Research Article

Kenyan Women's Rural Realities, Mobile Internet Access, and "Africa Rising"

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Abstract

The term "Africa Rising" is used in popular and academic discourse to describe economic growth in sub-Saharan Africa. Increased mobile phone ownership and access to the Internet figure prominently in this optimistic narrative. However, aspects of this story are being questioned, in particular whether this economic growth benefits Africa's rural areas. In this article, we extend this critique to the optimism surrounding access to the mobile Internet by detailing rural women's experiences with mobile devices. Drawing on data from our long-term fieldwork in Western Kenya, we describe how secondhand handsets, misinformation about social media, and gendered allocations of time constrain women's access to the mobile Internet. We then discuss how the materiality of mobile phones, seasonal changes, and other factors must be considered when developing technological interventions in rural areas. We conclude that rural women's lived realities merit more attention within growth narratives about Africa.

Keywords: HCI4D, Internet, Kenya, mobile phones, rural, social media, women

Introduction

Since 2000 the term "Africa Rising" and, more broadly, "growth" narratives about the continent have replaced traditional stories that characterized sub-Saharan Africa as a place rife with poverty, famine, and disaster. These new narratives are primarily motivated by increased economic growth; greater access to mobile phones and the Internet also figure prominently in this optimistic vision. As with earlier portrayals of Africa, these new views demand critical reflection, and scholars are increasingly drawing attention to the limits of this story. These critiques include the fact that much of the economic growth takes place in the countries' urban areas and has not trickled down to the poorest, mostly female rural populations (Dulani, Mattes, & Logan, 2013; Obeng-Odoom, 2015). To date, however, these critiques have not explored whether the optimism surrounding technology—especially access to the mobile Internet—accounts for rural women's experiences with information and communication technologies (ICTs). In this article, we begin to do this, by drawing from the primary author's fieldwork, conducted at sites in Kenya's rural western region in the counties of Bungoma and Homa Bay. Our findings primarily come from interviews and observation data collected during three field research trips to these sites (September 2014, June 2015, March 2016), when we investigated women's mobile phone usage practices. Our findings are also influenced by observations made over the authors' combined 25-plus years of experience of living and conducting research in Africa's rural areas.

Drawing on these experiences, we explore this question: What can ICTD (ICT for development) researchers, corporations, and NGOs (non-governmental organizations) learn from rural women's experiences, especially

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now that these researchers and institutions are working to increase access in Africa's rural regions? Our answers provide qualitative insights that come from women's perspectives regarding multiple barriers that work together to hinder Internet access. These constraints are also present in urban areas, but they are intensified in rural areas. These constraints include women's ownership of secondhand mobile devices; their misunderstandings about what the Internet is; and demands on their time, which leave them with few opportunities to learn how to access the Internet, let alone use it. Taken together, these findings suggest that, as with economic growth, the benefits of ICT access have not fully reached many of the women in our study and, more generally, that the Africa Rising story does not take into account rural realities.

The rest of this article is organized as follows. We first situate our research within related work, analyzing and critiquing the Africa Rising story as well as reports documenting the increasing mobile phone ownership and Internet access on the continent. We describe Western Kenya, the context of our study, and our methodology. Our findings are organized around women's constraints to accessing the mobile Internet. We then discuss how researchers, technologists, corporations, NGOs, etc., can learn from rural women's experiences in their efforts to increase mobile Internet access. Our work contributes novel empirical findings about constraints to rural Kenyan women's access to the mobile Internet and about their attitudes toward and understanding of the mobile Internet, in particular of social media sites such as Facebook. These findings improve our knowledge of mobile Internet use in Kenya and they advance debates about the Africa Rising narrative as it relates to ICTs.

"Africa Rising": A Changing Narrative

Over the last 20 years, stories about Africa have radically changed. Historically depicted as a violent, dark, and pessimistic continent, current portrayals show a place that is vibrant, hopeful, and "rising." Mainstream media have embraced and contributed to this "Afro-optimism," and scholars frequently draw attention to covers from *The Economist* (a popular British news magazine) to illustrate this transformation (Jerven, 2015; Nothias, 2014). In May 2000 *The Economist*'s cover featured a young black man carrying an assault rifle superimposed on a cut-out of the continent, with the title "The hopeless continent" (*The Economist*, 2000). Ten years later, in December 2011, the magazine's cover depicted the silhouette of a young boy running across the savanna and flying a rainbow-colored, Africa-shaped kite, with the headline "Africa rising" (*The Economist*, 2011). Positive depictions have become more prevalent in publications such as *TIME* and *The Sunday Times* and are increasingly pervasive in international news media more generally (Nothias, 2014).

Factors contributing to this new narrative primarily center on the impressive economic growth of many African countries. Following decades of slow growth, gross domestic product (GDP) in sub-Saharan Africa has averaged 5% since the mid-1990s, and four of the world's 20 fastest-growing economies are on the continent (i.e., Libya, Sierra Leone, Niger, Ivory Coast; Bach, 2013; Jerven, 2015; Shaw, 2012). Rising GDPs have contributed to general improvements in peoples' quality of life, evidenced by an increased number of children enrolled in school. Reductions in household poverty, an emerging middle class, and improved infrastructures are also frequently offered as evidence for the rise of Africa. Over the course of our fieldwork, we have witnessed some of these changes firsthand, including more supermarket chains (e.g., Nakumatt) that cater to a growing number of consumers, road improvements, and airport expansions.

Africa Rising and the ICT Revolution

It is also within this 20-year period that we see the swift growth in mobile phone ownership and, more recently, increased Internet access throughout the continent—phenomena that also figure prominently in the Africa Rising narrative (Kappel, 2014). Some media reports suggest that "mobile communications have been at the forefront of Africa's boom" (Akwagyiram, 2013, para. 8). The growth in handset ownership throughout Africa is remarkable: Within this short time the number of mobile devices leapfrogged the number of landline telephones, allowing many people on the continent to engage in voice communication for the first time. The Pew Research Center reported that in 2002 only one in 10 people in Tanzania, Uganda, Ghana, and Kenya had mobile phones (Poushter & Oates, 2015). Today, falling handset prices, improved mobile networks, and other innovations such as pay-as-you-go payment plans mean that these devices are no longer luxury items owned by the urban elite, but are ubiquitous and important assets among the countries' rural residents

(Hahn & Kibora, 2008). During this period, we saw the growth of ICTD as well as what has been described as the field's "almost utopian vision" of the potential accompanying mobile phone ownership, in particular its ability to provide marginalized populations (especially women) with useful information about health, business, education, etc. (Vokes, 2016).

The ICT revolution continues. Within the last decade much of sub-Saharan Africa has become linked to the rest of the world by undersea fiber-optic cable, making Internet access more affordable and accessible (Rao, 2011). In Kenya, which has been Africa's leader in Internet use, the country's Communication Commission reports that Internet users increased from 200,000 in 2000 to over 19.6 million at the end of 2013, a staggering 9,700% growth (Macharia, 2014). Now we see the culmination of these events and expectations of the mobile Internet. Mobile Internet diffusion has outpaced fixed, PC-based Internet access, and it is mostly recognized that mobile devices, especially smartphones, will be the primary means by which new Internet users—particularly those in Africa's rural regions—will get online (Napoli & Obar, 2014). As with the mobile phone, greater access to the Internet (and its accompanying services, e.g., social media) is touted for its potential to create economic growth and inclusive development on the continent (Liew, Vaithilingam, & Nair, 2014). Various efforts are under way to expand digital infrastructures and to "connect the unconnected" in Africa, including Google's "Project Loon," which uses high-altitude balloons to create wireless networks; Facebook's "Connectivity Lab," which uses drones to provide Internet access; and the BRCK, a Kenyan-designed modem intended for use in rural areas (West, 2015).

Critical Perspectives: Accounting for the Rural

The Africa Rising narrative is a welcome change from the familiar tropes of Africa as a "dark" continent, lost in time, nonproductive, devoid of technology, and so on. Just as these negative characterizations demand critical reflection, so too do positive ones, and the Africa Rising story has come under increased scrutiny.

Critiques vary. Some scholars argue that the neoliberal development path evoked when describing the continent as "rising" and related characterizations that mark Africa's "untapped" potential create "an invitation to call back the ghosts of the explorers, soldiers, traders, and settlers who each in their own way once discovered Africa" (Bach, 2013, p. 11). More frequent are commentaries that address the limitations of using GDP (as an indicator of success) and of growth-oriented models more generally. Taylor (2014) writes that such growth "is overwhelmingly characterized by the deployment and inflow of capital-intensive investments for the extraction . . . of natural resources," adding, "There is a conspicuous lack of value added on the African side" (p. 145). Fioramonti (2014) observes that the extraction of "natural resources account for the bulk of GDP growth on the continent" (p. 6), continuing by stating that growth indicators do not consider the "loss of selling out the most precious resources African countries possess." Shared among these perspectives is the belief that an emphasis on growth alone misinforms because it leaves pertinent questions unanswered, such as how to sustain economic prosperity on the continent and whether this growth is equitably distributed and benefits all members of society by generating employment opportunities. These observations are relevant to our research and worthy of more attention within ICTD, but the critiques that draw attention to how the Africa Rising narrative does not account for rural life, or regions where the vast majority of the continent's population live, resonate most with our research focus.

The Africa Rising story is one that emphasizes the importance of a vibrant private sector, is predominantly urban and, as Obeng-Odoom (2015) writes, "say[s] little or nothing about rural life in Africa"—a sentiment echoed by other scholars who have argued that rural Africa has been considered "peripheral and inconsequential to the urbanized cosmopolitan twenty-first century world" (Pini, Moletsane, & Mills, 2014, p. 453). Other reports show that the continent's rapid economic growth is failing to reduce poverty or improve ordinary citizens' lives, especially women's, who in many countries live in rural areas (Davies-van Es, 2014; Dulani et al., 2013).

Just as GDP does not account for spatial differences in economic growth (that is, whether it is evenly distributed across rural and urban areas), statistics touting increases in mobile phone ownership (and Internet access) reveal little about spatial differences despite knowledge of the infrastructural differences that exist between rural and urban areas. Access statistics provided by the International Telecommunication Union (ITU) and

Socialbakers.com make it abundantly clear that handset ownership and Internet access are growing in Africa, but provide no information about how poor mobile networks, limited electricity, and persistent poverty—common features of rural life—affect ownership and access (van Stam, 2014). In addition to overlooking the intra-country divide (Furuholt & Kristiansen, 2007), these numbers fail to capture gendered inequalities in mobile phone ownership and Internet access, information that becomes more significant when accounting for rural areas' tendency to be feminized. Multiple factors have contributed to increasing the number of female-headed households across rural Africa, such as when men migrate to urban areas to seek employment opportunities as agriculture becomes less profitable or when women are widowed due to HIV/AIDS (Milazzo & van de Walle, 2015). Rural women are typically unable to inherit or own land, have poorly paid or insecure jobs, are single parents, and are generally older (45-plus years old; Weisman et al., 2016).

As research suggests that economic growth has not trickled down to Africa's rural areas (and to the women who mostly live there), prior research suggests that mobile phones generally benefit the richer, more educated parts of society (Souter et al., 2005; Porter et al., 2012), who tend to live in the continent's urban areas. Further, ICTD as a field has primarily been concerned with urban populations, and although there are a growing number of exceptions (Bidwell, 2016; Burrell, 2010; Kumar, 2015; Murphy & Priebe, 2011), "there are still relatively few detailed studies of rural users" (Donner, 2008, p. 151), especially in Africa. This omission of rural areas is not unique to ICTD, but to studies of technology more generally (van Stam, 2014).

We do know that rural women benefit from access to ICTs. For example, M-Pesa, the popular mobile money transfer system, provides many with a safe way to save money and improves their financial wellbeing (Morawczynski, 2009; Suri & Jack, 2016). Broader questions remain, especially about the mobile Internet, a system significantly more complex and costly to use than M-Pesa. Further, unlike M-Pesa, mobile Internet is not accessible on all handsets. Drawing on our long-term fieldwork in Africa studying ICTs, we explore these questions by investigating the rural realities underlying Kenyan women's experiences with the mobile Internet. More broadly, by situating our research within a development economist's critiques of the Africa Rising narrative (Obeng-Odoom, 2015), we work toward connecting ICTD research with work in this field, thereby addressing critiques that "ICT applications in developing countries remain largely uninformed" by such literature (Chapman & Slaymaker, 2002, p. 30).

Study Context: Kenya

Rightly described as Africa's "Silicon Savannah," Kenya epitomizes the enthusiasm of a rising continent, especially as it relates to ICTs, making it an ideal setting for our research. It is estimated that more than 90% of the country's households own mobile phones, an ownership rate higher than in other African countries (Communications Authority, 2015). Widespread handset ownership and local innovations, including M-Pesa, play a prominent role in Nairobi's emergence as a technology hub. The fervor surrounding ICTs and their potential is present at AfriCHI, a recently held academic conference and, in places like iHub, the city's popular tech innovation center; on the campuses of the growing number of technology companies in Nairobi; and even on the city's crowded *matatus* (informal sector passenger vehicles), where smartphone users take advantage of free Wi-Fi.

Our findings come from fieldwork conducted in areas that are far removed from the smartphones and fast Internet connections in Nairobi. Kenya, like most sub-Saharan African countries, has a substantial urban–rural divide that affects ICT access. An estimated 70% of the country's population live in rural areas, where employment opportunities are few and agriculture (i.e., small-scale farming) is the dominant activity (World Bank, 2014). Rural areas experience development differently from urban areas; rural households typically lack access to water, electricity, and good roads. However, like urban areas, mobile phones are present in rural Kenya—and as is the case with many technologies, men were the first to have them (Hahn & Kibora, 2008). While women's access to mobile phones has grown, traditional gender roles have been slow to change, and—especially in rural areas—most women remain subordinate to men, socially, economically, and politically. Internet access is also present here and has been since at least 2011, when the primary author first visited Western Kenya. Since then connections have become faster and access more widespread.

Findings presented here primarily draw from data collected in the counties of Bungoma and Homa Bay, areas situated in Western Kenya's Lake Victoria Basin (about an eight-hour bus ride from Nairobi). Both counties have town centers that have grown rapidly, especially following the 2010 changes to the Kenyan Constitution, with its devolution provisions that transferred functions from the central government to county governments to bring more resources to rural areas (O'Brien & Kim, 2015). The towns of Bungoma and Homa Bay are surrounded by smaller market towns, with nearby villages that are clusters of mud and thatch houses—this is where we primarily conducted our fieldwork. The most recent figures suggest that households here primarily rely on small-scale farming and remittances as a source of income; 70% of households in these counties earn less than 5,000 Kenya shillings (about US$50) per month, and more than 40% are headed by women (Kusimba & Wilson, 2007; Wiesmann, Kiteme, & Mwangi, 2014).

Researcher Reflexivity

The first author has eight years' experience conducting research in Western Kenya, traveling there once or twice a year and staying for two to six weeks at a time. The second author is a geographer, who has 22 years' experience living and working in rural Kenya as well as in Burkina Faso, Central African Republic, Republic of the Congo, Rwanda, and Tanzania. In East Africa, both researchers are generally considered "outsiders" and referred to as *wazungu* (Swahili for foreigners or white people). We know that our level of education and comparative wealth are clear markers that distinguish us from many people in our field sites. Scholars have examined the ethical issues of relatively affluent researchers coming together with relatively poor respondents, observing that there are many issues of authority and positionality. The authors are aware of—and sensitive to—these debates: While some academics have expressed objections to research by "outsiders" (Kobayashi, 1994), others argue that it is simplistic to assume that only "insiders" can speak about the social issues affecting their communities (see Scheyvens, 2014; Sidaway, 1992). We agree with the latter perspective and acknowledge that we are the ones doing the speaking, rather than the rural women. It is important to report our findings; they offer researchers a global perspective on technology use and "there is much to gained through cross-cultural exchanges, in that structural problems between North and South cannot be solved by the South alone" (Shaw, 1995, p. 96).

Methodology

Qualitative methods offer an effective way to understand people's complex realities by empathizing with their experiences (Scheyvens, 2014). Our findings are influenced by observations made over the course of multiple studies of mobile phones in Western Kenya conducted since 2011, including where they are sold, where they are repaired, and where their batteries are charged (Wyche, Dillahunt, Simiyu, & Alaka, 2015; Wyche & Murphy, 2012). Specifically, the findings presented here primarily come from data collected over the course of an ongoing project investigating rural women's "device literacy," that is, their ability to use their mobile phones for purposes other than making and receiving voice calls (Wyche, 2015). Nightingale Simiyu and Martha Othieno played a critical role in this project; both live in our field sites. Both have training and extensive experience in conducting qualitative research with the primary author. They are our translators, field assistants, and cultural guides. They help us identify respondents and gain access to communities and they enable respondents to speak in the languages with which they are most comfortable (primarily Swahili and Bukusu in Bungoma; primarily Dholuo in Homa Bay).

Together, we traveled to sites in Western Kenya in September 2014, June 2015, and May 2016. During each trip we conducted observations of and group interviews with women mobile phone owners to learn about how they used them. We held eight group interviews during each of the three field research trips; in total, we interviewed/observed 68 women three times. Data collection also included photographing the handsets women had (116 documented mobile phones). Fifteen women were in their 20s, 21 were in their 30s, 19 were in their 40s, 12 were in their 50s and 60s, and one was 70, a relatively older sample that is representative of rural areas (Weisman, Kiteme & Mwangi, 2016). Most women under age 40 had a primary school education; a few had attended secondary school. Nearly all spoke Kiswahili or Dholuo, and some spoke English. Those older than age 40 generally had lower education levels, were less fluent in Kiswahili and English, and

Figure 1. Representative handsets of women in the study.

were most comfortable speaking the local dialects (Bukusu or Dholuo). They were mothers, grandmothers, wives, widows, girlfriends, and members or leaders of community groups. A few worked as teachers or were business ladies, but the vast majority identified as smallholder farmers. Although, as is common, many engaged in other income-generating activities, including selling *mandazi* (fried pieces of dough), charcoal, or produce at local markets. All participants reported having a phone, but some did not have them at the time of our meetings because they had left them to be charged or repaired, or were forgotten at home. Lastly, slightly more than half of our respondents had the same phone observed during our initial visits, suggesting significant turnover in phone ownership—a finding we discuss later in the article.

Additional details of our data collection and analysis appear elsewhere (Wyche, Simiyu, & Othieno, 2016; Wyche, Steinfield, Cai, Simiyu, & Othieno, 2016). The findings presented here are a culmination of these studies and also draw on extensive discussions between the first and second author. Our longitudinal approach provides valuable information on changes over time as they apply to ICTs in Western Kenya. Further, by meeting with some of the women three times, we strengthened the validity of our findings by sharing them with the women, getting their feedback, and refining the findings as needed. Member checking is a technique regarded as useful for improving the validity of qualitative findings (Creswell & Miller, 2000).

Findings

Our findings draw attention to rural women's experiences with ICTs, especially constraints that affect Internet access, including the conditions of their mobile phones, their perceptions of the Internet, how demands on their time affect using and learning about the Internet, and seasonal fluctuations in income. We also provide nuance to previous reports that describe how costs plus poor technical and actual literacy constrain access to the mobile Internet. Further, we observe that the Internet is not necessarily a new technology, but one related to women's understanding and perceptions of the mobile phone. Our findings suggest that the Africa Rising story, in particular the perceived benefits accompanying greater access to ICTs, has not yet fully reached the rural women in our study.

Secondhand Handsets and Batteries

Findings from Burrell's (2010) study of mobile phones in rural Uganda suggest that sharing arrangements between women and their husbands or boyfriends tend to exclude women from accessing information. While we have observed similar sharing arrangements in rural Kenya, the more common arrangement is for women to have their own phones. However, these handsets are predominantly secondhand and this also limits their access to information. Within ICTD, secondhand technologies are associated with electronic waste such as older computers once used in the U.S. and Europe that make their way to Africa's cybercafés and landfills (Burrell, 2012). It is more typical for technologies, especially mobile devices, to circulate within countries, such as a rural woman who receives a secondhand phone as a gift from urban-based family members in Kisumu

or Nairobi. Also common is for a woman to get a husband's or boyfriend's used phone when he upgrades to a new one, which is increasingly becoming a smartphone—low-quality "China-make" models can be purchased in towns and at markets for 3,000–3,500 KES (about US$29–34). These factors, paired with limited access to the latest handsets and rural residents' reluctance to discard electronic products (Pype, 2015), have resulted in a glut of used phones. It is these devices that most women in our study have. The phones are predominantly bar-shaped feature phones called *kadudu,* which provide voice, text messaging, and basic multimedia and Internet capabilities.

The abundance of used devices is a positive change. Indeed, the women in our study used them to send greetings and "please call me" SMS messages to friends and family, to receive M-Pesa remittances, to listen to the radio, and to use as a torch (flashlight). Although reports of growth in handset ownership are correct and most rural Kenyans have a mobile phone (Communications Authority, 2015), these reports tell us little about the types of devices women use, especially the devices' quality or even whether they function—significant factors that complicate accessing the mobile Internet.

As shown in Figure 1 most of the mobile devices owned by our respondents have limited functionality or outdated hardware. They may be "spoiled" or riddled with maintenance problems (e.g., poor batteries, broken screens, missing buttons, worn number pads). These handsets are difficult to hold, and women carry them in *kipochi* (Swahili for purse) worn around their necks. In addition to kipochi, they sometimes tuck handsets into their bras or fold them into the cloths tied around their heads or waists—insecure methods that frequently result in accidentally dropping them into water (toilets, washbasins, puddles) or breaking them. These spoiled phones are a regular feature of daily life in rural Kenya and have spurred an active repair industry (Wyche et al., 2015).

Even those women with functional handsets have problems that complicate their ability to use the phones, in particular poor batteries, a constraint that has implications for accessing the mobile Internet. Women's secondhand phones rarely come with an original battery (if they come with one at all). Phone batteries are typically low quality, inexpensive (about US$2–3), and are imported from China. These batteries tend to become bloated over time (typically due to overcharging and heat exposure) and after a few months will not hold a charge for, in some cases, more than a few days. Women told us they sometimes buy two or three batteries over a year and, like buying mobile phone credit/airtime, replacing a handset's battery is an expected cost of owning a phone—an expense that represents a significant portion of rural women's incomes.

A functioning battery is, of course, necessary to access the mobile Internet. Browsing the Internet demands longer and more sustained engagement with a mobile device, which requires more battery power. During our fieldwork we consistently observed a reluctance among women to use their mobile devices for any length of time because of their desire to "preserve the charge" of their batteries. Frequently mentioned strategies for maintaining a charged battery include keeping phones turned off at night and limiting phone use to brief voice calls. As has been observed in studies of mobile Internet use in rural Zambia, the implications of having a bad battery as well as limited access to electricity to keep it charged are overlooked consequences of efforts to increase access to the mobile Internet (Wyche & Baumer, 2016).

What Is the Internet? How Do I Access It? What Is It Used For?

Concrete buildings housing small shops are painted with advertisements for everything from Doublemint Gum to Pampers Diapers (as well as Safaricom Ltd.'s ubiquitous green ads—Kenya's leading mobile network operator) and are a dominant feature along the Trans African Highway A104, which connects Nairobi to Bungoma. In 2014 we observed the emergence of new ads encouraging rural residents to "take Google with [them]" (i.e., use the search engine on their mobile phones) and, more recently, Facebook ads saying to people (in Swahili, translated here), "You are not on Facebook? Don't be like that. Join Facebook" (see Figure 2). Visibility of these Internet services (in the form of these ads) as well as the infrastructures to support them are present in rural Kenya. Despite this, most women in our study had never accessed, let alone seen, the mobile Internet. Although some of the women's phones could be used to do so, only 11 of our 68 respondents told us they had accessed the mobile Internet.

"Technical literacy" is a recognized constraint: Women tend to lack the ability to use a mobile handset and

Figure 2. Facebook advertisement.

the variety of services available on it to full benefit; it is intensified in rural areas, where women tend to be less literate than urban women (Dodson, Sterling, & Bennett, 2013; West, 2015). We observed that it is not literacy alone that constrains women from using the mobile Internet. Broader misunderstandings about what they are accessing, how to access it, and what it is used for are also constraints.

This confusion is understandable, given that social norms, demands on women's time, and the high costs of transportation limit their mobility beyond the household (Porter et al., 2012). Most of the rural women in our study had never seen the Internet or a computer, both of which are available at cybercafés in towns. Instead, what our respondents knew came from ads. Some recognized that the Facebook logo (which is increasingly present on feature phone interfaces) was associated with the Facebook website. Other sources of learning came via word of mouth from children or husbands, even from songs on the radio, notably Rose Muhando's (a famous Tanzanian gospel singer) popular song titled *Facebook Song,* in which Swahili lyrics describe the popular social media site as a "craze to the current world."

Evidence of this confusion came from frequent comments indicating that, for many women, Facebook and, to a lesser degree, Twitter, Google, and WhatsApp *are* the Internet. Many women did not know that the Internet is what supports access to these services—a finding that has also been observed in rural Zambia and in Ghana (Gebhart, 2016; Wyche & Baumer, 2016). Unlike the Internet, a service that other scholars note is difficult to explain to non-users (Donner, Gitau, & Marsden, 2011), social media (notably Facebook) is understandable, likely because most women know the popular site supports activities they already use ICTs for—communication with family and friends, interactions that appeal to the women in areas where we conducted our research and where marriage is patrilineal, that is, the wife moves from her home and settles in her husband's home, frequently far away from her family (Murphy & Priebe, 2011). Also appealing were the new forms of communication that they understood Facebook supported, including the possibility of seeing photos of their friends and family as well as their mood. One woman said, "They say that on Facebook they see the person as he talks, walks, and they say even in the mood that person is will be seen on the Facebook."

There was also enthusiasm for possibilities to connect with people all over the world as well as to see more mundane things, ranging from animals to movie stars and political figures. One woman told us she would like to see "how Barack Obama looks." Findings suggest that, like the mobile phone, the mobile Internet is perceived as a tool for accessing mundane information—as opposed to useful information on business, education, healthcare, and so on (Archambault, 2011; Slater & Kwami, 2005) and that draws attention to benefits that could come with access—that would enable women to see things they had only heard about.

Curiosity about and enthusiasm for Facebook were typically tempered by laughter as well as a litany of

reasons why the women perceived the site as not for them. Reasons included the widespread belief that social media was reserved for "youth"; in one woman's words, "We fear Facebook and only know it is meant for young people. We are too old to use Facebook." Other concerns were based on rumors about marriages ending because a spouse met someone via the site and on stories about one's image being digitally altered (for instance, political leaders with chicken heads are common on Kenyan Facebook pages). Also common were concerns such as those documented in industrialized contexts regarding the impact of social media on children's wellbeing (see Yardi & Bruckman, 2011), themes that are invoked in the lyrics of Muhando's song, for instance, "Children are failing because they are chatting."

Widespread perceptions that accessing the Internet required upgrading to a smartphone, or what many referred to as a "touch," was another reason they perceived the Internet as not for them. In addition to being unaffordable, many told us they were reluctant to use a smartphone because of fragile glass screens and their unfamiliarity with the phones' multi-touch interfaces. Questions about "installing" the service on a phone as well as concerns regarding "how to enter it" or registering for an account were also mentioned as obstacles to creating a Facebook account. Although social media services do not charge subscribers to create accounts, some respondents knew this process would likely require seeing a *fundi,* that is, a computer expert who would charge them to create a profile on the site (Wyche, Schoenebeck, & Forte, 2013). Companies such as Facebook tout zero-rating programs as an effective strategy to address peoples' concerns about costs of accessing the mobile Internet. An application is zero-rated when a mobile operator does not count its usage against a user's monthly data allotment, rendering its use effectively free (Futter & Gillwald, 2015); however, this service was not well-understood among women in our study, who saw cost as a barrier. Even with free access, such schemes do not account for other costs, including the aforementioned costs of maintaining a phone, charging it, buying a battery, or upgrading to a new phone.

Rural Women's Labor Demands, Seasonal Changes, and Constraints to Access

It is recognized that throughout sub-Saharan Africa women provide more domestic labor than men. Many of our married respondents told us they worked away from their homes, some in Kisumu or Nairobi. Others worked closer to town as, for example, *piki piki* (motorcycle drivers). Women told us they worked long hours, some estimating up to 14 hours a day, a finding consistent with prior research (Baksh, Neumann, Paolisso, Trostle, & Jansen, 1994). Women's responsibilities are vast, and their work is crucial for maintaining households. Their days typically begin before sunrise, visiting the *shamba,* or farm, where they engage in back-breaking agricultural work (planting crops, tilling soil, weeding, etc.). They then return home to warm the water for a husband's bath, prepare children for school, and carry out a variety of other domestic duties such as collecting water, preparing meals, and caring for younger children and (increasingly) for their elders. Their days end after sunset with the dish washing. All activities are done with few if any labor-saving technologies and minimal help from others. As a result women have little to no time for leisure activities. Some days are busier than others, for example, Saturdays are typically for washing clothes. There are seasonal variations in women's workloads, for example, the rainy season (April–May) is the most labor-intensive because that is when the land must be prepared and the crops sown. Most aspects of rural life are tied to agricultural cycles (rainy and dry seasons). We know from prior research that seasonal variations affect access to financial resources (Chambers, Longhurst, & Pacey, 1981), which can dictate when rural residents repair their broken handsets. Repairers told us they are busiest post-harvest, when farmers tend to have more cash (Wyche et al., 2015).

Labor demands and seasonal fluctuations in income will likely have implications for mobile Internet use; indeed, as Kumar (2015) observed in rural India, women "[lead] extremely busy lives" and that watching mobiles online was a respite from daily activities. We have some evidence suggesting rural Kenyan women also turn to their mobile devices as a respite from tedious labor, although rather than watching videos, a few women showed us encouraging or inspirational SMS messages saved on their handsets, frequently a Bible verse, that would be read and reread when not working. More common was the perception that using the Internet required time, a resource few women had, and replies to our questions about it were answered with responses like this: "People like us are in kitchen—all the time, and the goats, the children, the shamba, we don't have time."

More significant was the perception that these demands left them with no time to learn how to access and use the mobile Internet, a process most recognized as time-consuming, with women telling us that, like learning to use their mobile phones, this process would happen *kidogo, kidogo,* that is, little by little, and *pole, pole,* or slowly, slowly, often adding that learning requires "staying with the same phone" and exploring its features. These women rightly recognize that active exploration is essential for learning to access the Internet, as is the case with any unfamiliar ICT (Gaver, 1991), and that exploration demands time and familiarity with a device, something further complicated by high rates of phone turnover in rural areas. In addition to our aforementioned findings about "spoiled" handsets, phones are frequently stolen or misplaced—all of which result in getting a replacement secondhand phone that is typically more complicated because it has more features than the previous, older handset. Inconsistencies in the design of phone interfaces as well as different ways to access the Internet using those interfaces (e.g., accessing it via the Facebook feature or via the ambiguous globe icon that indicates the Internet on many handset interfaces) further complicate these efforts. Lack of time paired with frequent handset turnover and the learning curve that come with a new handset constrain women from using the mobile Internet.

Discussion

We return to the question posed in our introduction: What can ICTD researchers, corporations, and NGOs learn from rural women's experiences? We find that although the "Africa Rising" narrative corrects for the historic overrepresentation of Africa as a place that lags behind—or even lacks—technological development and innovation, it is incomplete. The story's narrow focus on increasing economic growth—and on the role increased access to ICTs (a key part of this narrative) plays in it—obscures longstanding differences between Kenya's rural and urban areas. Nor does this narrow focus fully account for women's experiences. Our sense is that although the women in our study benefited from having mobile phones, their effects on women's daily lives were not transformative, and persistent challenges (e.g., access to education, labor demands) remain. Without falling into the naïve optimism that mobile Internet access will have a transformative effect on rural residents' lives, we consider here what those working to increase access in Africa's rural regions can learn from rural women's experiences.

Significantly, we see it is in rural areas where the critical technical and social challenges to providing people with mobile Internet access are most salient. Technological interventions used to facilitate rural access to the mobile Internet (e.g., drones, balloons, durable modems) may have little actual impact if the constraints we identified are overlooked. We see how the materiality of mobile devices must be considered because it draws attention to how handsets are difficult to carry, they change over time, and their batteries wear out—factors that restrict and complicate engagement with the mobile Internet. Our findings also remind researchers of the continued significance of older technologies, such as outdoor advertising and the radio, in informing rural women about and shaping their perceptions of new technologies (e.g., Facebook) and of the implications of the messages conveyed by other media. The ads we observed said little about social media (e.g., how to use it or what it can be used for), instead, they seemed to imply there is something wrong with not joining.

We also provide evidence that addressing literacy is more than educating women about their devices' technical features; it is also about "bringing about a more comprehensive and functional mental model of the (invisible) mobile Internet as something useful and under their control" (Gitau, Donner, & Marsden, 2009, p. 10). This education is especially important for rural women, who are usually tied to their farms and—other than church, funerals, or occasional school or government meetings—have few opportunities to interact with other people or engage in informal learning about the mobile Internet. We also found that rural environments dictate different priorities for women (food production), which do not necessarily allow time for leisure activities or which for many people in developing regions—including urban Kenya—are associated with using the mobile Internet (Gajjala & Tetteh, 2014). Although it is difficult to speculate how exactly seasonal fluctuations in labor demands and income will affect mobile Internet use, they must be considered in order to understand mobile Internet use in rural areas.

Last, our findings reveal that while the mobile Internet is not necessarily a new technology, it is related to mobile phones. Ultimately, access is only the latest stage in a long and unfolding technological sequence.

There are opportunities to learn from the past (Best, 2010), in particular recognizing that—like the mobile phone—the mobile Internet can be used to access mundane information and entertainment, rather than as a trusted source for "useful" things such as business-, education-, healthcare-, and government-related information (Archambault, 2011). What our respondents most wanted was to learn how to access and use the Internet, which suggests a greater effort should be made to provide such information to women and let them decide what content they want to access. Technologists must better connect the dots: They must understand the complexity and diversity of rural women's daily lives and how these aspects merge to affect women's mobile Internet access. Similarly, technologists must resist the "utopian vision" narrative that frequently accompanies technological change (Vokes, 2016).

Conclusion

Spurred mostly by economic growth, evidence of Africa Rising has motivated a new narrative about the continent, one that aligns with the ICTD community's mostly optimistic take on ICTs and their potential. The women we met over the course of our fieldwork are better off with mobile phones than without them, but Internet access remains costly. More problematic is that many of our respondents were confused about what it is. Further, the phones they are likely to have cannot easily access it. Last, the overwhelming demands on rural women's time must be addressed if they are to benefit from access to the information afforded by the mobile Internet.

This article offers a single story; there are other stories to consider, including those of men, and those elsewhere in rural Africa. There are also opportunities to more critically engage with feminist scholarship and colonial discourses in future research. Current efforts to provide Internet access to rural Africa are focused primarily on developing novel technological interventions (e.g., drones, balloons, durable modems). We examine the benefits of deeply understanding the complexity of rural areas and, particularly, how technical interventions alone may not be enough to benefit rural women. Our research offers a timely perspective on the Africa Rising story, especially as it relates to ICTs. We conclude that although technologists are increasingly considering the intersection of gender and ICT access, ICTD efforts rarely consider the intersections of gender, ICTs, and rurality. It is important to avoid universalizing urban populations' ICT experiences and to recognize that rural areas and their predominantly female populations should have a more central role in guiding narratives about Africa. ■

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