

Kapatamoyo, Musonda

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## Little Bytes: Zero Rating, Digital Divide and Competition in Africa

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Musonda Kapatamoyo

Title: Little Bytes: Zero Rating, Digital Divide and Competition in Africa.

## Introduction

According to the ITU most of global data traffic is Internet Protocol (IP) traffic []. However, the majority of people can ill afford mobile data despite. The average cost of data in developing countries is prohibitive. [] while the average income is xxx[]. The majority of this population now has access to a smartphone. [FIND GLOBAL DATA INFORMATION].

In developed countries, citizens have access to Wi-Fi networks and can easily use up to 2 GB of data a month. Elsewhere, individual need about 500 MB of data per month to be productive. The 500 MB enables the individual daily access to about 800 plain-text emails, or 17 web pages, or eight minutes of video. PriceWaterHouse asserted that only 43% of the world's population can afford the 500 MB of mobile data a month. In the paper, access to or affording 500MB per month of data is used a benchmark to discuss how the internet works, digital divide and competition amongst several actors in the data market.

According to the International Telecommunications Union (ITU, 129) mobile-cellular prices range from USD 3 to USD 25 per month in African countries. The ITIU's analysis of prices relative to gross national income (GNI) per capita levels shows that in more than two thirds of African countries the cost of the mobile-cellular basket represents more than 5 per cent of GNI p.c., and the service thus remains unaffordable for large segments of the population. ITU 126.

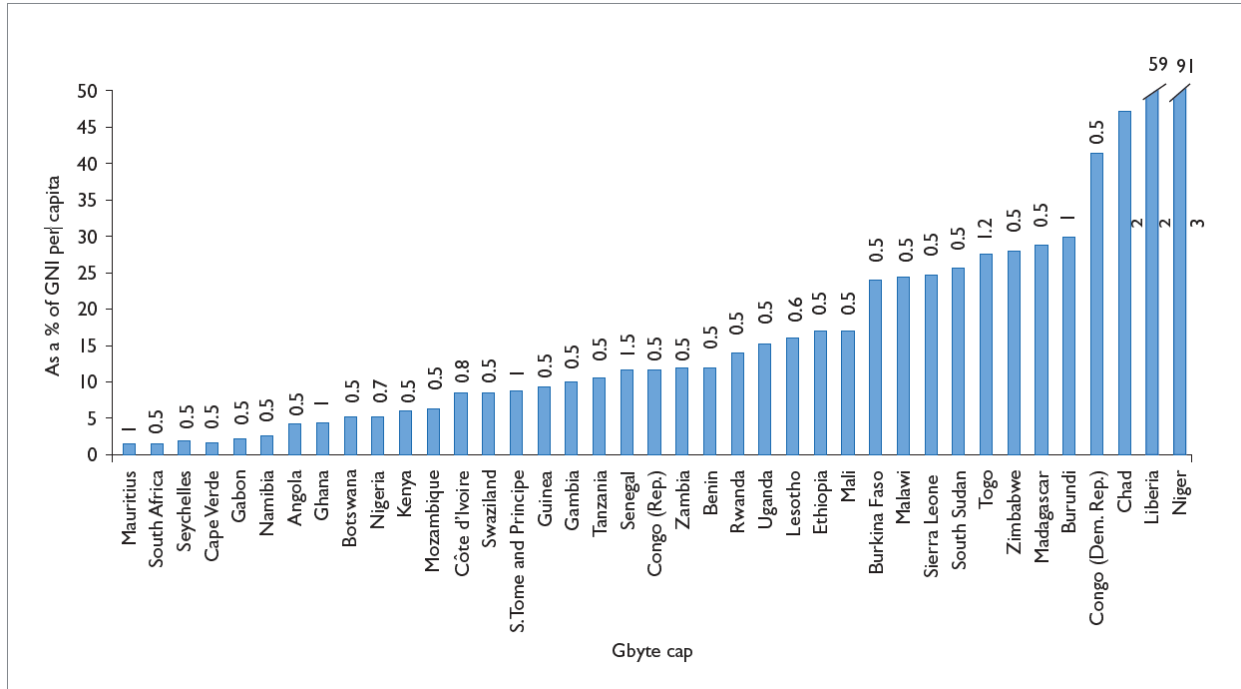


Figure 1. Prepaid handset-based mobile-broadband prices (500 megabytes per month) as a percentage of gross national income (GNI) per capita in the Africa region, 2014. (Source: The International Telecommunication Union.<sup>9</sup> The GNI per capita values are based on World Bank data (2016))

The prohibitive cost of data has been filled by zero rated services from companies such as Facebook, Wikipedia and Google. Zero rated services are controversial in both the developed and developing countries. *In recent years, there has been a heated ongoing debate regarding whether offering different pricing plans, such as zero-rated services and applications, might slant user behavior toward certain content on the Internet.* (Chen et al., 2016, p. 1) Most complaints are about how these services are closed (walled garden theory) and block startups who are trying to innovate; exploit the poor and are a form of economic discrimination. In developed nations, the resistance is due to acceptance of net neutrality. [] criticism: The practice is increasingly popular in both developed and developing countries, but it has

stimulated a vociferous debate especially in developing countries (De Guzman, 2014; Bathia, 2016), where the costs of mobile data services are higher relative to per capita incomes. Zero rating allows individuals to download and upload certain online content without incurring data usage charges or having their usage counted against data usage limits (Eisenach, 2015; Sen et al. 2016) Services often zero-rated by content application providers (CAPs) and MNOs for users in the Global South include Facebook, Google, Twitter, and messaging apps such as WhatsApp (McSherry, et al, 2016, Sen et al. 2016).

The Free Basics content, which consists of a scaled-down (non-graphical, non-video) version of Facebook and a variety of public-interest content such as employment, health, education and local information, is freely available without data charges. (Mutegi, 2015). A user of zero-rated Wikipedia Zero via an African Mobile Network Operator (MNO), has unlimited, no-cost access to everything in the online encyclopedia. Providing this kind of free access to popular, useful content and services is preferable, from an access-to-information and access-to-knowledge perspective, to practices that restrict access or prevent access entirely. Such zero-rated access also has the potential to drive demand for general-purpose mobile Internet access that can, in turn, stimulate demand for paid MNO data services and fund investment in infrastructure. (Sen et al. 2016, p4) Facebook claims that 50% of Internet.org/Free Basics users move on to use some paid data service within a month of using the free service for the first time (Internet.org, 2015a, Sen et al. 2016, p4)

This paper answers the following research question is “What is the relationship between the cost of a data packet on one hand and digital divide and competition on the other, amongst broadband and content providers in Africa? The question could easily be answered via an analysis of profit and loss information from the carriers and internet service providers.

However, with Africa being an emerging market, the new paradigm of zero rating has become a significant method for edge providers to work with internet service providers (ISPs) to deliver content. In addition, since people can actually opt out of zero rated services, their behavior in the face of zero rated options is a good indicator for issues of digital divide.

Prior and related work

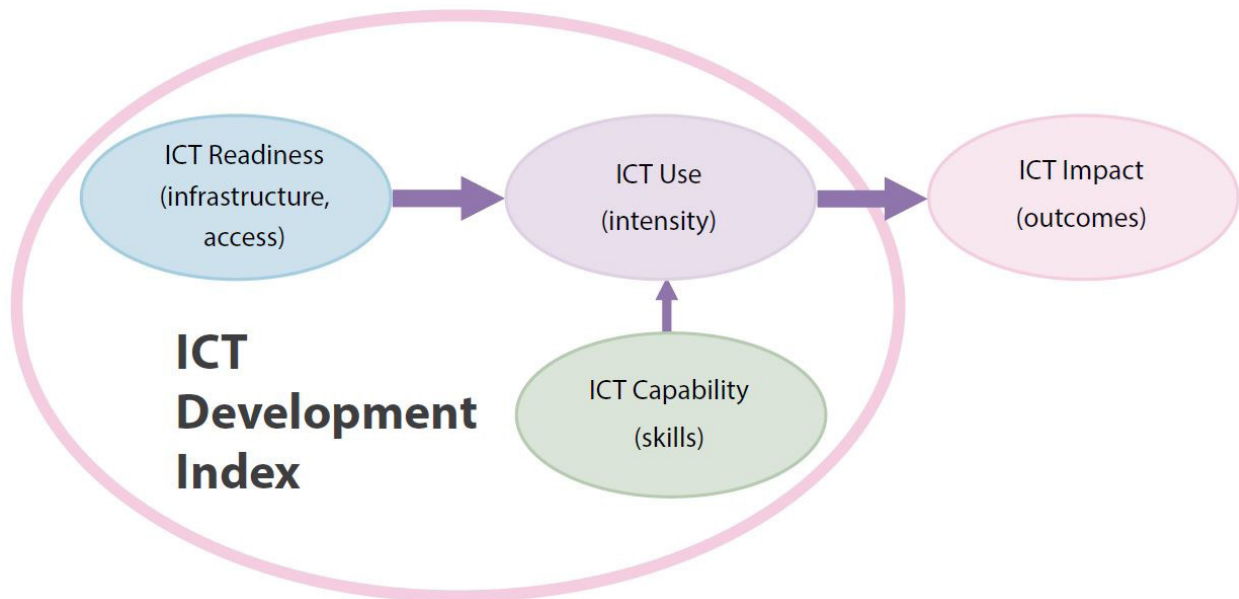
*Investigating data usage practices, and on user behavior analysis in the context of Africa was first done by xxx. They limited their analysis to behavioral trends on a macro scale, and attempts to predict user behavior at a micro (i.e., per-user) level. (Chen et al., 2016, p. 2). This paper borrows some of that behavior analysis in the context of digital divide. As observed below, the ITU describes digital divide also in terms of ICT skills that lead to further derived benefits of internet use. This section expands and contextualizes that user behavior in terms of the available technologies. For example, their analysis reported that with regard to traffic trends in Africa, peak-period mobile traffic is dominated by web-browsing (34.85%) and communications (28.92%) applications. (Chen et al., 2016, p. 2)*

Digital divide

Digital divide is a huge issue that has been studied in great detail over the last two decades. The focus has been on internet adoption (e.g. Andres et al. 2010; Zhang, 2013); devices [], data access or digital inequalities [Norris, 2001], computer skills and language-content [Van Deursen and Van Dijk, 2014; Zillien and Hargittai, 2009], rich media [Van Dijk, 2005]. This paper uses the global indices developed by the ITUs ICT Development Index (IDI) to plot a trajectory of how trends have shifted. According the the ITU, global digital divide for devices has shrunk, access to data is getting is improving and computer skills or ease of use of devices is strong indicator of digital divide show positive trends. These indices are very uneven from country to country.

Hence the necessity to provide some means to reach the unreached. The figure below is a graphic of the IDI conceptual framework.

Figure 2: Source ITU page 8



The IDI aims to measure: “the *level and evolution over time* of ICT developments within countries and their experience relative to other countries; progress in ICT development *in both developed and developing countries*; the *digital divide*, i.e. differences between countries in terms of their levels of ICT development; and lastly, the *development potential* of ICTs and the extent to which countries can make use of them to enhance growth and development in the context of available capabilities and skills.” ITU 8

According to ITU, digital divide can be mitigated through the three stages in the framework. These are *ICT readiness* (reflecting the level of networked infrastructure and *access* to ICTs); *ICT intensity* (reflecting the level of *use* of ICTs in the society); and lastly *ICT impact* (reflecting the results/ outcomes of more efficient and effective ICT use.) ITU 8

Before we see any progress, a community must have access to infrastructure. Secondly, they must be able to use that infrastructure through skills. Finally, individuals will be able to exploit new technologies and enjoying the derived benefits.

#### Consumers / price elasticity

Consumers of data services are price conscious. The services are price elastic. As observed above, even with zero rated offerings, people can switch and leave. The Research ICT in Africa (RIA) found that the price of data was a major barrier to internet uptake. Local market forces might make Internet.org and other zero-rated applications more appealing than they would be in countries where greater shares of the population already have access to the Internet and mobile phones (p. 7).

Consumer behavior is a good indicator for usage. In a longitudinal study of WhatsApp application, RIA found that once it was zero rated usage on Cell C increased, with Wi-Fi usage increasing almost sevenfold, to a median of around 17 MB of average monthly usage per device; and cellular usage increasing almost threefold to around 22 MB. They concluded that this result indicates that zero-rating WhatsApp may have had remarkable effects on its usage (Futter & Gillwald, 2015, p. 7). Other studies also came to the same conclusion that once zero rated, the use of WhatsApp increased dramatically during this zero-rating period regardless of connection type. (Chen et al., 2016; Sundararajan, 2013).

Results, such as those above, show that social networking and messaging applications dominate online mobile usage in Africa (). Entertainment and education- or work-related applications show less frequent usage. Overall, respondents in both countries follow similar online mobile usage patterns ().

Another significant consumer behavior is a phenomena called data conservation. RIA

Chen et al. found that people frequently closed inactive applications and avoiding data-consuming applications with some turning off their devices entirely to conserve data (Futter & Gillwald, 2015, p.. 13). In a similar study Mathur *et al.* (2015) found that both South African and Kenyan users displayed a strong dedication toward active data conservation methods. The choice was sort of forced on many people due to cost. Chen et al reported that the majority of their respondents in each country (65% in Kenya and 57% in South Africa) said that given the choice, “they would prefer to use a non-zero-rated application with full functionality instead of a zero-rated application with limited functionality (Futter & Gillwald, 2015, p. 14).

#### Providers

Mobile and data providers have a daunting task of expanding their networks. From the expensive infrastructure deployment to high cost of maintenance, the providers have an incentive to form monopolies and oligopolies. The end result is that the customer pays a high price for service. This is the broad perspective that the providers have repeatedly used to price their services. In the last 10 years, the number of data only providers have increased. This led to price wars that pushed the price of some services down. Amongst the various strategies has been zero rating or free basics. zero rating is used to increase market share. (Futter et al., 2015). (Chen et al. 2)

Amongst the providers, competition for market share is fierce and can come in form of Content and Application Providers (CAPs), Mobile Network Operator (MNOs), and Internet Service Providers (ISPs). These have adopted a zero-rating strategy in order to compete against dominant operators and build market share by bring users onto the Internet for the first time. (Futter & Gillwald, 2015, p.. 8)



Eisenach's study (2015) argues "that given the current characteristics of information technology markets, in which operators are driving down prices in order to expand market share (especially in developing countries where incomes are low), zero-rating programs generally can serve as economically efficient means for increasing consumer welfare." (p.1 ). Eisenach concludes that "while regulatory authorities should remain vigilant in monitoring business practices, broad-based bans or restrictions on Zero Rating plans are far more likely to harm consumer welfare than improve it" (2015, p. 1). Airtel, a major MNO in Africa used zero rated services as a means to lure customers from the competition. For example, Facebook and Airtel joined forces to offer Free Basics in all 17 of the African countries where it operates (Airtel, 2015). Airtel Africa, headquartered in Kenya, claims its provision of Free Basics will bring more people online and help close the digital divide on the continent (Airtel, 2015; Sen et al. 2016).

Zero rated services are not philanthropy. Providers have several mechanisms to recoup their investment and cost of services. For example, reverse-billing allows entities to provide zero-rated Internet browsing of their electronic channels, including websites and mobile apps, with the sponsoring entity paying for aggregated data usage by customers who access their online channels, in a bespoke arrangement with the network operator. (Sen et al. 2016, p. 32). The resulting question from this arrangement is what is the opportunity cost for large corporations like Facebook and Google that engage in these arrangements?

Another technique allows providers to negotiate better data rates for their customers, for either in- or out-of-bundle usage, with invoices settled by the client's post-usage. In-bundle usage is free, and out- of-bundle usage is fee based. (Sen et al. 2016, p. 32).

## Technical requirements

The ITU (2016) has identified infrastructure and devices as well as skills as indicator of digital divide. This paper contextualizes some of that technology. Using Facebook as an example, this section explains why certain technology affordances must exist on a device for it to work with zero rating. Any content creator can submit their app or site for free basics. This makes it possible for new entrants to reach their audiences. However, they may not monetize their work on this platform.

Most Africans have feature phones. Sometimes several per person. The first requirement for content providers is to ensure that their service is compatible with feature phones. Facebook advises that the site is built to be mobile compatible and optimizing for feature phones. The next is JavaScript Dependency. Sites must disable JavaScript because of limited bandwidth on feature phones. The third requirement is for meets the Visual Interface Functionality standards and is presentable. Lastly, a site must abide by data efficiency standards. Therefore, sites and applications must avoid video files, VoIP, file transfers, and high resolution larger than 1 MB. Facebook, 2016.

## Method

The paper users Document Analysis methodology which is “systematic procedure for reviewing and evaluating documents” that allows for the data to be “examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge” (Bowen, 2009, p. 27). Specifically documents from governments, International Telecommunications Union (ITU) and commercial providers are examined using a schema developed by the Open Technology Institute at New America. The schema examines cost drivers such as network

technology, download and upload speeds, subscription costs, data caps, and modem and equipment rental or purchase fees.

## Conclusion

This first is how the competition happens. So far we see trends in rapid sign-ups for data subscriptions and increased revenues. For example, a new forecast shows mobile data revenue in Africa, will be \$22 billion in 2019. The second is the cost benefit of zero rating. Policy makers indicate that “something is better than nothing.” (ITU, 214). This approach aids with reducing the digital divide. The third is the political economy of agreements (and international cooperation). As controversial as zero rating (or Free Basics) maybe across the world, this paper demonstrates that it is good for competition amongst providers. Competition leads to reduced prices of data, therefore, is a net benefit to subscribers. The paper demonstrates how an understanding of how the internet works, through common language or protocol (TCP/IP), helps to elevate the significance of data packet pricing. Data packet transmission charges are charged on the basis of the quantity of data packets transmitted (one packet = 128 bytes). Therefore, as in the case of accessing a website with images, transmitting/receiving e-mail with an attached file, and downloading data, the larger the volume of data transmitted is, the more expensive the transmission charges become. If the user exceeds their quota, a service may be suspended or throttled.

Consumers have become savvy ay techniques such as data conservation, using multiple SIM cards set for different carriers and figuring out when peak time use is necessary. Other behaviors that indicate skills would include the common practice of Wi-Fi or hotspot hopping

and sharing. Lastly, the consumer behavior slants towards entertainment is the most visited platforms and applications.

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