information app downloaded more than half a million times. It enables users to update information about delayed services and can enable employees to notify workplaces with validated messages about late trains and buses. (www.getgometro.com)

Afta Robot: is a platform that uses advanced wireless technology combined with cloud support that will improve the safety and efficiency for the minibus taxi operators and commuters. The minibus taxi industry in South Africa is 'private sector public transport' system accounting for 65 per cent of all public transport services, operated by approximately 331 taxi associations overseeing over 300 000 mini busses that operate an estimated 10 billion trips per annum. The app aims to increase the efficiency of this system using geo-aware smart devices and backend cloud software.

Afta Robot is an excellent of innovative app development based on a particular national context. South Africa's unique and extensive minibus transport system could achieve very large increases in efficiencies based on the use of such an app.

4.2 Ghana

4.2.1 Phone/app use

With a national population estimated in 2014 to be just over 27 million, Ghana's mobile phone penetration rate rose to 127.63 per cent after the voice subscriber base climbed to over 35 million in December 2015 from 34 million registered in the previous month.

The National Communications Authority (NCA) mobile voice and mobile data market share trends for December 2015 also reported the number of mobile data subscribers rose from about 17.73 million to 18.03 million, an access rate of 65.74 per cent. The main catalysts for the rise in the number of people who have access to mobile phones and Internet usage have been the recent push for telecommunication companies to expand their network coverage, the availability of cheap smartphones from China and a robust legal regime.[55] According to the Internet company, Opera, 31 per cent of the population in Ghana use mobile applications.[56]

4.2.2 App import and export

Only 11 developers from Ghana, or 0.42/million on a per capita basis, were captured in the sample for the Caribou Digital *Winners and Losers in the Global App Economy* report 2016, which sampled Ghanaian developers based on their appearance in App Annie's 'Top Ranked' and 'Top Grossing' categories for the nation. The ratio of those sampled developers who were constrained to their domestic market was 100 per cent, meaning that Ghanaian app developers do not sell their apps overseas. The inability of Ghanaian developers to export their apps has a double impact: primarily, being limited to one market is generally less lucrative than being able to enter additional markets; but secondly, these producers are in a low-revenue market, such that even if they are very highly ranked domestically, the revenue may not be sufficient for sustainable businesses.

[55] www.theafricareport.com/West-Africa/ghana-mobile-phone-penetration-soars-to-128.html
[56] www.africanews.com/2016/11/11/safrica-ghana-nigeria-africa-s-top-mobile-app-users-internet-survey/

The role of English as the global lingua franca of business, and especially ICT, is no doubt a driver of the widespread popularity around the world of apps produced in the United Kingdom and United States. Unsurprisingly, these apps are most popular in markets where English is the only or primary official language. A less predictable finding of the Caribou Digital report was that the region with the next-highest ratio of United Kingdom and United States based apps was sub-Sahara Africa, where Ghana, Kenya, Nigeria, South Africa, and Tanzania all showed over 50 per cent market share of United Kingdom and United States based apps. Market share of United States based apps sits just below 60 per cent in Ghana.

4.2.3 App developer revenue

The path to app monetization in Ghana is extremely challenging. Globally, advertising and app purchases are the dominant mechanisms for revenue generation. Developers in Ghana have, in principle, the same choices as anywhere else, but they are constrained by various market factors that limit their choices and their ability to raise revenues when products and services are targeting local audiences. Several app developers have needed to supplement their income through contract work in order to cross-subsidize app development. There are several revenue sources potentially available, but few are practically possible because of the lack of payment facilities within Ghana. The challenge remains the ability to match revenue sources with available payment facilities.[57]

Competitions for app developers, such as the App Developer Competition from MTN, are one tool to increase the supply of apps, but one-off competitions are unlikely to be the basis for a dramatic change in the availability of apps and the number of downloads. The challenge is that too few apps are using the available payment facilities, such as premium SMS, because of the perceived inequity in revenue share. The universal complaint among app developers was that revenue share was unfair and that payment, when it did take place, was often delayed for many months. Operator app stores suffer from the archetypal causality dilemma: if app developers have a viable business model, then MNOs will offer good terms; if MNOs offer good terms, then app developers will develop apps. MNOs are preoccupied with the app business model and require the app developer to submit a business plan to even get the API (Application Programming Interface). App developers distrust MNOs and feel that they are not being treated fairly. The net result is inaction.[58] This is a good example of how the absence of a payment system that is perceived to be fair and equitable can impede the development of new industries.

4.2.4 App discovery and distribution

By far the most attractive platform for Africa region app developers is the Google Play store: its revenue split is 70/30 in favour of developers and the procedures for registering an app are relatively straightforward and transparent. Google Play's API is available on the Web, easily accessible, and easily understood with few conditions. Though the Google Play store is popular, Google prohibits developers in Ghana from monetising directly through its app store. This means that developers are either restricted to free apps on Google Play or have to work through partners registered as merchants on another continent.[59]

Notably, in less economically developed countries such as Ghana, where high data costs and lower disposable income constrain web browsing and download behaviour, much app discovery and distribution takes place via alternative channels. Research published in the Caribou Digital report has shown that in Ghana, users often access third-party stores such as Opera app store (because they are familiar with the data-saving Opera browser) as well as third-party aggregator sites such as Waptrick. But offline channels are also very common, with many users in the study installing apps provided by friends, or buying apps from offline vendors who then transfer the app (or music, or video) locally.

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57 www.infodev.org/infodev-files/mobile_apps_at_the_base_of_the_pyramid_ghana_0.pdf
58 Ibid
59 https://support.google.com/googleplay/android-developer/table/3539140?hl=en .

GetJar is the major third-party OS store available to the Ghanaian market. GetJar is a third party because it is independent of handset operators (such as Nokia) and the OS stores (such as iTunes, Google Play, and BlackBerry World). Uploading apps onto GetJar is free and there is no revenue share requirement. From a revenue share perspective, this is an attractive app store, but its awareness among BoP consumers is reportedly low. There are also websites that act as content aggregation platforms to which users can log on to get apps, music, games and videos. Examples include www.waptrick.com and www.sefan.ru.

Vodaphone Ghana, in an effort to bring visibility to more Ghanaian app developers, has launched the Vodaphone App Store. It is described as a developer friendly app store with a focus on local, relevant content while giving subscribers the opportunity to still have access to a global range of popular apps. An advantage of this store is its low barrier to entry: the removal of the USD 50 – USD 100 cost on hosting apps on the major app stores will help developers host their apps more easily and possibly faster.[60]

4.2.5 Regulatory developments for the app economy in Ghana

Online news source BuzzGhana[61] published a story headlined *Ghanaians might say goodbye to Internet calls including WhatsApp, Skype.* This story was in response to a press release by the National Communications Authority (NCA)[62] on *The regulation of over-the-top (OTT) services.* This release did not actually oppose banning OTT services. It emphasised that OTT services were negatively impacting operator revenues and that the NCA was "*concerned with the fact that most of these OTT players are generally not bound by regulations in many countries which orients market dynamics in their favour"* and that the "*challenges posed by OTT services from a national perspective warrants the need for the authority to ensure proper regulatory balance and a level playing field in terms of regulatory compliance as well as the need to address the issues pertaining to security*". The NCA also noted that consumers benefited from being able to access OTT services. A little over a week later, the NCA announced that it was further reviewing the OTT market[63] but the next day Ghana Deputy Minister of Communication, Ato Sarpong, told key industry players in Accra that the government had no intention whatsoever of regulating the operations of over-the-top (OTT)[64]. The Chairman of the NCA Board, Eugene Baffoe-Bonney, speaking at a conference on the theme *The Growth of OTTs and the Role of Mobile Operators and Regulators*, emphasised that the NCA had no intention to ban OTT services, encouraging mobile network operators to rather embrace the technologies considered by many as disruptive.[65]

These developments appear to indicate a more liberal attitude to app driven disruption within the Ghana Government and regulators. This would seem to be reinforced by the announcement in June 2016 of the signing of a Statement of Understanding between Uber and the Ghana Transport Ministry.[66]

Ghana becomes one of the first countries on the continent to sign the Statement of Understanding (SoU) with Uber, whose operations in other parts of the continent have received resistance from traditional taxi drivers. Fiifi Kwetey, Minister for Transport signed the SoU along with Alon Lits, Uber General Manager for sub-Sahara Africa at the launch of Uber operations in Accra. Uber launched in Accra with free rides over the last week. The SOU is a fantastic first step for Ghana to become a smart city of the future and shows the critical role technology will play in creating thousands of economic opportunities for Ghanaians. The SOU also provides for Uber to partner with the Ministry to develop a regulatory framework that allows for ride sharing technology and also regulate its use and adoption by riders, drivers, and companies that use it to source business.

60 https://gharage.com/2015/09/21/vodafone-ghana-launches-the-vodafone-app-store-for-local-app-developers/
61 http://buzzghana.com/nca-restrict-internet-calls/
62 www.nca.org.gh/assets/Uploads/Press-Release-OTT-Services-v2.pdf
63 www.itwebafrica.com/telecommunications/338-ghana/236228-ghana-initiates-review-of-ott-services
64 www.biztechafrica.com/article/government-rules-out-ott-regulation-ghana/11345/
65 https://asokoinsight.com/news/embrace-over-the-top-services-national-communications-authority-tells-telcos-ghana
66 www.africanews.com/2016/06/14/uber-enters-agreement-with-ghana-s-transport-ministry/

These developments seem to indicate that the Ghana Government is focused on the consumer and economic benefits arising from app economy services and is taking a proactive approach to ensuring that these services are integrated sooner rather than later and that resisting the evolution of the app economy is not in the interest of Ghanaian citizens or the domestic economy.

4.2.6 App companies in Ghana

Ghana is home to The Meltwater Entrepreneurial School of Technology (MEST) and the MEST Incubator programme. Founded by successful Norwegian entrepreneur, Jorn Lyseggen, in 2008, MEST:

"… offers aspiring African entrepreneurs a fully sponsored intensive twelve-month program. Sourced from top graduates in Ghana, Nigeria, Kenya and South Africa, these Entrepreneurs-In-Training (EITs) are selected each year to receive comprehensive training across the spectrum of skills required to build successful tech businesses, including computer programming, software development, product management, finance, marketing, sales and leadership best practices.

After completion of the program, the EITs have the opportunity to pitch a business concept. Winning teams receive a seed round from the MEST Incubator to pursue their idea.[67]

MEST now has multiple businesses that have graduated from its program that are currently operating in Ghana and throughout Africa.

An outstanding example of a successful app company from Ghana that graduated from MEST is Saya. Saya was founded in August 2011 by Ghanaian entrepreneurs Robert Lamptey and Badu Boahen, both graduates of the Meltwater Entrepreneurial School of Technology (MEST) in Accra.

Saya is an excellent example of how a start-up app economy company can flourish by designing a product that is suited to local conditions. Saya built an app which was a replacement for text messaging much like WhatsApp, but built for feature phones which were much more prevalent in Africa than in more economically advanced countries where smartphones dominate. The app attracted millions of users in over 30 countries including India, Syria, Indonesia and Bangladesh."[68]

Saya was acquired by New Jersey-based Kirusa, a developer of Voice SMS based Mobile Value Added Services (MVAS), for an undisclosed amount in August 2014.

4.3 Conclusion: The state of telecommunications/ICT and the app economy in case study countries

4.3.1 Short-term pressure, long-term gains

There are a number of positive developments in the telecommunication markets of both South Africa and Ghana: coverage is improving both in extent and in terms of a shift to more advanced technologies such as 4G and LTE, mobile subscriptions are relatively high, and a shift from feature phones to smart phones is underway. On the negative side, particularly in Ghana, mobile broadband subscriptions are underrepresented, usage of mobile broadband is relatively low and, perhaps most importantly, mobile broadband prices are high in terms of GDP per capita.

The chicken and egg problem is that per capita incomes in Africa are low relative to the cost of providing mobile broadband services. The cost of smart phones has now fallen so much that smart phone ownership is no longer a real barrier to enjoying the benefits of mobile broadband. If operators are under margin pressure because of OTTs then this may make them less willing to invest in the near

[67] http://meltwater.org/about/about-mest/

[68] www.forbes.com/sites/mfonobongnsehe/2014/08/20/u-s-company-acquires-african-mobile-messaging-startup-saya/#47e30b676358

and medium term. Perhaps there is some opportunity for policy innovation in terms of creating incentives for operators to achieve increased numbers of subscribers and/or additional infrastructure expenditure.

Governments face difficult trade-offs in creating such incentives for operators. Where governments own, or part own, operators they experience falls in revenue as operators come under competitive pressure from OTTs. In addition, the increasing popularity of OTT services means a loss in the tax revenue base within national jurisdictions. These pressing concerns must, however, be balanced against the long-term interests of consumers and national economic development. Modern economies are increasingly communications and information technology driven for efficiency and economic development. Impeding the ongoing development of the communications sector in the interests of short to medium term revenue raising will likely create a deficit in future economic growth.

4.3.2 Measures of the app economy

Governments are also seeking to understand the extent of the progress of the app economy within their own jurisdictions. This is difficult to ascertain from existing statistical collections because these have typically focused on telecommunications and broadband rather than the app economy per se. Existing collections could be used, however, to construct measures of app economy progress or some form of an 'app economy engagement index' based on how the nature of communications use changes as the app economy progresses in a particular jurisdiction. For example, the number of smart phones compared with feature phones within a particular market will be one indicator of the progress of the app economy. Another would be the proportion of all subscribers with some form of mobile broadband service. Another measure would be the cost of a standardised broadband account subscription (specified in terms of Mbit/s per month of data allowance) as a proportion of GDP per capita compared with the price for more advanced jurisdictions.

Such components could be combined into an 'app economy engagement index' that would enable jurisdictions to compare progress and use this as an input to the formation of policy and regulation. ITU would have much useful data collected on a national basis but, in addition, operators could provide additional useful data such as relative usage of voice and data services of various categories of customers, trends in mobile data packages preferred by consumers and other types of detailed consumer data.

5 Summary: regulating the app economy in Africa

5.1 The importance of app economy regulation in Africa

One of the central conclusions of this report is that, following the emergence of the app economy, the ICT sector is more economically significant and more important than ever for the economic and social development of the Africa region nations. This is not only because of the traditionally cited reasons such as improved efficiency and productivity, reduced transactions costs, improved social inclusion and enhanced economic growth, but also because of a less visible but no less important potential for the app-powered ICT sector to foster the development of markets and institutions in Africa at lower cost and more quickly than has happened in more economically advanced nations. This potential did not exist until the arrival of cheap mobile phones, and increasingly, cheap smart phones along with much greater mobile broadband coverage that together will bring unprecedented and transformative capabilities to the majority of people living in Africa in less than a decade.

To the extent that the app economy will play a critical role in the economic development of Africa and given the importance of regulation in influencing the evolution of the app economy, the stakes

are indeed high for the numerous regulatory decisions now confronting governments and regulators in Africa.

There has been extensive discussion regarding the need for flexible regulation, a regulatory light touch, innovation in regulation and, perhaps, most importantly, the need for collaborative regulation. The need for collaborative regulation emerges from the general phenomenon of convergence and, with respect to the app economy in particular, the many ways in which app driven innovation crosses traditional industry boundaries, disrupts existing business models and challenges long-standing regulatory parameters.

5.2 Opportunities and challenges for the app economy in Africa

The opportunities and challenges described in this report may at first seem insurmountable but it should be recalled that in Africa, the real shift into the app economy is just moving into full swing. It is not surprising that, coming late to the party, having relatively small markets and low income per capita, the nations of Africa do not rate highly in the global app development stakes.

Nonetheless, there are reasons to be optimistic about the future of app development in Africa. These reasons include:

- the next five years will see extremely rapid increases in smart phone ownership and mobile broadband subscriptions throughout Africa;
- there is an enormous number of niche markets based on its economic circumstances and linguistic uniqueness – apps will most certainly be developed to meet intrinsically Africa region needs, and could be leveraged on a regional or global scale;
- there is an enormous willingness to adopt useful mobile app technologies based on simple feature phones with M-PESA probably being the leading example. The functionality and usability of such apps are contained by the relative primitiveness of feature phone interfaces – all this will change with the shift to smart phones and apps will become more feature-rich, usable and attractive to users;
- there is a need to develop customised and productivity-enhancing apps that will enable it to leapfrog many of the institutional and market development processes.

5.3 General policy guidelines to encourage the development of the app economy

The following general policy settings are recommended as initiatives that could be undertaken by governments in the Africa region to encourage the development of the app economy:

- develop a policy that encourages the creation of app start-ups that are targeted at both global markets and niche markets in Africa;
- encourage the rollout of high-speed mobile broadband networks throughout the region including high capacity fibre backhaul and backbone links;
- endorse policies that support net neutrality rules similar to many global markets subject to reasonable network management;[69]
- promote fiscal incentives to encourage operators to lower tariffs, including the elimination or reduction of customs duties on telecommunication/ICT equipment for infrastructure providers as well as on consumer devices;
- encouraging the development of app economy skills throughout national education systems including coding, business, marketing and entrepreneurship;

[69] As a minimum, this could be similar to Article 14.10 of Trans-Pacific Partnership Agreement (TPP). Available at www.mfat.govt.nz/Treaties-and-International-Law/01-Treaties-for-which-NZ-is-Depositary/0-Trans-Pacific-Partnership-Text.php

- work with national financial system regulators and taxation authorities to ensure that app developers can fully participate in global app store payment systems;
- encourage collaborative regulation among all sectors and between regulatory agencies for the industries affected by app-based and other relevant agencies such as competition regulators, financial regulators, etc.;
- facilitate the establishment of in country and inter-region Internet exchanges in order to reduce tromboning and secure lower interconnectivity costs for domestic ISPs;
- Support the liberalisation of international gateways to increase international capacity, reduce the costs of international data capacity (which is a rapidly growing cost to providing broadband services) and to guarantee a higher quality of service by having multiple redundant submarine cables and/or terrestrial links where possible, with a view to reducing the cost of connectivity;
- adopt innovative licensing regimes to encourage new business models for covering remote and rural areas;
- design flexible, incentive-based and market-oriented policy and regulatory frameworks with regard to allocation and assignment of spectrum, in particular for broadband services;
- make as much as possible spectrum available in the IMT bands as soon as possible this may require governments to lower their expectations about the revenue they can raise from spectrum sales.

Not all of these recommendations concern policy and regulatory issues that relate directly to the app economy, but they are all designed to foster its long-term development. It is true that some of these recommendations are concerned with policy and others with regulation and, some policy innovations will have regulatory implications while others will not.

Acronyms and abbreviations

ACMA	Australian Communications and Multimedia Authority
ADSL	Asymmetric Digital Subscriber Line
API	Application Programming Interface
AR	Augmented Reality
ASEAN	Association of South East Asian Nations
CAGR	Compound Annual Growth Rate
Capex	Capital expenditure
CITC	Communications and Information Technology Commission of Saudi Arabia
DSL	Digital Subscriber Line
EU	European Union
FCC	Federal Communications Commission of the United States
FDI	Foreign Direct Investment
FTTB	Fibre-To-The-Building
FTTC	Fibre-To –The-Curb
FTTH	Fibre-To-The-Home
FTTx	includes FTTH, FTTB, FTTC, etc.
GDP	Gross Domestic Product
GNI	Gross National Income
GSMA	GSM Association
GSR	ITU Global Symposium of Regulators
ICTs	Information Communication Technologies
ICT4D	ICT for Development
IMT	International Mobile Telecommunication
IoT	Internet of Things
ITU	International Telecommunication Union
ITU-D	ITU Telecommunication Development Sector
ITU-T	ITU Telecommunication Standardization Sector
ITU-R	ITU Radiocommunication Sector
LDCs	Least Developed Countries
LTE	Long-Term Evolution
LTE-A	Long-Term Evolution Advanced
MDGs	Millennium Development Goals
M2M	Machine-to-Machine
MNO	Mobile Network Operator
NBN	National Broadband Network

NBP	National Broadband Plan
NGN	Next-Generation Network
OECD	Organisation for Economic Cooperation and Development
Opex	Operating Expenditure
PPP	Public-Private Partnership
QoS	Quality of Service
RCEP	Regional Comprehensive Economic Partnership
SAARC	South Asian Association for Regional Cooperation
ROW	Right of Way
SDGs	Sustainable Development Goals
SMEs	Small- and Medium-Sized Enterprises
STEM	Science, Technology and Mathematics
TPP	Trans-Pacific Partnership
UN	United Nations
UNESCO	
USF	Universal Service Fund
USOs	Universal Service Obligations
VoLTE	Voice over Long Term Evolution
WDR	World Development Report
WRC	World Radiocommunication Conference
xDSL	Refers to different variations of DSL, such as ADSL, SDSL, VDSL
2G	Second-generation mobile
3G	Third-generation mobile
4G	Fourth-generation mobile
5G	Fifth-generation mobile

Annex 1: Telecommunication markets in South Africa and Ghana

A1 South Africa

A1.1 Market share of mobile operators

By the end of 2015, Vodacom held 37.7 per cent of the South Africa market, followed by MTN at 35.9 per cent and Cell C at 23 per cent. Telkom Mobile (former incumbent – government now has 40 per cent stake) is the smallest mobile network operator, with 2.6 per cent of the market.[70]

Figure A1: Mobile operator market shares

Mobile operator market share		
Operator	**Number of subscribers**	**Market share**
Vodacom	32.12 million	37.7%
MTN SA	30.55 million	35.9%
Cell C	19.6 million	23.0%
Telkom	2.19 million	2.6%
MVNOs	650,000	0.8%

MTN's financial year end is 31 December, therefore its market share is overestimated.

Source: http://www.researchictafrica.net/polbrf/Research_ICT_Africa_Policy_Briefs/2016_Policy_Brief_2%20South_Africa_mobile_operators_wake_up_as_2020_draws_closer.pdf

A1.2 Regulator

The South Africa ICT sector is regulated by the Independent Communications Authority of South Africa (ICASA). The authority now falls under the purview of the newly created Department of Communications (DoC) following a 2014 decision to split various government ICT responsibilities into two bodies: the DoC and the Department of Telecoms and Postal Services (DTPS).[71]

A1.3 Growth in data usage

The largest mobile operators in South Africa have all reported rising data demand and revenues as low-cost smartphones become more widely adopted. Smartphones now account for more than half of all mobile users in the country, rising from just under 5 million active devices in 2010 to nearly 24 million in 2015. This means that 37 per cent of the population own a smartphone.

Mobile Internet now accounts for more than 97 per cent of all Internet connections, and with almost two thirds of the population able to access LTE services, this sector will continue to see strong growth into 2017.[72]

Current trends indicate that mobile data traffic could grow at an annual rate of 63 per cent between 2014 and 2019, eventually accounting for 32 per cent of all data traffic by 2019, versus just 13 per cent

[70] https://mybroadband.co.za/news/cellular/172592-vodacom-vs-mtn-best-and-worst-mobile-network-in-south-africa.html
[71] https://www.oxfordbusinessgroup.com/overview/down-wires-rising-popularity-data-sparking-heavy-investment-fibre
[72] https://www.budde.com.au/Research/South-Africa-Mobile-Infrastructure-Operators-and-Broadband-Statistics-and-Analyses

in 2014.[73] In line with this trend, mobile operator Vodacom saw 23.4 per cent data revenue growth to reach ZAR 15.54 billion (USD 1.34 bn) in 2014/15. Data now comprises 28.8 per cent of Vodacom revenues in South Africa, while active data customers rose 9.4 per cent to reach 16.6 million in the 2014/15 financial year. MTN South Africa reported that its data growth was supported by 'attractive data promotions', including data bundles, with data revenues rising by 17 per cent during the fourth quarter of 2013.[74]

This shift away from traditional voice and SMS services into the realm of data services is prompting telecommunication operators to invest heavily in new fibre-optic and next-generation infrastructure, although the country's delayed digital TV migration and lack of available frequency spectrum, which is critical for the roll-out of 4G long-term evolution (LTE) mobile broadband services, has slowed progress.[75] Mobile operators are able to reduce the cost of data to consumers only as much as they have excess spectrum. As operators are faced with an increasing shortage of spectrum, consumers may feel the impact on mobile data services.[76]

A1.4 Delay in allocation of spectrum

ICASA planned to sell five blocks of spectrum (700 MHz, 800 MHz and 2.66 Ghz) starting at ZAR 3 billion (USD 220 million) each to help extend Internet access across South Africa in 2016. The High Court in Pretoria ruled at the end of 2016, however, that ICASA could not go ahead with the auction, deciding that an orderly process for the auction must be followed that involves both the regulator and the government formulating a policy for the allocation of the spectrum. The telecommunication ministry was against the sale, arguing that South Africa's biggest phone companies, including MTN Group Ltd and Vodacom Group Ltd, would benefit at the expense of smaller competitors. This means that the auction will be pushed back to May 2017. This dispute risks further delaying South Africa's move to 4G broadband Internet, with many countries in the rest of Africa now pulling ahead of South Africa in the allocation of spectrum.[77]

A1.5 Cost of data

The South Africa market is facing challenges in terms of affordability and quality of service, with the average monthly price of broadband being ten times more than in the United Kingdom, yet Internet speeds in the United Kingdom are five times greater than in South Africa.[78] In addition, while the effective prices of data may be well below the advertised price of the 1 GB measure used internationally, mobile users in South Africa, especially those in the lower income category, are spending significant portions of their income (around 20 per cent), on relatively small amounts of data (1 GB). South Africa is ranked 16th out of 47 Africa region countries in relation to the average cost of 1 GB of data.[79] South Africa also has the second highest data contract prices among the BRICS countries (Brazil, China, India and Russia), once prices were converted to Rand and re-based for the cost of living.[80] ITU rates South Africa 71st out of 184 countries in terms of the cost of the 'Mobile-cellular sub-basket' with a cost of 1.25 per cent per month of GNI per capita.[81]

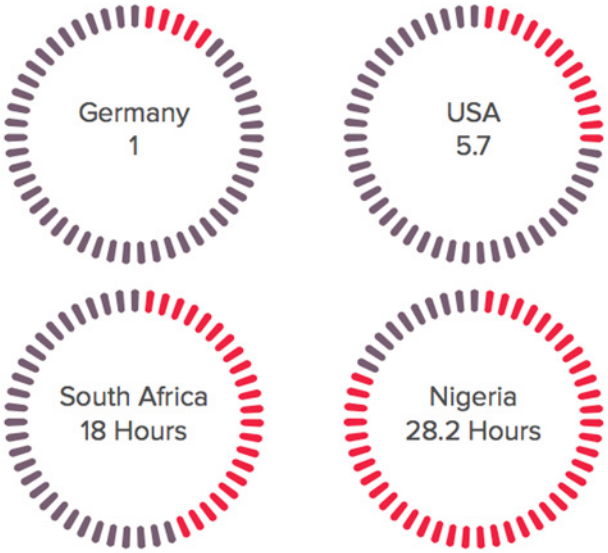
The high cost of data can be partially attributed to the high demand for data, which is forcing operators to build out NGNs, increase their international and local capacity, whilst maintaining the quality of their networks. As a result, operators are collectively investing billions (over ZAR 20 billion between

73 https://www.oxfordbusinessgroup.com/overview/down-wires-rising-popularity-data-sparking-heavy-investment-fibre
74 Telecoms & IT pdf.
75 https://www.oxfordbusinessgroup.com/overview/down-wires-rising-popularity-data-sparking-heavy-investment-fibre
76 www.fin24.com/Tech/Gadgets/SA-mobile-data-growth-to-surge-63-per-year-20150226
77 http://ewn.co.za/2016/09/30/High-Court-sets-aside-Icasas-planned-spectrum-auction
78 Telecoms & IT pdf.
79 www.sowetanlive.co.za/news/2016/10/20/why-data-must-fall-too
80 www.fin24.com/Tech/Multimedia/data-prices-how-sa-compares-to-the-rest-of-the-world-20160930
81 ITU, Measuring the information society report, 2016

Vodacom and MTN in the current financial year alone) in network extension and upgrades, which they need to justify to shareholders with robust rates of return.[82]

Some critics argue that the government has not done enough to legislate on prices, with its current stance of allowing market forces to drive prices down through increased competition regarded as not adequate, primarily because of the barriers to entry for new entrants into the market. Critics argue that without legislation, the current oligopolistic stranglehold on the market cannot be broken, and the existing operators have no incentive to aggressively cut data prices, particularly as they aim to offset their losses in voice revenue.[83]

Figure A2: Hours of work to pay for 500 MB of mobile data



Source: McKinsey Global Institute 2015

A1.6 Major infrastructure investment programmes

Although 4G LTE services remain concentrated in wealthy suburbs across Johannesburg, Cape Town and Durban, some operators have begun rolling out innovative 4G LTE services to expand access and availability in under-served areas. The 4G LTE network technology offers an improved responsiveness that makes a range of voiceover Internet protocol applications, such as Skype and Facebook, function with minimal latency. This has attracted the attention of mobile operators adapting to a growing customer preference for data services.

In April 2015, Cell C announced plans to invest 691 million over the next three years to establish 4G LTE services in metropolitan areas. The company also plans to build an additional 1353 3G sites, largely within areas outside and between the metropolitan centres that will comprise its 4G LTE network. Telkom also moved to launch its own next-generation mobile broadband, announcing in November 2014 that it will roll out a 4G LTE-Advanced network connecting more than 50 suburban communities. Over the longer term, the company hopes to increase Internet speeds to more than 200 Mbit/s.[84]

82 http://researchictafrica.net/publications/Other_publications/2016_South%20Africa_Cost%20to%20Communicate%20Submission_RIA%20.pdf
83 http://www.sowetanlive.co.za/news/2016/10/20/why-data-must-fall-too
84 Telecoms and IT pdf.

A1.7 National broadband/telecommunications development plans

The Minister of Communications gazetted a new broadband policy for South Africa in December 2013. The policy and its associated strategy and plan have been collectively dubbed 'South Africa Connect' and outline a number of activities to improve broadband in South Africa, which run until 2030. In particular, the overall vision of the policy is to give everyone in South Africa access to a broadband connection at a cost of 2.5 per cent or less of the average monthly income. ICASA will supplement these targets by specifying quality of service standards, download and upload speeds, latency, waiting time for installation and fault clearance. South Africa Connect has ambitious targets, including achieving 50 per cent Internet coverage with speeds of 5 Mbit/s by 2015, 90 per cent coverage at the same speeds by 2020, 50 per cent coverage with speeds of 100 Mbit/s by 2020 and universal 100 Mbit/s coverage by 2030. To meet the national objective of more affordable broadband access for all, South Africa Connect allows for both demand and supply-side policy interventions. These are reflected in a four-pronged strategy that will close the gap between the currently poor status of broadband in the country, and the country's vision of a seamless network of networks that by 2030 will make broadband universally accessible at a cost at a quality that meets the needs of citizens, formal and informal business and the public sector.[85]

A2 Ghana

A2.1 Market share of mobile operators

The Ghanaian market has six mobile operators, five operating GSM and one CDMA. All of the mobile operators are associated with international telecommunication companies. As of June 2015, the dominant player in the mobile market was MTN, with a 46 per cent market share. MTN was followed by Vodaphone, with 22.55 per cent, Tigo with 13.87 per cent, Airtel with 12.71 per cent, Glo with 4.47 per cent and Expresso with 0.41 per cent.

Vodaphone entered the market in Ghana as part of the privatisation process. Ghana Telecom was the incumbent national operator, and Vodaphone acquired a 70 per cent stake (the remainder still held by the government) in 2008.[86]

A2.2 Regulator

The National Communications Authority (NCA) was established by Parliamentary Act 1996 as a central regulatory body to regulate the telecommunication sector and to promote a stable operating environment for all participants, while also promoting fair competition and efficiency. The main task of the NCA includes the licensing and regulation of telecommunication system operators and assigning or allocating systems frequencies.[87]

The government policy towards the telecommunication sector is guided in part by two over-arching policy documents: the National Telecoms Policy (NTP), and the Information and Communications Technology for Accelerated Development (ICT4AD). The NTP broadly aims to make telephone and Internet connectivity available and affordable to all Ghanaians. The related ICT4AD sees ICT as an important catalyst for economic growth and the development of a range of economic sectors.[88]

85 www.gov.za/sites/www.gov.za/files/37119_gon953.pdf
86 www.africantelecomsnews.com/resources/Ghana_mobile_subscribers.html
87 www.itu.int/osg/spu/ni/3G/casestudies/ghana/ghanafinal.pdf
88 https://www.oxfordbusinessgroup.com/overview/calling-shots-liberalisation-and-mobile-demand-are-driving-strong-market

A2.3 Broadband access

The six licensed mobile network operators currently compete mostly in the 10 administrative regions of Ghana and other major towns, with the competition fierce in the two most-wealthiest and populous regions: Greater Accra and Ashanti region, which has a combined population of about 10 million.

Mobile network operators in Ghana have a universal licence that mandates them to roll-out services throughout the country, but policy makers and the industry may sometimes have different priorities. The operations of the Ghana Infrastructure Fund for Electronic Communication (GIFEC), which is funded from the one per cent revenue contribution of all the network operators, has largely failed to connect many underserved and economically challenged communities. The decision by some network operators to ignore underserved areas and concentrate on the cities, where subscription is nearly at saturated levels, is based on the fact that the cost of extending services to deprived communities will not be met with the right compensation required to break even in an economy in which the cost of doing business is always rising amid the fact that affordability is still a challenge and out of reach of many people. According to ITU latest price research, mobile broadband costs 1-2 per cent of monthly income in developed countries, compared with 11-25 per cent of monthly average income in developing countries.

Based on these findings, some critics argue that the raft of tax policies introduced by the government needs to be relaxed to bring down the cost of operations and give breathing space to mobile network operators to commit more resources to investment and deployment of mobile services to unconnected areas. In particular, it is argued that the 20 per cent import tax on mobile phones needs to be scrapped to put broadband-enabled devices in people's hands.[89]

A2.4 National broadband/telecommunications development plans

The Ghana ICT4AD launched in 2003 aimed to promote adequate supply of broadband infrastructure, universalization of broadband, private sector interest in investment in broadband networks and to stimulate demand to ensure efficient take-up of broadband services .[90] Some specific government actions/announcements to date include the following:

- The government has created a national backbone network that is run by the National Communications Backbone Company (NCBC), a subsidiary of Vodaphone Ghana. This network is intended to be managed on an open access basis, encouraging competition, transparent pricing, interoperability with other infrastructure, devolved local applications and solutions and increased access to an usage of broadband. However, questions have been raised about the effectiveness of open access to date, partly because operators have invariably chosen to develop their own fibre-optic networks.
- The creation of the Ghana Investment Fund for Electronic Communications, the Ghana universal service fund.
- Announcement of intention to create a more efficient tax regime – where the burden of taxation on the total cost of mobile phone ownership is more than 22 per cent (in stark contrast to close neighbour Nigeria, where only 5.4 per cent of the total cost of mobile ownership is represented by tax).[91]

In addition, the national broadband strategy was launched to ensure the uptake of broadband in Ghana as an economic stimulus by making it accessible and affordable.

89 http://businesstimesafrica.net/index.php/telecoms/1552-ghana-mobile-broadband-growth-deceptive.html?showall=&start=1
90 https://cdn.modernghana.com/images/content/report_content/ICTAD.pdf
91 https://a4ai.org/wp-content/uploads/2014/07/Ghana-Case-Study_FINAL.pdf

The national broadband strategy sought to achieve by 2015:

- 50 per cent broadband penetration for Ghanaians by 2015;
- reduce broadband cost by 80 per cent;
- reduce customer-premises equipment and PC costs by 90 per cent.[92]

A2.5 Attempted removal of smartphone tax

As of 2015 in Ghana, 21 per cent of the population owned a smartphone. This is compared to a median of 37 per cent in emerging and developing nations, and a global median of 43 per cent.[93] The Ghana Government announced plans in the 2015 budget to eliminate the 20 per cent import duty to reduce the cost of handsets in Ghana, where taxes make up approximately 35 per cent of the cost of a smartphone. This was the first step in an innovative government drive to enable affordable Internet access through policy reform. However, this plan was withdrawn in 2016, with the government confirming that it will not cancel the tax but instead reduce the rate from 20 per cent to 10 per cent.[94] It is worth noting when Kenya scrapped VAT on handsets in 2008, devices in circulation quadrupled and overall mobile penetration rose from 50 per cent to more than 70 per cent.[95]

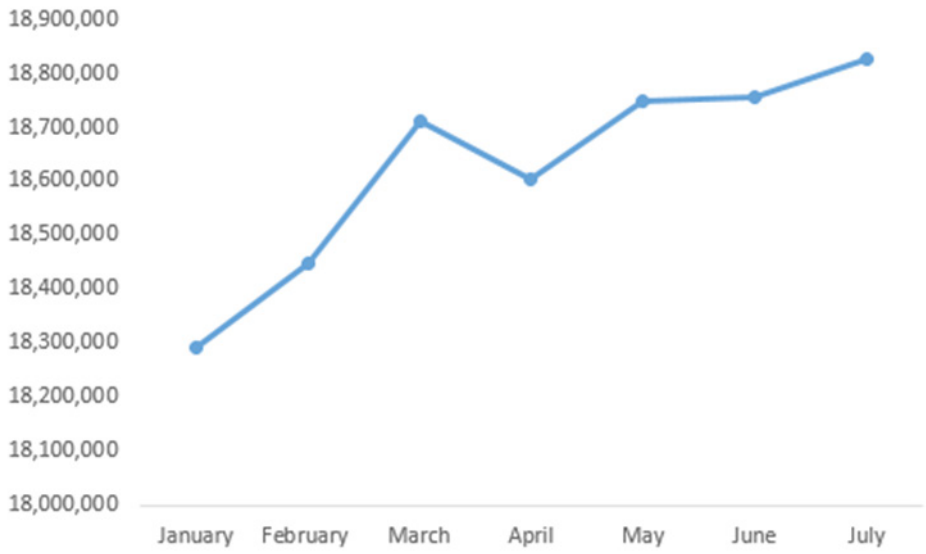
A2.6 Data use

A 15-month report on SMS and mobile data use in the country indicates SMS use declined year-on-year as mobile data consumption more than doubled in the same period. The report shows a 25.2 per cent decline in the number of SMS sent both on-net and off-net, between and within the six telecommunication operators, over the period between the second quarter of 2015 and the second quarter of 2016. Meanwhile, the gigabytes of mobile data consumption within the same six telecommunication operators rose by more than 100 per cent over the same period.[96] Notably, Ghana is third highest country in Africa based on active mobile-broadband subscriptions, with 66.82 per 100 inhabitants.[97]

The National Communications Authority of Ghana mobile voice and mobile data market share trends reported the number of mobile data subscribers rose from about 17.73 million to 18.03 million in December 2015, an access rate of 65.74 per cent. The rise in the number of people with access to mobile phones and Internet usage has been attributed to the recent push for telecommunication companies to expand their net (see Figure A3) work coverage, the availability of cheap smartphones from China and robust legal regime.[98]

92 http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2014/03/Ghana_Broadband_Strategy_v8.pdf
93 www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/
94 https://www.telegeography.com/products/commsupdate/articles/2016/02/05/ghana-cancels-plans-to-scrap-20-smartphone-tax/
95 www.balancingact-africa.com/news/telecoms-en/32292/alliance-for-affordable-internet-welcomes-ghanaian-governments-moves-to-cut-mobile-phone-taxes
96 https://asokoinsight.com/news/report-sms-declines-as-mobile-data-use-doubles-ghana
97 www.broadbandcommission.org/Documents/reports/bb-annualreport2016.pdf
98 www.theafricareport.com/West-Africa/ghana-mobile-phone-penetration-soars-to-128.html

Figure A3: Total Mobile Data Subscriptions from January to July 2016



Source: www.theafricareport.com/West-Africa/ghana-mobile-phone-penetration-soars-to-128.html

A2.7 Major infrastructure investment programmes

Competition is heating up in the Ghana telecommunication market, with growing demand for data prompting operators to roll out large-scale investment programmes in order to expand network capacity. With the bulk of Internet access in Ghana now coming via mobile handsets, the pressure on network infrastructure has increased dramatically. In the two years to March 2015, mobile data penetration nearly doubled, from around 8.8 million people to 16.1 million, with a total penetration increasing from 34.8 per cent to 59.7 per cent, according to the National Communications Authority (NCA), the sector regulator.

To keep pace with growing demand, several of Ghana's top mobile operators have announced sizeable investments to boost capacity and position themselves to offer a wider portfolio of services. MTN Ghana announced USD 103 million worth of investments in 2015 to expand, optimise and maintain its network. This comes on top of more than 2.4 billion already invested between 2006 and 2014. Tigo announced in July that it would channel 24 million into its own network expansion efforts, to be completed by the first quarter of 2016. The company aims to open 275 new base stations, in addition to the 1050 already in operation across the country. This should help improve network quality and geographical coverage, while also easing bottlenecks in areas known for heavy usage, boosting Internet speeds and call quality. In a similar move, Airtel Ghana announced plans to expand its network with a view to improving data services, with 51.7 million earmarked for the build out.[99]

[99] http://www.oxfordbusinessgroup.com/news/ghana's-telecoms-operators-eye-expansion

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ISBN: 978-92-61-25871-9

Printed in Switzerland
Geneva, 2017

01/2017