

Mobile at the Base of the Pyramid: Ghana, Mozambique, Nigeria, Zambia



 **infoDev**
Growing Innovation

Mobile at the Base of the Pyramid: Ghana, Mozambique, Nigeria, Zambia

Summary Report



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Executive Summary

This report assesses existing mobile application (app) business models targeted at, or suitable for, people living at the base of the pyramid (BoP). The report addresses specific pain points for app developers and provides practical, actionable advice. Its recommendations are specific to each of the four countries: Ghana, Mozambique, Nigeria, and Zambia.

While assessing the app markets in the four countries, it quickly became clear that there is a wide range of business models. Each business model is unique to the sector and to the business problem the app is attempting to address. This report focuses on three areas common to all business models to provide maximum value for app developers:

- Revenue sources—Generating revenue is at the heart of any business model. App developers must choose how to make money from their products and services. Options include in-app advertisements, pay per download of content or app, in-app purchases, upgrading free apps to more feature-rich ones for a fee (freemium), and subscriptions.
- Distribution channels—The availability of an app is dependent on its distribution network. Apps can be distributed through app stores, mobile operators—through unstructured supplementary service data (USSD) services, for example—or through local distribution networks.
- Payment facilities—Main payment options for app developers include premium short message services (SMSs), airtime transfers, mobile money, and bank-based payments such as electronic transfers and checks, or debit and credit cards.

This report also presents a brief assessment of app incubators or hubs. These incubators play a

significant role in supporting and advocating apps. However, this role is often only partially realized and this report makes recommendations to address this. The key findings in each of the three areas, which also apply to app incubators, are:

- Revenue sources—Multi-sided platforms are an under-exploited business model. Apps are more likely to make profits and be sustainable if they provide services to consumers that are paid for by businesses—the other side of the platform. Of course, the multi-sided model is dependent on apps addressing problems or needs experienced by both consumers and businesses.
- Payment facility—Premium SMS is the ideal payment facility because it reaches all mobile subscribers regardless of phone type. However, premium SMS is challenging because mobile network operator (MNO) revenue shares can be very high. Nevertheless, this report finds rates are negotiable and MNOs are beginning to realize that high revenue shares are slowing market growth. At the same time, increasing smartphone penetration and mobile money adoption is rapidly creating alternative payment facilities, outside of MNO control.
- Distribution platform—MNO stores are ideal distribution channels because of their access to local subscribers, but this is unrealized. As a result, independent distribution is the most common option. The Ovi Store¹ is a viable alternative for feature phones, but this is an option only in Nigeria where Ovi Stores have local presence. As smartphone adoption increases, Google Play will become dominant. There is a commercial opportunity for Google to register developers as merchants, but few African developers can take advantage of the opportunity due to different combinations of regulatory and market barriers.

¹ The Nokia Ovi Store is an application store for Nokia phones. Nokia was recently purchased by Microsoft.

- Incubators and hubs—The hubs and incubators the team visited were staffed by inspired and motivated personnel. The more structured the environment, the more beneficial it is for developers; specific programs are provided at regular and planned intervals. The target is to better mix commercial realities of launching a business with technical skills already available in the hubs.

There is large untapped potential in all four countries. The primary obstacle to realizing this potential is commercial intelligence that can enable viable and sustainable app businesses.

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List of Acronyms

API	application programming interface
app	mobile application
BoP	base of the pyramid
CPC	cost per click
CPM	cost per thousand impressions
DCB	direct carrier billing
ICT	information and communication technology
IFC	International Finance Corporation
IP	Internet protocol
MEST	Meltwater Entrepreneurial School of Technology
MNO	mobile network operator
OS	operating system
RIA	Research ICT Africa
RoP	rest of the pyramid
SMS	Short Message Service
USSD	Unstructured Supplementary Service Data
VAS	value added services
VAT	value added tax

Introduction

Apps can be used as standalone applications or to support or complement products or services. Another use is for content delivery. Products and services offered via mobile phones are further differentiated as mobile services, mobile applications, and the mobile web.

- Mobile services include premium SMS, USSD,² and voice services, which can be offered to any mobile user including basic phone users. These services are in the scope of this study as they cater to 80 percent of base of the pyramid (BoP) users, who mostly use basic phones. These services can be integrated with mobile apps and mobile web services.

² USSD stands for unstructured supplementary service data. USSD is a protocol used by GSM (global system for mobile communications) cellular networks to communicate with MNO servers. USSD is most commonly used for mobile money services. Unlike SMSs, USSD messages create a real-time connection to the server during a session that remains open, allowing a two-way exchange of data.

- Mobile web services are services provided through mini browsers such as Opera Mini.
- Mobile applications are software packages that run on feature and/or smartphones with different operating systems (Symbian OS,³ Android, iOS, etc.).

All three services—mobile services, mobile web and mobile applications—can be combined in a set of products. For instance, customers can send requests via premium SMS to have analytics delivered to their businesses via a mobile application or mobile web. Mobile web, as such, is outside the scope of this study, it is included where it is used in the context of mobile apps or services. Most websites have a mobile web view, but including mobile web in this mobile app study would mean including most e-commerce sites.

³ Operating system

Understanding the Base of the Pyramid

This section draws on nationally representative households and a survey of individual access to and use of information communication technologies (ICT) by Research ICT Africa (RIA). The survey was conducted in 2012 in Ghana, Nigeria, and Mozambique.⁴ For the purposes of this report, BoP refers to the *infoDev* definition of persons who earn less than \$2.50 per day.⁵ Individuals⁶ were classified in terms of average household income, that is, household income divided by household size.

Less than a quarter of BoP individuals have access to bank accounts and about half own mobile phones. Of those that own mobile phones, 97 percent or more are prepaid; 99.4 percent in the case of Mozambique. Using mobile phones as organizers or clocks and playing games are the most popular activities, besides calling and texting. Only 10 percent use them to browse the Internet.

Internet use among BoP customers is generally low, between 8 and 14 percent in the three countries. In Mozambique and Nigeria, the majority of BoP users accessed the Internet for the first time from their mobile phones. In Ghana, most Internet users are still from the first wave

of Internet adoption. They accessed the Internet for the first time on computers, mostly at Internet cafes.

In Ghana, 94 percent of BoP users accessed the Internet from Internet cafes during the 12 months prior to the survey and only 60 percent from mobile phones. The ratio is reversed for Nigeria and Mozambique.

FIGURE 1: Internet Users Among BoP and RoP Customers (%)

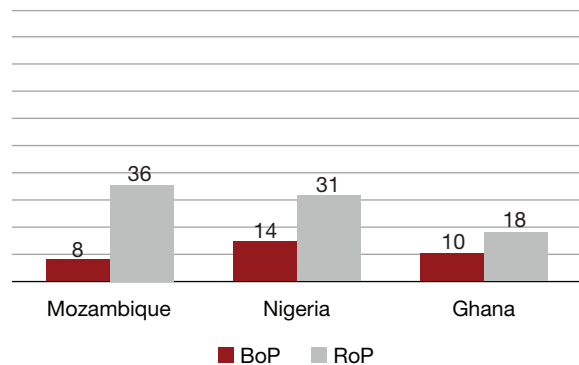
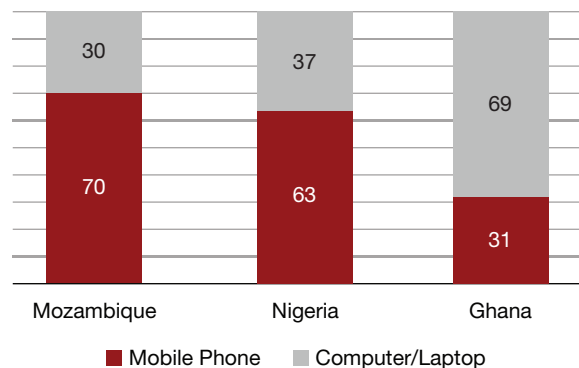


FIGURE 2: How BoP Consumers Accessed the Internet for the First Time: Mobile Phones or Computers? (%)



⁴ The Zambia household survey was conducted by Intelecon and Research ICT Africa in 2010, and the results were nationally representative. However, due to the sampling methodology, the results could not be disaggregated into the base of the pyramid and the rest of the pyramid (RoP), as with the other country case studies. Also, the results are from 2010 and somewhat dated, when compared to the other countries, where the data is from 2012.

⁵ *infoDev*, *Mobiles at the Base of the Pyramid*, *infoDev* Project Concept Note, August 2011, available at http://www.infodev.org/infodev-files/resource/InfodevDocuments_1114.pdf

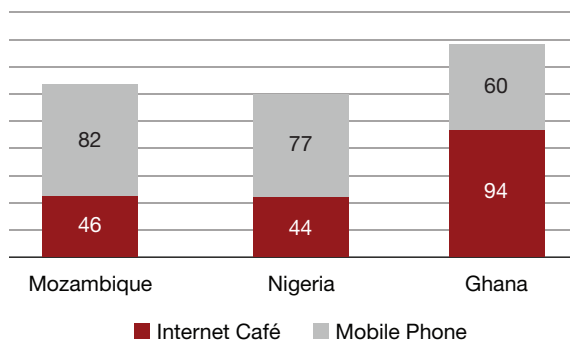
⁶ Individuals are classified as adults if they are 15 years and older.

TABLE 1: Bank Accounts and Mobile Phone Use Among BoP Customers (Age 15+)

		Ghana (%)	Nigeria (%)	Mozambique (%)
BoP individuals with bank or post office account		21.8	21.8	13.9
BoP mobile phone owners		51.2	61.1	42.1
Types of mobile phones owned	Prepaid	97.1	98.7	99.4
	Postpaid	2.9	1.3	0.6
	Mobile phone capable of browsing the Internet	22.7	14.4	22.3
Usage patterns	Browsing the Internet	10.9	10.2	9.8
	Skype/voice over IP	1.3	1	5.1
	Personal organizer/diary/notebook reminder/watch	43.6	39.7	75.7
	Taking photos or shooting video	36.1	36.2	22
	Social networking (Facebook, Twitter, Mxit, etc.)	8.7	10.9	9
	Transferring airtime	5.8	37.2	65.8
	Sending or receiving money	1.5	7.7	6.3
	SMSs to radio or TV programs	4.8	14.3	18.5
	Playing games	33.6	53.2	38.6
	Listening to music/radio	46.1	50.9	46.2
	Downloading applications	10.1	11.3	7.3
	Reading and writing emails	6.6	11.8	7.8

[Source: Research ICT Africa, 2012]

FIGURE 3: From Where Did BoP Consumers Access the Internet for the First Time: Internet Cafes or Mobile Phones? (%)

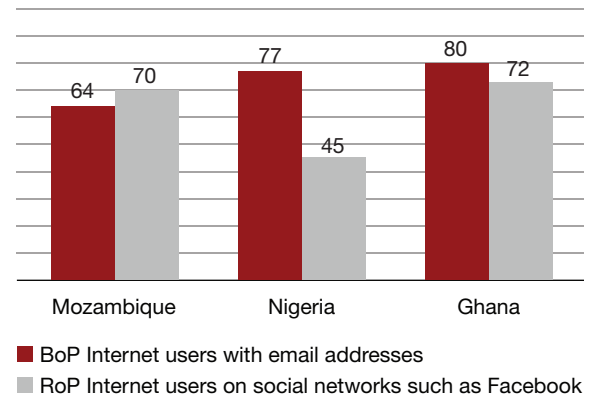


Another trend is the replacing of email by social network applications such as Facebook. This trend is more prevalent on national levels but is also observable among BoP Internet users. In Mozambique, more Internet users use Facebook and the like than email. For Ghana and Nigeria, email use is still higher than social network use.

What are the implications of ownership and usage patterns for mobile application development?

- The RIA survey shows that 23 percent of BoP mobile phone owners in Ghana, 14 percent in Nigeria, and 22 percent in Mozambique had handsets capable of browsing the Internet in 2012. Between 10 and 11 percent actually used their mobile phones to browse the Internet.

FIGURE 4: BoP Users with Email and Social Networks (%)



These figures will have increased since then as smartphone and feature phone prices have dropped considerably. An entry level smartphone today is available for as low as \$70⁷ and prices are likely to fall further.

- Between 78 and 86 percent of BoP consumers do not have bank accounts. SMS or airtime-based payments are the only feasible way, at this stage, for BoP customers to pay for apps or services.

⁷ What a \$70 smartphone means for mobile in Africa, available at <https://medium.com/what-i-learned-today/99674f8d4f6f>

Evolution of App Adoption

Generally, app adoption takes place over three stages for BoP individuals.

- **Stage 1—Basic phone:** Here, services can only be provided via SMS or USSD. In 2012, between 77 and 85 percent of BoP mobile phone users across the four countries used basic mobile phones that could not browse the Internet.⁸ The distribution platforms for basic phones are entirely controlled by mobile network operators (MNOs). MNOs, together with third party facilitators, take up to 70 percent of after-tax SMS value, leaving developers with around 5 to

⁸ There are no estimates for the BoP population in Zambia because the household survey could not be broken down into BoP and RoP populations

20 percent of nominal SMS value, depending on applicable taxes.

- **Stage 2—Feature phone:** The increasing adoption of feature phones in stage 2 weakens control of MNOs and opens up the possibility of third party app stores such as the Nokia Ovi Store. These stores target feature phone users and can negotiate better payment terms with MNOs by aggregating volumes.
- **Stage 3—Mobile computing:** Smartphones open up a third revenue stream for developers: app sales, in-app sales, and in-app advertisements. Some MNOs operate app stores, but the most popular are the ones linked to the operating system (OS), such as Google Play, iTunes, and BlackBerry stores. App stores usually take a 30 percent share, leaving developers with 70 percent, a major improvement over premium SMS. Smartphones in stage 3 give developers the

FIGURE 5: Evolution of App Adoption

Stages	Stage 1: Mobile voice & SMS	Stage 2: Mobile voice & data	Stage 3: Mobile computing
Revenue sources: Mobile operators	Airtime Share of premium SMS Share of mobile money fees	Airtime Share of premium SMS Share of mobile money fees	Airtime Share of premium SMS Share of mobile money fees
Revenue sources: Developer	Share of premium SMS	Web Share of premium SMS Mobile money	Share of app sales Mobile money revenue Web Share of premium SMS
Revenue sources: Third Party	Share of premium SMS Share of mobile money fees	Share of premium SMS Share of mobile money fees	Share of app sales Share of premium SMS Share of mobile money fees
Distribution channel	Mobile operators	Mobile operators Web	Mobile operators Web App stores
Technology	Basic mobile	Feature phone	Smart phone
Nigeria:	approx. 85% of the BoP	approx. 14% of the BoP	approx. 0–5% of the BoP
Mozambique:	approx. 78% of the BoP	approx. 20% of the BoP	approx. 0–5% of the BoP
Ghana:	approx. 77% of the BoP	approx. 20% of the BoP	approx. 0–5% of the BoP

widest choice for revenue collection and distribution. Smartphone penetration among BoP mobile phone users in all four countries is still very low, below 5 percent, but is expected to increase with Android-based smartphones coming into the market, priced at \$70 or less.

The wider ecosystem in stage 3 includes additional players in the form of Google Play and Facebook. However, app developers targeting BoP customers

need to consider that between 77 and 85 percent of BoP mobile phone owners are still in stage 1. The RIA survey shows that 23 percent of BoP mobile phone owners in Ghana, 14 percent in Nigeria, and 22 percent in Mozambique did not have handsets capable of browsing the Internet in 2012. It is changing rapidly, but the transition to stages 2 and 3 will take time.

Smart and Feature Phone User Survey

This section draws on an entirely online survey of 1,600 mobile users by research firm Jana⁹ in Ghana and Nigeria. Users accessed the survey page via mobile phone, desktop, or tablet. The details of respondents are displayed in table 2.

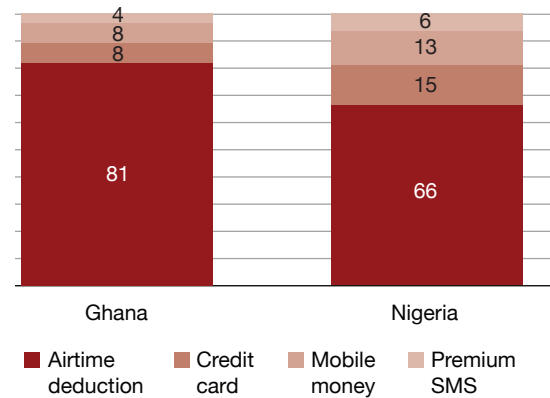
⁹ Jana is the world's largest mobile research and rewards platform covering 237 mobile operators. Registered panelists log in to mCent, see a list of surveys and offers available. If they participate, they earn airtime. Respondents can access the survey via any means—computer, tablet, or mobile phone.

TABLE 2: Survey of Smart and Feature Phone Users in Nigeria and Ghana

		Ghana	Nigeria
Responses		800	800
Female		23.3%	30.3%
Average age		24	23
Minimum age		15	15
Maximum age		61	65
Rural responses		31.8%	24.3%
Installed mobile apps		93.8%	92.9%
App stores previously used	Google Play	60.8%	52.4%
	Nokia Ovi	29.6%	39.5%
	MTN app Store	20.8%	23.1%
	Samsung app store	15.5%	6.5%

[Source: Jana mobile user survey]

FIGURE 6: Preferred Payment Methods for App Downloads and In-App Payments by Feature and Smartphone Users (%)



The survey is not representative because participation was based on self-selection; users could decide to participate or not and there was no random selection. Only the first 800 responses per country were used. The majority of respondents were male, the average age was 23–24, and about 93 percent had already downloaded applications for their phones. Thus, respondents can be classified as early adopters and indicative of a future trend in each country. 60 percent of respondents in Ghana and 52 percent in Nigeria used Google Play to download apps, indicating that more than half of respondents were smartphone users.

81 percent of users in Ghana and 66 percent of users in Nigeria preferred airtime deduction to pay for apps. In other words, direct carrier billing (DCB). This is in contrast to the low popularity of premium SMS, which only scored 4 percent in Ghana and 6 percent in Nigeria. Because these are early smartphone adopters, it indicates that premium SMS is best to target basic and feature phone users. As people transition towards smartphones, new payment methods such as DCB and mobile money are vital to support innovation in the app ecosystem.

Hubs and Incubators

The survey team visited seven app incubators, labs or hubs in the four countries. The visits were inspiring, thanks to the commitment of the leadership team to develop apps in their country. Visiting the hubs across this diverse range of countries provided a relatively unique perspective: a helicopter view of hub operations.

A common theme was that the more structured the environment, the higher the level of participation and stronger the success of the apps. Structure, in this context, means creating dedicated space and time to deliver learning opportunities to app developers. For example, Mobile Web Ghana conducts three-week courses every six months. Course content varies from technical skills to business modelling for apps.

Hub offerings vary; the most basic only provide shared office space and guaranteed Internet bandwidth. High-end hubs such as the Meltwater Entrepreneurial School of Technology (MEST)

in Accra, Ghana, offer structured daily classes over 18 months, and an additional six-month pre-incubation period. Developers are expected to be on campus from 8 a.m. to 6 p.m. every day. The better the structure and offerings, the more successful are hubs in encouraging participation and collaboration from developers.

The second attribute for a hub's success is a combination of technical and commercial expertise. This takes the form of interactions between developers, industry players, and investors facilitated by the hub. MEST has a particularly structured approach, which requires that teams—formed at the end of the third semester (18 months into the two-year program)—consist of both technical and commercial team members.

MEST stands out for several reasons:

- Competition and collaboration is built into the system. Students are aware that they must establish partnerships with fellow students by the end of their first year. It is also clear that teams need to include technical and commercial team members.

TEXT BOX 1: Incubator Case Study: MEST

The Meltwater Entrepreneurial School of Technology (MEST) is based in Accra, Ghana. It is funded by the non-profit Meltwater Foundation, which in turn receives funds from the Meltwater Group. MEST is an educational institution with the objective of training young Africans to become software entrepreneurs. During the two-year program at MEST, entrepreneurs develop software applications targeted at the global marketplace.

MEST received \$20 million funding from the Meltwater Foundation as operational funding for the ten-year period from 2008 to 2018. All education and living expenses are covered for the first year for students enrolled at MEST. At the end of the third semester (18 months into the two-year program), students are required to form teams with the objective of creating a business. This first step is a selection process. Teams must consist of commercial and technical team members. Once teams are formed, each team is given three months to come up with a business concept and pitch for investment. If the investor decides to invest in the concept, MEST covers all expenses for another nine months. If the investor decides not to invest, then the team's time at MEST is over.

If MEST decides to invest in a project, it acquires between 20 percent and 40 percent equity in the business. The founders' equity (the remaining equity after MEST has taken its share) is vested in a trust over a period of four years, each founder being allocated equity regularly over this period. If one of the founders quits after six months, they receive their percentage of equity allocated. If the concept is sold during the course of four years, MEST gets 100 percent of the equity it was promised during the investor pitch, even if the full vesting period has not been completed.

TABLE 3: App Hubs and Incubators

Nigeria	ccHub	ccHUB is a for-profit multi-purpose space for creative social technical ventures. Its primary role is to bring together stakeholders—technologists, social entrepreneurs, government, technology companies, impact investors, and hackers—to address social problems in Nigeria. ccHub has four tiers of membership, ranging from free virtual membership (red membership) to blue membership, which costs Nigerian naira 300,000 (\$1,902) per year. It is targeted at small and medium businesses.
	iDEA hub	Founded in 2013, iDEA is a not-for-profit organization. Its primary aim is to accelerate the development of the software industry in Nigeria. Entrepreneurs accepted into iDEA centers receive support in terms of physical work space, shared facilities, training, mentoring, and access to capital.
Ghana	Hub Accra	Hub Accra provides co-location space, bandwidth, and conference rooms. Hub Accra runs training programs via Startup West Africa and provides the opportunity to network with a range of stakeholders. Membership fees range from Ghanaian cedi 5 (\$2.43) per day to Ghanaian cedi 1,000 (\$487) a year.
	Mobile Web Ghana	Mobile Web Ghana is a non-profit organization that supports app development. It offers co-location and bandwidth space. Mobile Web Ghana also runs mobile entrepreneurship training sessions every six months, followed by a period of mentorship and incubation. Membership ranges from free (crystal) to platinum, which is Ghanaian cedi 35 (\$17.1) per month for a minimum of a year.
Zambia	BongoHive	<p>Founded in May 2011, BongoHive provides co-location space for Zambian entrepreneurs to create sustainable apps. Membership to BongoHive is free. The objective is to get people to meet and share experiences with each other and develop sustainable apps through collaboration.</p> <p>BongoHive equips and connects creative technologists by providing forums for collaboration, information and training for skills enhancement, and exposure to potential clients, investors, and partners.</p>
Mozambique	Maputo Living Labs	The Maputo Living Lab (MLL) is a collaboration between the Eduardo Mondlane University (EMU) and the Autonomous Province of Trento (Italy). The Maputo Living Lab's goal is to use ICT to stimulate development and create new business opportunities for the local community, and also create joint-ventures with international investors.

Exchange rates are based on average exchange rates for 2013, source Oanda.com

- Awards are given out at regular intervals. Just getting enrolled at MEST, with all living and tuition expenses covered, is an achievement. Then, there is the option to stay an additional three months to work on a business concept and pitch to investors. If successful, students are funded for a further nine months for tuition and living expenses.
- Failure has consequences—students have to leave MEST if they cannot achieve certain goals at various stages.
- MEST has significant funding, allowing it to plan for the longer term and to bring in resources to train students in cutting-edge technologies.

- There is a daily structure; students are expected to be on campus from 8 a.m. till 6 p.m. every day.
- MEST is an ideal model for a hub, with the caveat that it is an expensive model.

The contrasting models of the other six hubs provide a useful counterpoint. Without the funding resources of MEST—and its structure—the other hubs are primarily co-location areas, providing Internet bandwidth and desk space. The hubs do try to create a collaborative atmosphere through special training events and app competitions, but both collaboration and competition are transitory. The discipline required to create apps with commercial returns on investment is missing. App developers at MEST, in contrast, actively research

and experiment with different revenue streams and business models. Several viable businesses have been created, as a result.

Hubs have an important role in the app ecosystem in terms of imparting technical and commercial skills and as advocates for app developers. For example, hubs could play an important advocacy role in encouraging operators to adopt direct carrier billing as a payment channel.

Hubs with more structured environments seem to better understand the commercial realities of launching an app. In comparison, hubs that assume ad hoc networking will automatically produce synergies between developers, rarely achieve success.

Business Models

Entrepreneur, software developer, and business school professor Tomi Davies, during an interview¹⁰ in Lagos, defined a business as an entity that must solve a problem, make a profit, obtain customers, and keep them. Applied to app development, a developer has to choose a problem to solve and think about how to make money from solving it. Revenues need to exceed costs. The first important consideration is revenue sources. Obtaining customers is about choosing the right distribution channels and using suitable payment channels. Keeping customers is about continuously delivering value.

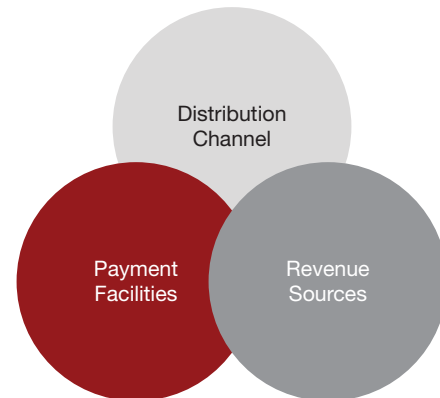
Decisions on distribution channels, revenue sources, and payments are intertwined. Most developers choose several combinations, either sequentially or simultaneously.

- Revenue sources: Fees and subscriptions, in-app advertisements, pay-per-download of content or apps, in-app purchases, and upgrade of free apps to paid feature-rich apps.
- Distribution channels: Via an app stores or directly to MNO subscribers as value-added services (VAS).
- Payment options: Premium SMS, mobile money, airtime, credit or debit card, and cash or checks.

The combinations of these determine the business models available to app developers. Broadly, there are three categories of business models in order of complexity: basic, freemium, and multi-sided platforms. The basic business model includes three versions: app store, VAS provider and content provider. The key feature of the freemium business model is that it is a blended model: free services are offered alongside premium paid

¹⁰ Tomi Davies is CEO of TechnoVision Communications and a visiting professor at Lagos Business School. He was interviewed by the author on October 23, 2013.

FIGURE 7: Overlap of Choices



services. The key feature of a multi-sided platform is that it facilitates transactions between two (or more) distinct yet interdependent customers.

Basic Business Models

The three basic business models are displayed in figure 8.

App Store

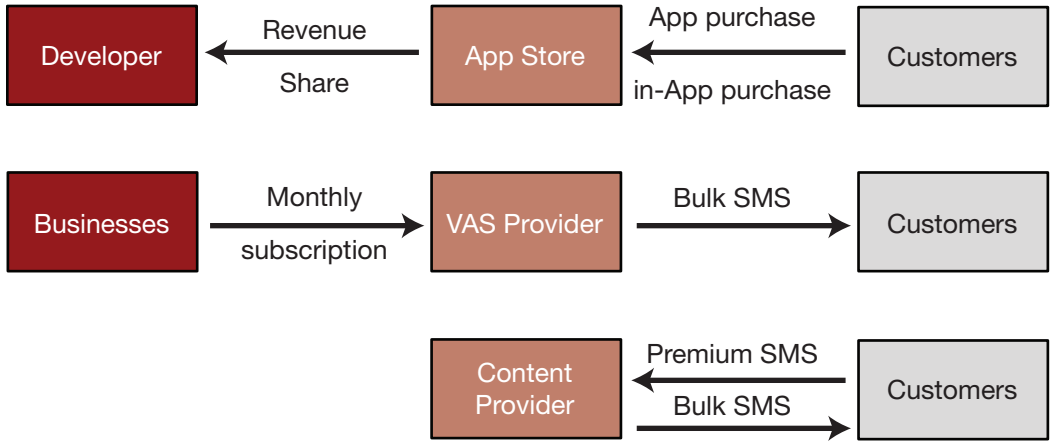
The key feature of the app store model is that content or services are sold by app stores such as Google Play or Nokia's Ovi Store. The developer gets a share of the value of the app. For example, in the Google Play store, a developer receives 70 percent and Google Play 30 percent. This applies to in-app purchases too.¹¹

In this business model, these are the key questions that developers should ask:

- How does the developer gain visibility in the app store?
- What is the payment mechanism? Google Play does not allow a business in any

¹¹ Google Play, 2013. In-App Billing Availability and Policies, available at <https://support.google.com/googleplay/android-developer/answer/1153481>

FIGURE 8: Basic Business Models



African country to register as a merchant, so developers would have to go to other countries that act as intermediaries with Google.

- What is the revenue share with the app store? The MTN App Store in Nigeria has a revenue share of 40/60, with 40 percent going to developers. In comparison, the revenue share for Google Play is 70/30, with 70 percent to developers.
- Are there any particular benefits of each app store choice and/or conditions of exclusivity? For example, local app stores may promote apps but require exclusivity in return.

An example of the app store business model is the iWarrior game from Leti Arts. This is a game with African iconography. The purpose of the game is to protect a village from wild animals such as elephants, lions, and cheetahs. iWarrior is sold

on iTunes for \$0.99. Revenue share is 70/30, with 70 percent going to the developer.

VAS Provider

The key feature of the VAS provider model is that content and/or services are distributed by bulk SMS, which is paid for by businesses or institutions. In this model, the distribution channel is not an app store, but the mobile network operator (MNO) network. These are the key questions that a developer should ask:

- Does the client provide the subscriber database or is it from a third party?
- How do developers market their services to businesses? Where do they find businesses that are interested in sending bulk SMSs to the developer’s customer base?

FIGURE 9: iWarrior Business Model

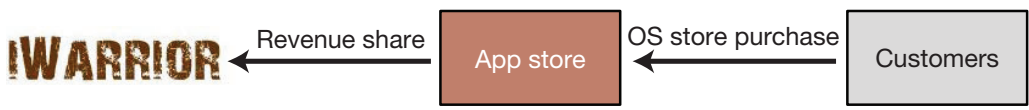
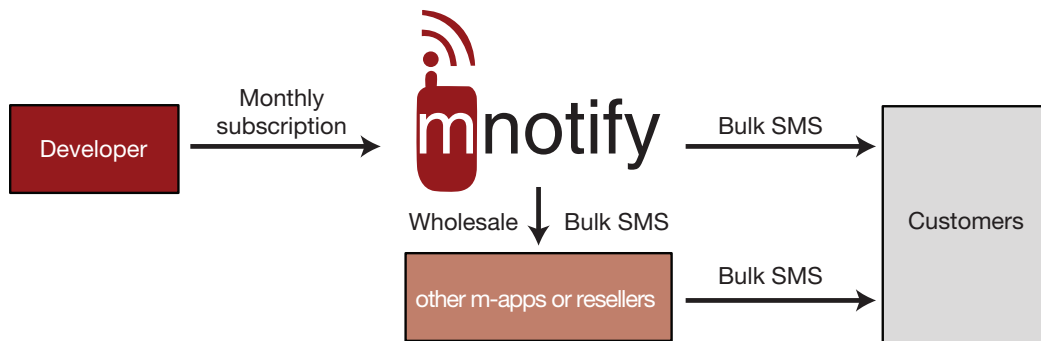


FIGURE 10: mNotify's Business Model



An example of the VAS provider business model is mNotify in Ghana. mNotify provides bulk SMS services to businesses, institutions, individuals, and clubs. Clients can send bulk SMSs through the mNotify webpage. Subscriptions are linked to the quantity of SMSs and vary from Ghana cedi 5 (\$2.44) for 148 SMSs to Ghana cedi 500 (\$244) for 17,858 SMSs. mNotify also offers an application programming interface (API) to app developers that allows them to include an SMS-based notification feature in their applications.

Content Provider

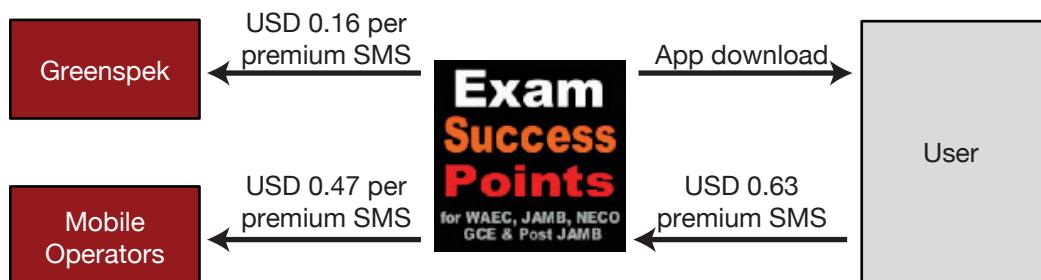
The key feature of the content provider model is that customers pay for content and/or services through premium SMS or interactive voice response (IVR). Premium SMSs are distributed via the MNO network. The content provider receives a small revenue share of the premium SMS value, but the main portion goes to the MNO. These are key questions that developers should ask:

- What is the revenue share between MNO and developers?
- Is marketing done by the MNO? If not, how will developers ensure that customers are aware of their content or services?

An example of the content provider business model is Exam Success Points. This is a mobile application providing learning notes for O-level examinations in Nigeria. The notes are available for English, Physics, Chemistry, Biology, and Economics. The application is available for feature phones and Android phones, but not through Google Play. The Android version is downloaded directly from the publisher Greenspek's website. Greenspek initially allowed payment through airtime. When subscribers grew concerned that airtime would be charged and no download would be received, it switched to a premium SMS model. Exam Success Points has a 60-second free trial after which subscribers have to pay Nigerian naira 100 (\$0.63) via premium SMS. Of this, Greenspek receives between Nigerian naira 20 (\$0.13) and 40 (\$0.25) depending on the operator. On an average, Greenspek receives Nigerian naira 25 (\$0.16) per Nigerian naira 100 (\$0.63) across Nigeria's three major networks. Exam Success Points had been downloaded 47,250 times at the time of this survey.

Nandimobile is another example of the content provider business model. Its main product is Infoline, a web and mobile application that enables organizations and businesses to interactively communicate with customers. Companies send

FIGURE 11: Exam Success Points Business Model



information to customers via bulk SMS and include a short code. Customers respond with the code, either requesting information or providing feedback. Businesses can also advertise on billboards and newspapers, which include a short code that potential customers use to request more information. Infoline can be used for competitions and voting (such as in TV game shows). A premium SMS sent with any of the Infoline codes costs the subscriber Ghana cedi 0.10, (\$0.05) regardless of which network. The entire amount goes to mobile operators and third party aggregators.

Nandimobile received \$70,000 seed funding in 2010 and is operating on revenues since. Distribution is mainly through the web and payments are collected manually from business customers. This limits its scalability to services within Accra.

Freemium Business Models

A layer of complexity is added in freemium business models. They are often used in conjunction with other business models, such as content provider models. This is a blended model: free services are provided along with paid premium services. Generally, there is a large user base for the free app, which is cross-subsidized by a smaller user base for the paid version. Paid users often comprise 10 percent¹² of all users. Paid subscribers access both free and premium services, hence the name freemium. Here are the key questions that developers should ask:

- What is the cost of providing content or services to free users?
- Do fees charged to paying customers cover free content and cost of operation?

¹² Osterwalder, A. & Pigneur, Y. Business Model Generation. John Wiley & Sons.

- How many paid subscribers does the application need to break even?
- How quickly or often do free subscribers convert to paid subscribers?

An example of the freemium business model is the game Danfo Reloaded II, which is available for feature phones via Java, the BlackBerry App store, and Google Play. Realizing the need for a payment mechanism, the game’s developer Pledge51 launched ChopUp, a social platform that allows players to interact based on in-game achievements. Revenues are collected entirely via ChopUp Coins, which are paid for by premium SMS. Players purchase ChopUp Coins to move from one level to the next. Coins are in Nigerian naira 30 (\$0.19), 50 (\$0.32), and 100 (\$0.63) denominations.

Danfo Reloaded II reportedly has 100,000 subscribers, of whom about 15 percent spend an average of Nigerian naira 45 (\$0.28) per month, of which the developer gets about 37 percent. In this model, 15 percent of subscribers subsidize game access for the 85 percent free subscribers.

Multi-Sided Platform Business Models

Multi-sided platform business models contain complex combinations of all three dimensions: distribution channels, payment facilities, and revenue sources. Newspapers are a simple example of a multi-sided platform. Newspapers can be sold below cost to attract more readers, but can charge more for advertisement space, effectively cross-subsidizing the newspaper for its readers. The key features of a multi-sided platform business model are:

- Network effect—the platform’s value is dependent on the number of users on each

FIGURE 12: Nandimobile’s Business Model



FIGURE 13: Danfo Reloaded II Business Model



side. The larger the number of users on one side, more the value for users on the other side.

- Facilitator—a multi-sided platform facilitates transactions between different customer bases.
- Distinct customers—the business model can differentiate between different customer segments, charging distinct prices within each segment.
- Interdependent prices—prices are interdependent, lowering the price on one side allows an increase in price on the other side.
- Prices are independent of cost—allowing free downloads of apps is less than the cost of developing apps. Revenues to cover costs are generated from the other side.

There are two variations in the multi-sided platform business model. In the first version, customer segment A gets services for free (or heavily subsidized) while customer segment B pays for the services. In the second version,

customer segment A pays to advertise to customers of segment B (usually consumers), thereby allowing the platform to subsidize content to consumers.

Here are key questions that developers should ask:

- How can developers attract sufficient A and B customers?
- Which side (or segment) is more price sensitive?
- What is the optimal pricing for interdependent markets? Free or low payment for one side and higher charges for the other, or more balanced payments?
- What are the core elements of the services for which users are willing to pay?
- What are the marginal costs to host free users?
- How can developers lower the costs of hosting free users?
- How will users experience premium benefits (limited full trial, etc.)?

FIGURE 14: Multi-sided Platforms

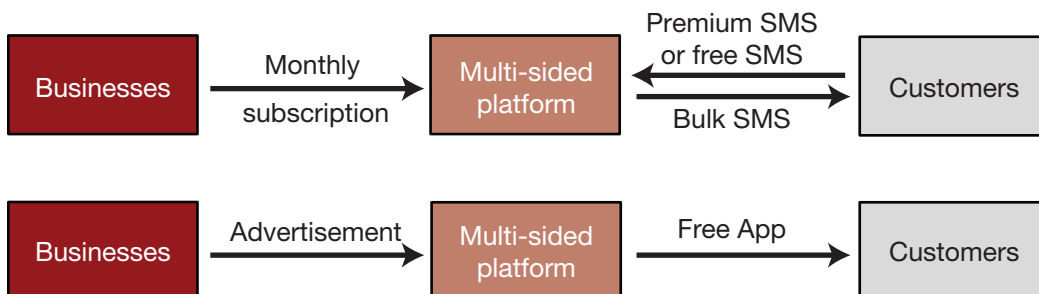


FIGURE 15: Multi-sided Platforms Example: mPedigree



Example 1: mPedigree

An example of a multi-sided business model is mPedigree, which operates in Ghana and Nigeria. mPedigree, is a verification service that allows users to send a free SMS to verify that a pharmaceutical drug is genuine. The cost of the SMS and the service mPedigree provides is paid for by pharmaceutical companies who have an interest in ensuring that the drugs that people use are genuine and not counterfeit. In this variation of the multi-sided platform business model, the service to the consumer is free.

Example 2: mPawa

mPawa is a job-matching service targeted at blue collar workers in Africa. mPawa bridges a gap that exists in the current blue collar recruitment space and is free for workers. Workers register online or via SMS (mPawa therefore works on all phones) to receive notifications whenever prospective employers require their skill sets. mPawa’s main differentiating feature is that, over time, a worker can build a strong resume based on prior work and employer recommendations. The recommendation system reduces time needed to find appropriately skilled workers. Workers are informed by SMS or on the mPawa website to see if they have been selected for a job.

mPawa charges employers and not workers, based on a percentage of the worker’s salary. Pricing ranges according to the period of employment. A short-term job (from one day to three months) costs 10 percent of the worker’s first month’s pay. A long-term contract (from three months to one year) is 25 percent of the worker’s first month’s pay. A permanent job (above one year) costs 50 percent of the worker’s first month’s pay.

Example 3: Zaplaces and Zhappening

Zaplaces and Zhappening in Zambia provide a variation in how advertising revenues can be obtained on a multi-sided platform. The advertising revenue model generally requires an intermediary to match advertisers with app developers or publishers. The attractiveness of a publisher to an advertiser depends on the size of its subscriber base. Businesses are charged a subscription fee to advertise within the Zaplaces or Zhappening apps.

Example 4: Saya

Saya, from Ghana, is a cross-platform chat application that is significantly cheaper than standard SMS as it uses data. Saya works on both feature phones and smartphones. Saya offers advanced functionality such as Facebook

FIGURE 16: mPawa’s Business Model



FIGURE 17: The Zaplaces and Zhappening business model



FIGURE 18: Saya's Business Model



chat (for those with a Facebook account), group discussions, and exchange of multi-media. However, its chief application is a location-based chat called street chat, where users can exchange messages based on their location. Saya was first offered only on feature phones, but is now focused on smartphones. The value of Saya's multi-sided platform is based on the size of its subscriber base, which is attractive to advertisers. Saya has no revenues, but is testing an advertising model with adsbrook, a digital advertisement service provider from the same incubator.

Conclusions

The best combination of payment facilities, revenue sources, and distribution channels will depend on actual choices available in a country, the target audience, and nature of product and services offered. Most potential customers still use basic phones. Feature and smartphones make up only 15 to 20 percent of the mobile subscriber base. Smartphones apps need to generate enough revenues to sustain app development from a smaller number of subscribers when compared to apps developed for feature phones.

It is, however, easier to monetize complex content (compared to ring tones, for example) on smartphones, particularly with advertisement-based revenues due to screen-size, interactivity, and functionality.

A multi-sided platform is the most promising business model for apps, particularly in countries such as Ghana, where payment facilities are limited or uneconomical. There are several examples of multi-sided platforms in Nigeria and Ghana. However, these are not widely used in Zambia and Mozambique as the mobile app sector is still nascent at best.

Danfo Reloaded II exemplifies an innovative approach to the freemium business model. In Danfo level one of the game is free. If gamers want to move to the next level, they have to purchase ChopUp Coins (a virtual currency) using premium SMSs. Advertising could become a second revenue source if it builds up a large subscriber base, which would make it a multi-sided platform as well.

Revenue Sources—Paths to Monetization

Generation of revenues is at the heart of any business model. App developers have to make a choice about how they will make money from their products and services: fees and subscriptions, in-app advertisements, pay-per-download of content or app, in-app purchases, or the upgrade of a free app to a feature-rich paid app.

Globally, advertising and app purchases are the dominant mechanism for revenue generation (see chart on the following page). The trend in 2013 also shows a shift towards advertisements, in-app purchases, and freemium models.

Mobile advertising in Nigeria has seen explosive growth: one global advertising network has seen advertising impressions grow from 473 million in the first quarter of 2011 to 2.7 billion in the third quarter of 2013. In comparison, Mozambique served 162 million banner ads and Ghana served 506 million mobile banner ads.¹³

Developers in the four countries have, in principle, the same choices but are constrained by market factors pertaining to their local audiences. The following considerations are common to all:

- Smartphone penetration is still quite low.
- MNOs own the distribution channels—via their SIM (subscriber identity module)¹⁴ cards—to subscribers and take revenue shares of between 60 to 70 percent for content delivery.
- Local app stores have limited subscriber bases or are just entering the market.

The various revenue sources are discussed in the sections below.

¹³ BuzzCity, 2013. The BuzzCity Report: A quarterly briefing on the mobile Internet. Vol. 3 Issue 4: October 2013, available at <http://www.buzzcity.com/l/reports/The-BuzzCity-Report-Vol-3-Issue-4.pdf>. No data was available for Zambia.

¹⁴ Subscriber identity module.

TABLE 4: Revenue Sources

In-app advertisements	Advertisers pay app developers to place advertisements within the app, for example, at the bottom of the screen.
Pay-per-download	The most common model, where subscribers pay a fee to download the app
In-app purchases	Downloading the app is often free but the user has to pay to access various functions and/or content.
Freemium	Basic services are free. Advanced services (such as additional features) are charged. The freemium model is a form of in-app purchase.
Subscriptions	Frequent, regular payments to the app developer to continue using the app.

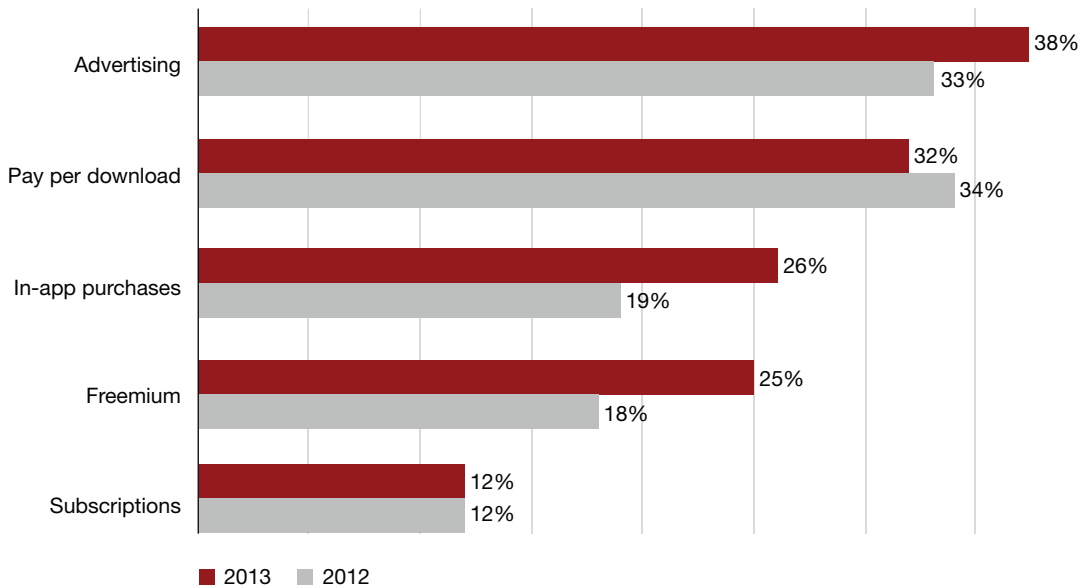
USSD/SMS-Based Content or Services

Value-added services such as ringtones, wallpapers, and daily horoscopes have been offered for many years. Any developer considering providing services or content via this channel needs to be aware that subscribers, networks, and payment facilities are all in the hands of MNOs. The revenue share for developers is relatively small. At the same time, this is the most effective channel to reach large numbers of BoP customers. Apps using this channel should try to ensure that premium SMS is not the only revenue source and that it is complemented by others.

App Purchase, App Upgrade and In-App Purchases

The mechanics are the same when launching products through Google Play, Facebook, iTunes,

FIGURE 19: Revenue Sources (%) for Global Mobile Developers (n = 2,167)¹⁵



However, in practice, there are limitations. By far the most attractive platform for African app developers is the Google Play store because of its revenue split of 70/30 in favor of developers and relatively straightforward and transparent procedures for registering apps. In contrast, the application programming interface (API) for MTN Nigeria and MTN Ghana app stores is only available on request and revenue shares need to be negotiated.

Operator app stores also tend to take a higher revenue share than global stores, using the argument that they actively promote apps through marketing campaigns and that they facilitate payment.

Though the Google Play store is popular, the list of countries in which developers may register as merchants does not include a single African

country.¹⁶ 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. Another option is to sell through an operator app store. Multinational operators may have an agreement with Google to act as merchants in all countries in which they operate. Payment is then made from the user to the operator and from the operator to the developer. The revenue share is thus likely to be lower compared to directly selling through the Google Play store.

In addition to selling applications, revenues can be generated by selling upgrades with more features or allowing in-app purchases.

¹⁵ Visionmobile, 2013

¹⁶ Google Play, 2013. Supported locations for merchants, available at https://support.google.com/googleplay/android-developer/answer/150324?hl=en&ref_topic=15867

In-App Advertisements

In-app advertisements represent a promising source of revenue for app developers in Africa. The advertising model generally requires an intermediary to match advertisers with app developers or publishers. The attractiveness of a publisher to an advertiser depends on the size of its subscriber base. This is the key characteristic of a multi-sided platform. There are two operational advertising platforms, across the four countries: Twinpine Networks and adsbrook. The business models of the two platforms are discussed below.

- adsbrook is an advertising platform that offers targeted ads within apps and online. adsbrook is specifically focused on providing local consumers with relevant ad content. The application allows developers to serve advertisements across different mobile platforms: Android, iOS, J2ME, and BlackBerry. Regional competitors include Twinpine Networks from Nigeria while international competitors include Blueview.com and m-mobi. adsbrook has chosen a cost per thousand impressions (CPM) model where an advertiser pays \$0.65 for 1,000 impressions, of which \$0.40 is paid to the app developer. The advantage of this model is that the app developer (for example, Saya) is guaranteed a relatively stable income, assuming that Saya can predict its traffic flow. The alternative model, adopted by Twinpine Networks in Nigeria, is cost per click (CPC) where an advertiser only pays when a user clicks on the advertisement.
- Twinpine helps publishers monetize content by serving locally relevant ads. Twinpine Networks facilitates interactions between advertisers and publishers, where the publishers—such as Vanguard News Nigeria and Punch, both popular news sites—have the subscribers and advertisers want to promote their products to the subscribers. Twinpine Networks has chosen a CPC model rather than a CPM model. The advantage of the CPC model is that an advertiser only pays for people that have actively chosen to learn more about the advertisement. In comparison, with the CPM model the advertiser pays for the number of impressions served, regardless of the click-through. Twinpine Networks charges an advertiser between \$0.13 and \$0.11 per click, depending on discounts offered to the

advertiser. Twinpine is trying to drive increased advertising traffic and offers discounts to large advertising agencies to attract business. Twinpine keeps 40 percent of the revenue while the app developer gets 60 percent.

Freemium

The freemium model provides a basic service for free and then encourages consumers to purchase additional features at a price. The freemium business model reduces risk by allowing consumers to test out the product or service and then decide whether they want to purchase more features. This model has been most commonly used by farm information services, pioneered by apps such as Esoko, which originated in Ghana. In Nigeria, Danfo Reloaded II has an innovative adaptation of the freemium model where gamers use a virtual currency called ChopUp Coins to purchase access to the next level. Subscribers download the app for free—the first level is also free—but need to buy ChopUp Coins using premium SMS to advance to the next round.

Subscription

Monthly subscriptions are an attractive revenue source because of the stable cash flow they provide. Companies pay for a range of services, such as delivering bulk SMSs to their customers, allowing customers to request information, and informing farmers about market prices. mNotify in Ghana, for example, relies on a subscription model for its revenues.

Other Revenue Sources

Revenues can be generated by several other means. Apps can be commissioned by public institutions such as schools, clinics, or companies. These kinds of contracts can subsidize the development of other applications. Apps can be designed to support business processes, manage information, and/or receive and make payments. Revenues are thus generated by the supported business processes and not by the app.

Several app developers that were interviewed said contract work ensured their continued survival or was the mechanism to earn enough to be able to develop apps. For the developers of Danfo Reloaded II, 90 to 95 percent of company revenue

originally came from consulting—developing customized apps for clients—and project management.

Conclusions

Internationally, there is a shift towards advertisements, in-app purchases, and upgrades as sources of revenue. In-app purchases and advertising are the two most promising revenue sources. Innovative games, such as Danfo Reloaded II, are experimenting with different ways to encourage subscribers to spend money within the app by converting premium SMS into a platform currency. While mobile advertising is nascent, it represents an exciting potential market as app developers build large subscriber bases.

The path to monetization in all four countries is extremely challenging. Several app developers have to supplement incomes through contract work to cross-subsidize app development. In Ghana, for example, Leti Arts subsidizes the development of apps such as iWarrior and its gaming platform, Leti Centre, through contract work for large companies. In Nigeria, Pledge51, the developers of Danfo Reloaded II and the ChopUp platform, have also relied extensively on contract work to cross-subsidize app development.

The challenge for app developers is to link revenue sources to payment facilities. A revenue source is useless unless there is a mechanism to transfer money from the user to the developer or content provider.

Payment Facilities

There are four main payment options for app developers to collect revenues: operator-based, mobile money, bank-based, and others. Operator-based payment facilities include premium SMS and airtime transfer. Mobile money can be operator-based or bank-based, depending on regulatory frameworks. Bank-based payments are electronic transfers, checks, or debit and credit cards. A fourth category, that is not bank or operator-based, comprises scratch cards and vouchers. The cost of collecting revenues and degree of availability varies, depending on the facility.

Each payment facility has advantages and disadvantages. Bank fees are high, especially fixed monthly costs. The requirements to open a bank account are prohibitive to most BoP individuals. Consequently, few people have access to banks.

Mobile money could be an alternative to banks as it offers pro-poor money transfer and, if implemented correctly, other banking facilities too. This is unfortunately not the case in Nigeria. MNOs offer a payment alternative through premium SMS, exploiting this gap and taking a share of up to 70 percent of revenues. This is because MNOs have unique access to their subscribers. Additional intermediaries—SMS aggregators—are often required to reach subscribers of all MNOs in a country. They too take another share of the pie. Figure 20 depicts subscriber/user base and revenue share from various payment facilities for the four countries.

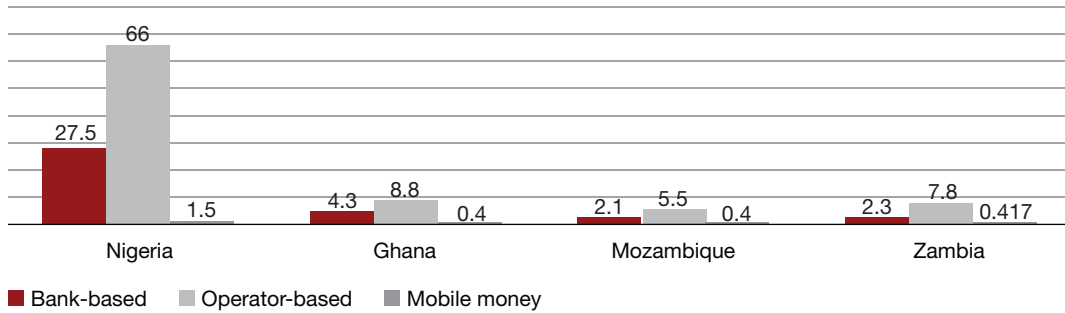
With the exception of Mozambique, mobile money facilities are not designed to handle micro-payments, defined as less than \$0.50 per transaction.¹⁷ Transaction fees for these can be between 50 and 100 percent, if such small

17 In the developed world, the value of micro-payments is around \$12.

FIGURE 20: Payments Facilities

Payment options	Nigeria	Ghana	Zambia	Mozambique
Operator Based:	Operator-based:	Operator-based:	Operator-based:	Operator-based:
Premium SMS	Developer revenue share: 37% Customer base 15+: 66 million	Developer revenue share: 5–15% Customer base 15+: 8.8 million	Developer revenue share: 15% Customer base 15+: 7.8 million	Developer revenue share: 20–40% Customer base 15+: 5.5 million
Airtime transfer	Developer revenue share: 85–90% Customer base 15+: 66 million	Developer revenue share: 85–90% Customer base 15+: 8.8 million	Developer revenue share: 85–90% Customer base 15+: 7.8 million	Developer revenue share: 85–90% Customer base 15+: 5.5 million
Mobile Money:	Mobile money:	Mobile money:	Mobile money:	Mobile money:
Mobile money	Developer revenue share: >95% Customer base: 1.5 million (active)	Developer revenue share: >95% Customer base: 400,000	Developer revenue share: >95% Customer base: 417,000	Developer revenue share: >99% Customer base: 400,000+
Bank-based:	Bank-based:	Bank-based:	Bank-based:	Bank-based:
EFT/check	Developer revenue share: >95% Customer base 15+: 27.6 million	Developer revenue share: >95% Customer base 15+: 4.3 million	Developer revenue share: >95% Customer base 15+: 2.3 million	Developer revenue share: >95% Customer base 15+: 2.1 million
Credit/debit card	Developer revenue share: >95% Customer base: unknown	Developer revenue share: >95% Customer base: unknown	Developer revenue share: >95% Customer base: unknown	Developer revenue share: >95% Customer base: unknown
Other:	Other:	Other:	Other:	Other:
Vouchers/ scratch cards	Developer revenue share: >95% Customer base 15+: 66 million	Developer revenue share: >95% Customer base 15+: 8.8 million	Developer revenue share: >95% Customer base 15+: 7.8 million	Developer revenue share: >95% Customer base 15+: 5.5 million

FIGURE 21: Payment Facilities in Terms of Reach to Subscribers (in millions)



transactions are even possible. As a result, most mobile money providers target high value transfers rather than micro-payments.¹⁸

Micro-payments are an enabler for mobile application innovation. Premium SMS is the most viable payment option precisely because it can handle micro-payments. Mobile money is not, at this point, a viable alternative because it caters only to high-value person-to-person transactions.

Premium SMS

Premium SMSs are similar to ordinary SMSs. However, instead of content they contain a payment instruction. When a subscriber sends a premium SMS, her/his airtime is reduced by a specified value, usually higher than the cost of a standard SMS. Because these messages involve a premium fee, they incorporate a special number (known as a ‘short code,’ consisting of 4 to 8 digits).

In some countries, using premium SMS is restricted and is therefore controversial. In Zambia, the regulator charges developers or aggregators \$3,000 for the use of a designated short code in an attempt to control content

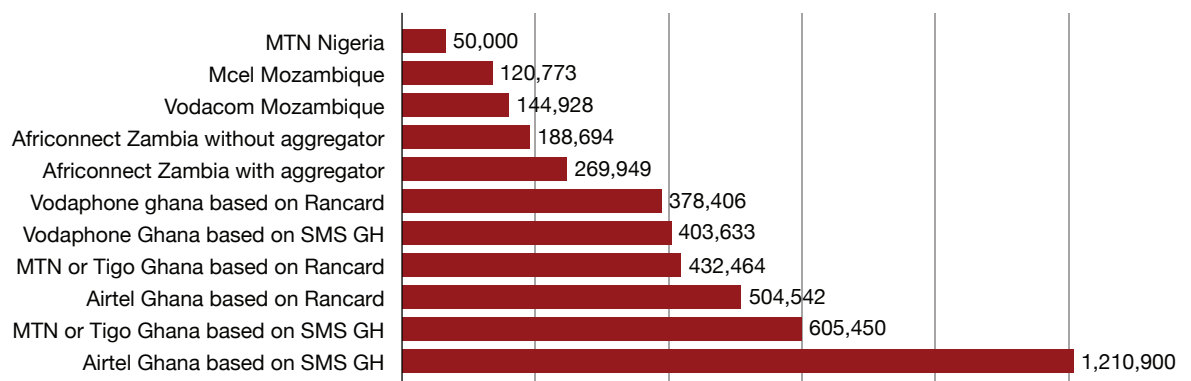
delivery. In Mozambique, short codes are allocated largely to MNOs, making it difficult for app developers to access.

Of the four countries, Mozambique has the best revenue split for premium SMS, with app developers receiving up to 40 percent. Nigeria follows closely behind with developers getting 37 percent of revenues. The worst operating environments are Ghana and Zambia, where app developers can receive between 5 and 15 percent of revenues. The poor economics of premium SMS in these countries is apparent from the massive numbers of premium SMSs that need to be downloaded to make \$5,000 per month. The key findings for each of the four countries are:

- Nigeria: This country has the most favorable conditions to deploy premium SMS due to the market size, low VAT, and a revenue share of 60 percent off a massive subscriber base.
- Mozambique: This is the second most favorable country. It has a much smaller subscriber base, but MNOs have realized that the shift to smartphones and data applications is an opportunity and therefore offer the most flexible terms among all MNOs covered in the study. Operator revenue shares are 40 percent for Mcel and 50 percent for Vodacom and are negotiable, based on the business model and nature of the app. Mcel additionally offers

¹⁸ While MPESA in Kenya has recently allowed micro-payments, mobile money providers in Zambia, Nigeria, or Ghana do not support micro-payments.

FIGURE 22: Number of Premium SMSs, at \$0.10 per SMS, Required to Raise \$5,000 (detailed calculations can be found in the country reports)



fixed bands rather than revenue shares for SMS services based on interactivity, allowing developers to retain as much as 89 percent of revenue.

- Zambia: Premium SMS is not an attractive payment facility in Zambia. Taxes, such as VAT and regulator’s fee (short code tax of \$3,000), are high and revenue share is not as flexible when compared to the other three countries. Also, an exorbitant premium SMS license fee ensures that it is attractive only to large corporates (such as banks and large retailers).
- Ghana: Premium SMS is a last-resort payment facility. Revenue share of Airtel, an MNO, for example, is 70 percent and not negotiable. Premium SMS makes sense only in combination with multi-sided platform business models and where main revenues come from other sources.

Mobile Money

At this stage, mobile money, across all four countries, is not a viable payment facility. Mobile money rollouts have been weak, the markets fragmented, and, with the exception of Mozambique, do not cater for micro-payments because of high transaction fees.

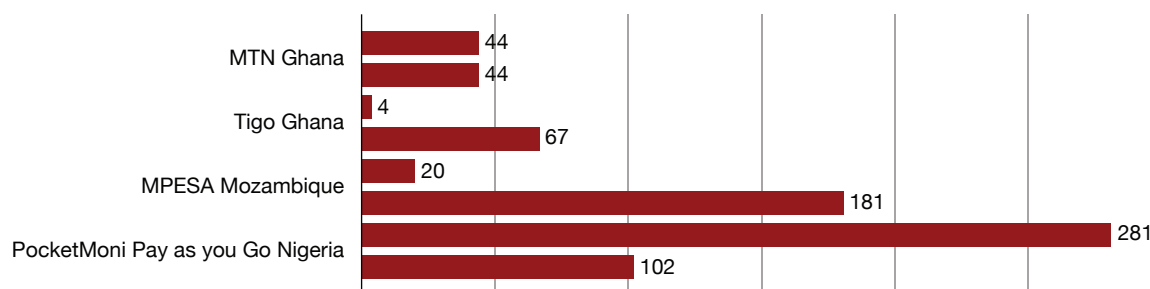
In the medium term, Mozambique shows the greatest potential for mobile money as a payment facility because it already allows micro-payments and is actively growing the merchant network.

Nigeria

IFC rates Nigeria as one of two countries in the world with high mobile money potential.¹⁹

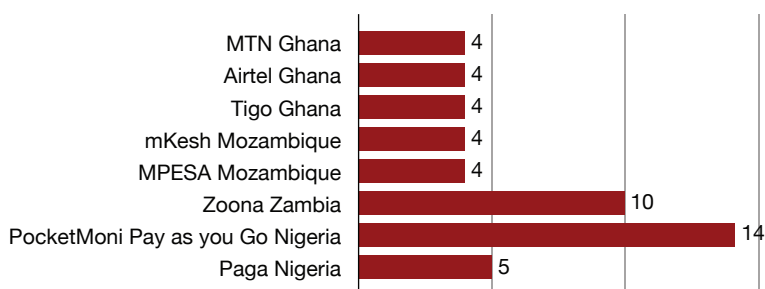
¹⁹ CGAP, Mobile Money Market Sizing Toolkit, available at <http://tinyurl.com/onv8q8c>

FIGURE 23: Cash-to-Cash Cost for \$0.50 from Registered User to Registered User (%)²⁰



²⁰ Service provider websites and author calculations.

FIGURE 24: Cash-to-Cash Transfer Costs for \$10 from Registered User to Registered User (%)²¹



Unfortunately, mobile money penetration in Nigeria is still insignificant. There are approximately 1.5 million active mobile money subscribers in a population of 150 million, a penetration of 1 percent. Paga, the largest mobile money provider in Nigeria with over 1 million subscribers²² has an agent network of 3,500,²³ which is tiny in comparison to MPESA in Kenya with over 65,000 agents for a population of 43 million. The number of mobile money agents in Nigeria is very small because agent networks have to be built from scratch, rather than rely on already established MNO networks.

This is because MNOs, with large networks of agents, are not allowed to lead mobile money initiatives or brand mobile money. Instead, mobile money is branded by banks and third parties. Mobile operators are required to form a consortium with a bank or non-bank partner taking the lead. From the perspective of a mobile money operator, this means the lead partner reaps all the benefits of the MNO's agent network without any of the costs associated with setting it up. As a result, MNOs have very little incentive to participate in mobile money initiatives. Thus, the primary obstacle in Nigeria is the regulatory framework. If the Central Bank of Nigeria eases regulatory rules governing mobile money, it may become a viable payment facility for mobile applications. Until that happens, however, mobile money is not practical in terms of mass adoption.

Ghana

After premium SMS and airtime, mobile money is the most ideal payment facility. However, the

number of active mobile money users is low, around 400,000 in a population of 25.37 million, a penetration rate of 1.5 percent. Also, mobile money initiatives are not technically structured to appeal to app developers. APIs are not publicly available for example. A developer can get access to an API through negotiations with each operator, and usually only after the operator has assessed his business model. Apart from technical obstacles, two of the three mobile money operators in Ghana are not set up to effectively process micro-payments: both MTN Mobile Money and Airtel Money have a minimum charge of Ghanaian cedi 1 (\$0.50), representing a transaction fee of 100 percent for payment of Ghanaian cedi 1. Tigo Cash is a substantially cheaper service with transaction fees of 3.5 percent on a transfer of Ghanaian cedi 1 and can therefore handle micro-payments. As mobile money penetration increases, Tigo Cash may represent a significant opportunity for app developers to integrate mobile money as a payment facility. To be appealing to an app developer, all mobile money solutions should ideally integrate into the app.

Zambia

Superficially, mobile money in Zambia is very attractive: Airtel Money alone reports more than 1.2 million users. But these high numbers disguise the fact that very few subscribers are active users. Airtel Money is a default option for new Airtel subscribers but few go on to use the service. Airtel Money agents have struggled with liquidity and potential customers have been turned away. Active users are less than 10 percent of the 1.2 million subscribers. Similarly, MTN Mobile Money has around 700,000 subscribers but active users constitute 7 percent of that total (49,000 subscribers).²⁴

²¹ Service provider websites and author calculations.

²² Paga, 2013, available at <https://www.mypaga.com/paga-web>

²³ Author interviews with Paga

²⁴ Author interview with MTN

Outside of the MNOs, Zoono is an independent operator, which provides traditional mobile money services. Zoono is also trying to grow the small business ecosystem by offering working capital financing packages linked to using Zoono mobile money. The more Zoono mobile money is used for a small business, the more working capital that business can access. However, at this stage Zoono is focused on expanding its mobile money transactions by integrating Airtel Money's operations. Zoono is taking over Airtel Money operations, including its agent network, and addressing the lack of liquidity being experienced at Airtel Money agent locations. A major obstacle to wider use is the high cost of a cash-to-cash transaction.

Mozambique

MPESA was launched by Vodacom Mozambique on May 16, 2013.²⁵ Vodacom said that it had about 250,000 activated (registered and then activated) users in November 2013 and mKesh had about 157,000 active users. Mobile money use is thus very limited as a means of collecting revenues, but that may change within a short period of time. The total cost of cash-to-cash payments with mKesh ranges from 50 percent for micro payments of Mozambican metical 20 (\$0.67)²⁶ to 0.22 percent for the maximum amount of Mozambican metical 25,000 (\$839). The actual costs for mobile money users could be considerably lower when, for example, paying merchants. The merchant payment fee for mKesh is Mozambican metical 1 (\$0.03) per transaction. Mobile app developers may register as merchants and thus allow users to only pay Mozambican metical 1 (\$0.03) instead of the Mozambican metical 5 (\$0.17) transfer fee. Developers can convert mKesh to money once the maximum amount of Mozambican metical 25,000 (\$839) is reached for a fee of Mozambican metical 50 (\$1.67). This translates to a 0.2 percent transaction fee.

Transfers of Mozambican metical 20 (\$0.67) to 100 (\$3.35) is free on MPESA for a promotional period. New prices were yet to be announced at the time of this survey. The free micro-transfer for registered users and Mozambican metical 3 (\$0.1) fee for non-registered users makes micro cash-to-cash transactions affordable with only a 15 percent transaction fees, compared to 50 percent

25 AllAfrica.com. Mozambique: Vodacom Launches MPESA Service, accessed in December 2013, available at

26 Exchange rate is based on average exchange rate for the year 2013, source Oabda.com.

for mKesh. More importantly, merchant and PoS (point of sale) payments are free for consumers. The APIs for MPESA and mKesh are not publicly available and have to be requested for from operators.

Both mobile money implementations offer promising avenues for developers to collect revenues. While free apps may be distributed through global app stores, mobile money can be accessed through the app to pay for services (in-app purchases).

Airtime

Airtime is, theoretically, an alternative to premium SMS as a payment facility. It has the same attractive features: a potential subscriber base of all mobile subscribers and a payment method with which subscribers are familiar. However, there are two challenges: first, it cannot be easily integrated into an app but requires a separate transaction where the buyer has to send airtime to the seller and assume that the seller will honor the transaction. Second, mobile operators oppose the use of airtime as a payment mechanism²⁷ and very few developers have integrated airtime as a payment facility in any of the four countries.²⁸ Also, airtime as a payment facility involves the challenge of cashing out: the accumulated airtime has to be resold for cash.

Direct Carrier Billing

Direct carrier billing (DCB) is the direct deduction of mobile airtime when a consumer buys an app. When compared to premium SMS, DCB offers greater flexibility—payment can be deducted in-app rather than by sending or receiving an SMS. Also, DCB is integrated directly into the MNO's billing platform. However, DCB is not yet available on all networks in the four countries. In terms of revenue share, DCB is far more attractive than premium SMS as operators typically receive

27 One of the reasons mobile operators oppose using airtime as a payment method is that central banks tend to discourage it as it can potentially become an alternative currency and can hide money laundering.

28 Greenspek, developer of apps such as Exam Success Points, My Abuja and First Aid, initially started using airtime as a payment facility, but reported that users were reluctant to pay because they were concerned that their airtime payment would disappear and the app download would not take place.

between 10 percent and 20 percent of revenues rather than the 60 percent to 70 percent, which is typical of premium SMS.

Platform Currency

The only platform currency available in an app is ChopUp in Nigeria. ChopUp is a social platform, created by Pledge51, the company that launched the games Danfo and Danfo Reloaded II. ChopUp allows players to interact based on in-game achievements. ChopUp captures the various conversations players have while playing games such as Danfo Reloaded II and is available across multiple platforms, including Android, iOS, and Java. Features include real-time online leaderboards, recognition of in-game achievements online, and a virtual currency called ChopUp Coins that can be used across and within games. Given the challenges involved in creating customer awareness and that a viable alternative is available in the form of premium SMS, a platform currency is unlikely to become a feasible payment facility.

Conclusions

Premium SMS is the most viable payment facility across all four countries. This conclusion is based on market sizes in general, and that a large number of subscribers still use basic and feature phones. Revenue share can be negotiated with operators, depending on subscriber volumes. MNO stores have the unique advantage of having access

to these subscribers, though this advantage is being eroded as smartphone penetration increases. Experimental payment facilities, such as ChopUp Coins, are worth investigating if an app developer is unable to negotiate fair terms with an MNO. Virtual currencies can be reloaded through various payment options including mobile money, which provides greater flexibility compared to premium SMS. Direct carrier billing is an exciting possibility, but is yet to be implemented in any of the four countries. The mobile user survey showed that as users transition towards smartphones, DCB will become an important part of the app ecosystem.

Mobile money as a payment facility is still developing and penetration will continue to be slow until regulatory obstacles can be addressed. Outside of regulatory obstacles,²⁹ mobile money providers do not cater to micro-payments because transaction fees are extremely high for small transfer amounts. The focus of mobile money remains on person-to-person transfers and basic bill payments. Small value payments for apps using mobile money will depend on both commercial and regulatory obstacles being addressed, unlikely in the short term. Mozambique is an exception in that its micro-merchant payments are affordable. The main challenge in Mozambique is to grow the agent and merchant networks.

²⁹ With the exception of Mozambique, which is pioneering the use of micro-payments in mobile money.

Distribution Channels

The availability of mobile applications depends on distribution networks. Distribution can take place through app stores, mobile operators (through USSD services, for example), through local distribution networks, or viral marketing. WhatsApp is an example of a mobile application with an exploding subscriber base because it addresses a clear problem, especially in Africa: expensive SMS messages.

Using USSD or SMS-based services to deliver content has the advantage of having the distribution channel already in place through mobile networks. This is the main justification given by operators for their high revenue shares. In addition, operators actively market VAS content on their platforms. App developers also have the choice of operator app stores, operating system (OS) app stores, independent app stores, or local app stores. There are several options for global stores. The basic features of each global OS store are summarized below:

Distribution is driven by the size of the consumer market and estimates of its potential growth. For example, BlackBerry is still a viable platform in Africa because of the large number of consumers that have BlackBerry phones, while in North America and Europe, developers are moving away from BlackBerry.

Android and iOS dominate with nearly two-thirds market share. Mobile web (especially HTML5) has a significant market share of around 17 percent.

Operator App Stores

MTN Ghana and MTN Nigeria were the only operators with app stores in the four countries surveyed. In both countries, the stores have been operational for only a few months. MTN is attempting to increase the range and relevance of apps by hosting the MTN App Developer Challenge, an app competition. MTN splits revenues 60/40, with MTN receiving the larger share. In comparison, the Google Play store splits revenues 70/30, with the app developer receiving the larger share. MTN's justification for the larger revenue share is that it promotes local apps via its

TABLE 5: OS App Store Features

Name	Established	Revenue Share	Total number of Apps (approximate)
Apple App Store	2008	70/30	>1 million
BlackBerry World	2009	70/30	235,000
GetJar	2004	Free	750,000
Nokia Ovi Store	2009	70/30	120,000
Samsung App Store	2009	70/30	Unknown
Windows Phone Store	2010	70/30	125,000

(Source: App store websites)

TABLE 6: Platforms Used among Mobile App Developers

Platform	Percentage of Developers
Android	34.4
iOS	32.7
HTML5 mobile	17.3
Windows Phone	4.5
BlackBerry	4.2
Others	7

(Source: Visionmobile, 2013)

network, something that Google Play is unable to do. However, there are hardly any apps that have payment facilities, so revenue share is a moot point. The 60/40 split is likely to be motivated by the high revenue shares that the operator takes

for premium SMS. It ignores the fact that the app ecosystem is characterized by different mechanics and the value chain is no longer fully controlled by MNOs. MTN will need to align its revenue share to global standards in the medium term or lose this business altogether.

Other mobile operators have not yet launched app stores. In Nigeria, the volumes of MTN App Store downloads are small, indicative of the challenges facing operator app stores.

While competitions, such as the App Developer Challenge, offer avenues to increase the supply of apps, one-off competitions are unlikely to initiate a dramatic change in availability of apps and number of downloads. The challenge is that too few apps use available payment facilities, such as premium SMS, because of the perceived inequity in revenue share. The universal complaint from app developers was that revenue share was unfair and that payment, when it did take place, was often delayed by months.

TABLE 7: MTN App Store Top 10 Downloads

	Platforms	Date of Submission
Chat with Annabel	Android, Java, BB	August 6, 2013
Akpos Jokes	Android, Java, BB	August 5, 2013
Nearest Locator	Android, Java, Symbian	July 2, 2013
ATM LOCATOR	Android	August 2, 2013
TRACKMYCASH	Android	July 2, 2013
HEALTH TIPS	Android	August 12, 2013
1999 Constitution Amended	Android, Java, BB	September 3, 2013
HNICS's Maths Table	Android	September 24, 2013
MTN Info App	Android	August 11, 2013
AndroTUBE - YouTube Downloader	Android	June 9, 2013

(Source: MTN Nigeria)

Operator app stores suffer from the archetypal causality dilemma: if app developers have a viable business model, then MNOs will offer good terms. From a developer perspective, if MNOs offer good terms, then app developers will develop apps. MNOs are preoccupied with the app business model and require app developers to submit business plans to even get the API. App developers distrust MNOs and feel they are not being treated fairly. The net result is inaction. However, MNOs are prepared to negotiate and there is a chance that all parties can profit with better communication and commitment from both sides.

The MNO approach fails to acknowledge that app success cannot be determined by reading business model reports behind a desk. The app needs to be available for download and be modified according to user demands. Apple and Google, for example, do not vet business models of apps submitted to their stores. As long as the technical requirements—and in Apple's case, some content requirements—are met, the app is free to launch.

OS App Stores

International stores such as Google Play and BlackBerry World are the primary distribution platforms for the smartphone market. Uploading on Google Play is free and revenues are split 70/30. Payment facilities are not available on the African continent for Google Play, so apps that target Africans are generally free. However, developers can enter into agreements to work through partners registered as Google Play merchants on other continents.

BlackBerry World (formerly BlackBerry App World) is the app store for BlackBerry devices. BlackBerry World has 120,000 apps and payment can be made by credit card and PayPal. In some countries, payment can be made through carrier billing, but this is not available in any of the four countries surveyed. BlackBerry World is the third largest app platform in the world, after iOS and Google Play.³⁰ Due to its efficient compression technology—resulting in lower bandwidth use—BlackBerry is a popular smartphone in Africa and is still seen as a viable development platform despite its declining user base in Europe and North America.

30 VisionMobile. Developer Economics 2013. Developer Tools: The Foundations of the App Economy.

Handset App Stores

The Nokia Ovi Store is one of the largest app stores because it is targeted at Nokia feature phones only. Nokia has a separate app store targeted at its range of smartphones, Asha and Lumia. For paid apps, revenue share is 70/30, with 70 percent going to the app developer. In-app payment is made primarily through premium SMS. So MNOs play a critical role in payments. Nokia has rapidly expanded operator billing but this is not yet available in any of the four countries. The Nokia Ovi Store can be accessed from any of the four countries, but it has a local presence only in Nigeria. This gives Nigerian app developers a crucial advantage because Nokia can negotiate better terms with MNOs, particularly for premium SMS. In Nigeria, Nokia started with a 40/60 revenue share with MTN (MTN taking 60 percent) but has since negotiated the split down to 50/50. For new app developers, without a significant number of downloads, going via the Nokia Ovi Store is more attractive than going directly to MNOs or SMS aggregators.

Third-Party App Stores

GetJar is a major third-party OS store in Nigeria. It is independent of handset operators (such as Nokia) and OS stores (such as iTunes, Google Play, and BlackBerry World). Uploading apps on to GetJar is free and there are no revenue share requirements. This is an attractive option for developers from a revenue sharing perspective. GetJar and wireless application protocol (WAP) sites (such as sefan.ru) are more popular among BoP consumers than Google Play and BlackBerry World since most use feature phones.³¹

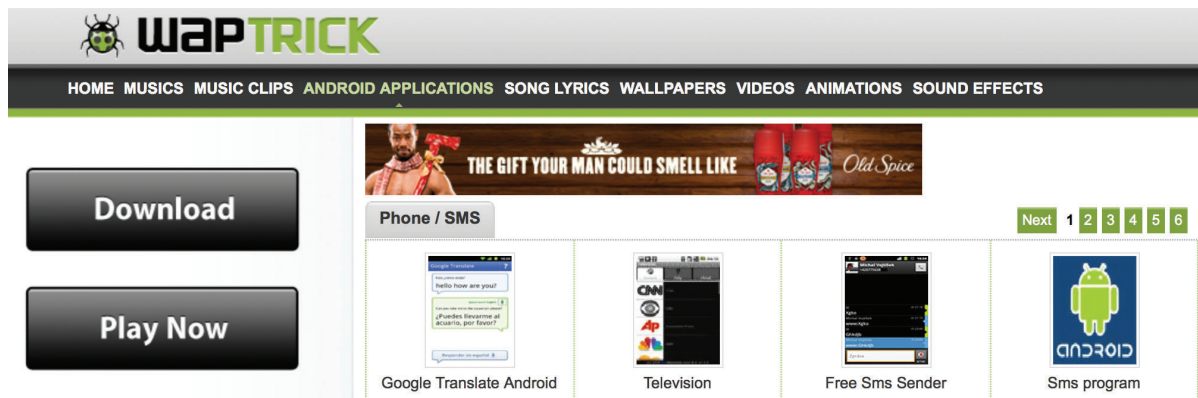
There are also websites that act as content aggregation platforms and users can log on to get apps, music, and videos. Examples include www.waptrick.com and www.sefan.ru.

Conclusions

MTN is the only operator that has launched an app store, which is available in Nigeria and Ghana. Since the MTN App Store was only recently launched, consumer visibility is low but this will change as MTN continues to market it. While MNO

31 Comments from Zubair Alhaji Abubakar, co-founder of Pledge51

FIGURE 25: Waptrick Website



app stores, because of their local presence, are the most logical channels from which to distribute apps, MNOs are still trying to understand the app environment and gaining access to the app store API for a developer is cumbersome. New app developers need to consider the following:

- Operator app stores have potential but require investment from both app developers and MNOs.
- Global stores such as BlackBerry World and Google Play offer the highest traction with local

audiences, but suffer from lack of payment facilities and local information.

- Independent distribution can be a viable strategy but is dependent on well-established social networks.
- The Nokia Ovi Store in Nigeria is worth considering if the target market is Nokia feature phone customers and the payment facility is premium SMS.

Conclusions and Recommendations

The objective of the case studies in four countries is to identify and explore scalable business models and present concrete solutions to challenges faced by app entrepreneurs. Because business models vary substantially across industries and countries, the research focused on three key areas: revenue streams, payment facilities, and distribution channels. Key business models identified by this study can be grouped into content providers and multi-sided platforms. The specific recommendations for these are:

- Content provider: Content can be delivered as downloadable apps and SMS or USSD-delivered information. Payment for the content is usually through premium SMS. The advantage of this approach is its simplicity. Content is pushed out to subscribers via MNOs. However, while the content provider model is successful, its simplicity is also a disadvantage. This is because MNOs dominate the value chain and keep the majority of revenue.
- Multi-sided platforms: There are three configurations of successful multi-sided platforms that tap revenue streams and are partially independent of MNOs. Content can be provided for free or at low cost to end users by charging the party that is either interested in the content delivery or benefits from the interaction. In-app advertisement is one of the most potent revenue streams for smartphone app developers. Free apps can grow user bases more quickly than paid apps and hence are more attractive to advertisers.
- Premium SMS: In Ghana, few app developers use premium SMS as a payment facility due to unfavorable revenue-sharing. The picture is more positive in the other three countries, where premium SMS volumes needed to make \$5,000 per month are significantly lower. However, there are two important points with regard to premium SMS: first, rates are generally negotiable despite operators insisting that premium SMS rates are fixed, so developers should not be discouraged; and second, premium SMS provides more reach in terms of subscribers than any other payment facility.
- Mobile money: Mobile money, across all four countries, is not widely used at this stage. Mobile money rollouts have been weak, markets fragmented and, with the exception of Mozambique, do not cater for micro-payments as transaction fees are high. In the medium term however, mobile money in Mozambique shows the greatest potential. Mobile money providers in that country have created a platform with extremely low transaction fees for micro-payments, ideally suited to app developers.

In terms of distribution channels, global app stores, such as Google Play, do not specifically cater to local conditions or populations. By virtue of its subscriber base, an MNO store has an advantage over global stores and is able to market apps with local content more easily.

The most viable payment facility for apps targeting BoP customers is premium SMS. Mobile money is currently not widely used and so does not feature as an alternative. However, this is likely to change over the next few years, particularly in Mozambique.

- Operator app stores: Operator app stores suffer from the archetypal causality dilemma: if app developers have a viable business model, then MNOs will offer good terms. From a developer perspective, if MNOs offer good terms, then app developers will develop apps. The net result is a dearth of local, commercial apps. However, the ability to target local populations provides MNO stores with a unique advantage—just one that is not yet fully exploited.
- Google Play via merchants: The alternative distribution platform is a global app store such

as Google Play. While access to Google Play is far easier than access to an MNO app store, Google Play suffers from two disadvantages: access to the local population and lack of payment facilities, both in-app and for the app purchase. There is an advocacy role here for app stakeholders.

In addition to business model aspects, the environment for apps has a direct impact on the level of application development in each country. Because development capacity in each country is limited, incubators or hubs play a crucial role in

cultivating apps and conducting advocacy on their behalf. The final recommendation refers to the role that incubator hubs can play in app development.

Incubator hubs, such as MEST, can positively impact the app environment. There are three roles to play: first, as an education and training space; second, as an advocate for policies that support industry stakeholders; and third, as a place for potential investors to meet entrepreneurs. The more structured the hub's environment, the more easily will it meet these objectives.

References

- AllAfrica.com. *Mozambique: Vodacom Launches MPESA Service*, accessed in December 2013, available at <http://allafrica.com/stories/201305280313.html>.
- BuzzCity, 2013. *The BuzzCity Report: A Quarterly briefing on the mobile Internet*. Vol. 3 Issue 4: October 2013, available at <http://www.buzzcity.com/l/reports/The-BuzzCity-Report-Vol-3-Issue-4.pdf>.
- CGAP. *Mobile Money Market Sizing Toolkit*. Accessed in November 2013, available at <http://tinyurl.com/onv8q8c>.
- Google, 2013. *In-App Billing Availability and Policies*. Accessed in November 2013, available at <https://support.google.com/googleplay/android-developer/answer/1153481>.
- Google Play, 2013. *Supported locations for merchants*. Accessed in November 2013, available at https://support.google.com/googleplay/android-developer/answer/150324?hl=en&ref_topic=15867.
- infoDev. *Mobiles at the Base of the Pyramid*. InfoDev Project Concept Note, August 2011, available at http://www.infodev.org/infodev-files/resource/InfodevDocuments_1114.pdf.
- Margaux, 2013. *What a \$70 smartphone means for mobile in Africa*. Available at <https://medium.com/what-i-learned-today/99674f8d4f6f>.
- Mobile Payments Today. October 15, 2013. *Direct Carrier Billing: The world's most popular mobile payment*. Available at <http://www.mobilepaymentstoday.com/blog/11377/Direct-Carrier-Billing-The-world-s-most-popular-mobile-payment-Infographic?rb=false>.
- Osterwalder, A. & Pigneur, Y. 2010. *Business Model Generation*. John Wiley & Sons.
- Paga website. Accessed in November 2013, available at <https://www.mypaga.com/paga-web>.
- Research ICT Africa, 2010. *Household and Small Business Survey*. Confidential Report.
- Research ICT Africa, 2012. *Household and Small Business Survey*. Available at www.researchictafrica.net
- Visionmobile, 2013. *Developer Economics Q3 2013: State of the Developer Nation*. Available at <http://www.developereconomics.com/reports/q3-2013/>.

Visionmobile, 2013. *Developer Economics 2013. Developer Tools: The Foundations of the App Economy*.
<http://www.visionmobile.com/product/developer-economics-2013-the-tools-report/>.

World Bank, 2012. *Global Financial Development Database (GFDD)*. Available at <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTGLOBALFINREPORT/0,,contentMDK:23492070~pagePK:64168182~piPK:64168060~theSitePK:8816097,00.html>.

Annex: List of Mobile Applications

This section lists each mobile application with its distribution channel, payment facility, platform, and revenue model. While the various OS app

stores are a major distribution platform, 18 of the 30 apps highlighted bypass formal app stores and are distributed independently. For 18 of the 30 apps, formal banking facilities are used, in other words, payment does not occur in-app but separately. The revenue model for 14 of the 30 is SMS-based content or services.

TABLE A: App Summary

#	Mobile Application	Business Model	Payment Facilities	Platform	Revenue Model
1	Saya	Multi-sided: advertising	Mobile money Formal banking facilities	iOS Android Feature phones	Advertising In-app advertisement
2	iWarrior (Leti Arts)	App store	Formal banking facilities	OS Android Feature phones	App purchase Other
3	Jumpfon	VAS provider	Premium SMS	SMS/USSD	SMS-based content or services USSD/SMS-based content or services
4	BoxBuzz	VAS provider	Formal banking facilities	SMS/USSD	SMS-based content or services USSD/SMS-based content or services
5	Infoline (Nandimobile)	VAS provider Content provider	Premium SMS Formal banking facilities	SMS/USSD	SMS-based content or services Subscriptions services USSD/SMS-based content or services
7	Farmerline	Content provider Multi-sided: customers pay	Formal banking facilities Premium SMS IVR	SMS/USSD	Subscription SMS-based content or services USSD/SMS-based content or services
8	Esoko	Freemium	Premium SMS	SMS/USSD	SMS-based content or services USSD/SMS-based content or services Freemium
9	mPawa	Multi-sided: customers pay	Formal banking facilities	Feature phones SMS/USSD	Non-app related revenue Other
10	mNotify	VAS provider	Formal banking facilities	Android SMS/USSD	Subscription USSD/SMS-based content or services

#	Mobile Application	Business Model	Payment Facilities	Platform	Revenue Model
11	Trokxi	App store	None	Android	In-app advertisement
12	mPedigree	Multi-sided: customers pay	Formal banking facilities	SMS/USSD	USSD/SMS-based content or services
13	PharmaSecure	Multi-sided: customers pay	Formal banking facilities	SMS/USSD	SMS-based content or services USSD/SMS-based content or services
14	VConnect	VAS provider	Formal banking facilities	iOS Android Feature phones	Subscription In-app advertisement
15	Saya	Multi-sided: advertising	Mobile money Formal banking facilities	iOS Android Feature phones	In-app advertisement
16	Wecyclers	VAS provider	Vouchers or scratch cards	SMS/USSD	Non-app related revenue Other
17	Jobs in Nigeria	VAS provider	Formal banking facilities	Feature phones Android BlackBerry	Subscription Other
18	Nigerian Constitution App	App store	None	Feature phones Android BlackBerry	Advertising In-app advertisement
19	Efiko	Multi-sided: customers pay	None	Android Feature phones	Other
21	Exam Success Points	Content provider	Premium SMS	SMS/USSD	USSD/SMS-based content or services
22	My Abuja	Content provider	Premium SMS	SMS/USSD	USSD/SMS-based content or services
23	Mobiashara	App store	Formal banking facilities Mobile money	SMS/USSD	Other
24	Danfo Reloaded	Freemium	Premium SMS	BlackBerry Feature phones	In-app purchase
25	First Aid	Content provider	Premium SMS	SMS/USSD	USSD/SMS-based content or services
26	Lagos Island Street Map	Content provider	Premium SMS	SMS/USSD	USSD/SMS-based content or services

(continued)

#	Mobile Application	Business Model	Payment Facilities	Platform	Revenue Model
27	1999 Constitution of the Federal Republic of Nigeria	Content provider	Premium SMS	SMS/USSD	USSD/SMS-based content or services
28	iSchools Zambia	Content provider Multi-sided: customers pay	Formal banking facilities	Android	Other
29	Farm Prices	VAS provider	Premium SMS	SMS/USSD	Premium SMS
30	Zhappening & Zaplaces	Multi-sided: advertising	Formal banking facilities	Android & iOS	Subscription



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