Innovating mobile solutions for refugees in East Africa
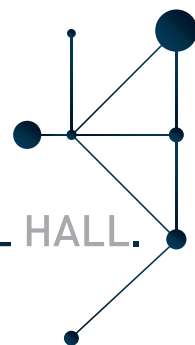

Opportunities and barrier to using mobile technology and the internet in Kakuma refugee camp and Nakivale refugee settlement

January 2018

Contents

NAKIVALE CELL TOWER IN BASE CAMP

Definitions

DEFINING MOBILE DEVICES

A mobile device is designed for portability and is typically lightweight and compact. Increases in processing power and data storage, coupled with advances in screen displays have enabled mobile devices to perform many tasks traditionally reserved for personal computers.

This study focuses on three main types of mobile device: Basic phones, Feature phones and Smartphones.

BASIC PHONE:

The most affordable type of mobile device, but with limited functionality. Basic phones support voice communication, Short Message Service (SMS) and Multimedia Message Service (MMS). They typically to not provide access to the internet, but due to their limited functionality have long battery lives which span many days.

FEATURE PHONE:

Exceeding the functionality of a basic phone, feature phones support selected applications, basic game downloads and feature a limited web browser. These devices also have in-built cameras, which can have a high megapixel count. Features phones are more affordable than smartphones because of their reduced functionally, but have longer battery lives as a result.

SMARTPHONE:

The most feature-rich mobile device, but also the most expensive. Smartphones have all the functionality of a feature phone, in addition to a touch screen display and full internet access. Furthermore, users can download applications from online stores such a Google Play. Largely due to the display, smartphones typically need to be recharged daily.

MULTIMEDIA RESOURCES

The study has produced two short video case studies produced by refugees themselves in Kakuma camp and Nakivale settlement, which can be accessed by clicking on the images below[1]. The case studies and other findings can also be found on a micro-website that accompanies this research.

CASE STUDY 1

CASE STUDY 2

MICRO-SITE

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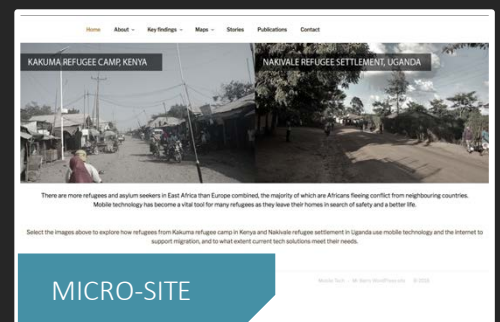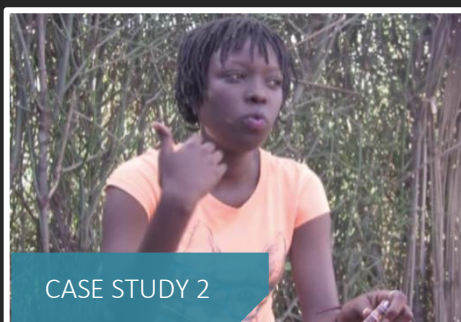
[1] The footage produced was edited by Samuel Hall to reduce play time.

Executive summary

There are more refugees and asylum seekers in East Africa than Europe combined, the majority of which are Africans fleeing conflict from neighbouring countries[2]. Smartphones have become a vital tool for many refugees as they leave their homes in search of safety and a better life[3].

This study explores how refugees traveling within East Africa use mobile technology and the internet to support migration, and to what extent current tech solutions meet their needs. The study takes a significant step towards deciphering the degree to which mobile phone coverage, access to smartphones, awareness of mobile-based services and technical literacy affect the role mobile technology can play in supporting refugees.

Kakuma refugee camp in Northern Kenya and **Nakivale refugee settlement** in South Western Uganda were selected as the two locations for this study. Both host a diverse range of nationalities from across the region, including refugees from Somalia in the east, to the Democratic Republic of Congo in the west. Their diversity provides an opportunity to better understand the role mobile technology plays in refugees' travel to, from and within the region, and how it can support the lives of refugees once they reach settlements.

Data collection included a large-scale quantitative survey, focus group discussions (FGDs), key informant interviews and case studies. Refugees were purposefully selected based on nationality, age, gender and population distribution in each location. The primary data collected represents the first dataset of its kind to focus on understanding the use of mobile technology and the internet within refugee populations in Kenya and Uganda.

KEY TRENDS

Although Kakuma and Nakivale have very different geographic, urban and infrastructural differences, there are many similarities in the way refugees access and use mobile technology and the internet, and the challenges they face in attaining such access. Furthermore, there are close similarities in refugee needs across both locations, as well as in the role mobile phone technology can play in addressing these needs. Based on analysis of the data collected, eight key trends have been identified that are common to both Kakuma camp and Nakivale settlement.

KEY TRENDS	
1	The majority of refugees access the internet using 3G-connected smartphones, not WIFI.
2	Younger refugees are more likely to use smartphones than older refugees; they are also more likely to access the internet.
3	Smartphone ownership increases with level of education, as does the number of mobiles apps and services refugees use.
4	The majority of refugees who own a mobile device earn less than $1 USD per day. Furthermore, income above $5 USD per day does not significantly influence smartphone ownership.
5	Refugees arriving in refugee settlements within the past three years are more likely to have used a mobile phone to support their journey.
6	Neither age, nor the type of mobile devices owned by refugees influences awareness of mobile-based services.
7	Refugees primarily use the mobile internet for accessing information and communication with friends and family.
8	Refugees largely source information from family and friends, but social media and SMS play strong supportive roles.

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[2] ReDSS/Samuel Hall (2016) A review of durable solutions in the East & Horn of Africa
[3] Gillespie et.al. (2016) Mapping Refugee Media Journeys Smartphones and Social Media Networks

The close correlation of the eight trends identified in Nakivale and Kakuma suggest a broader relationship between; (1) refugee needs that can be addressed through mobile; (2) barriers to mobile phone and internet access and; (3) mobile phone usage across settlements and between countries in East Africa.

When taken as indicators for the potential adoption of mobile and internet-based solutions, these trends have important programming and policy implications for those working with refugee communities and should be considered as part of future programme designs

KEY INDICATORS

Although access to any type of mobile device provides a channel (voice/text) through which humanitarian organisations and others can deliver services to refugees, smartphones clearly offer the most effective way to connect to social media through the internet and, in turn, with refugee communities to address a diverse array of needs.
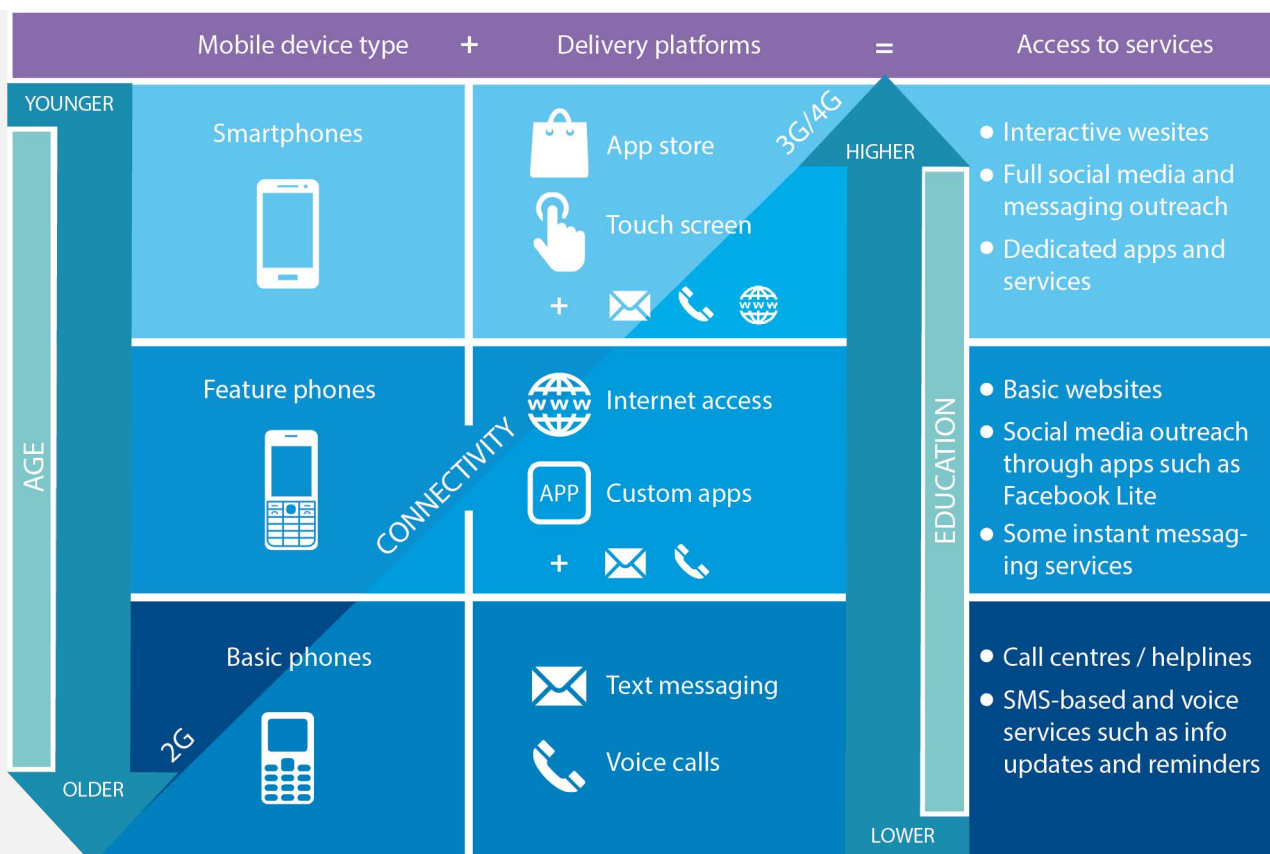
Based on the key trends identified in this report, the strongest indicators of access to mobile technology and related services are *connectivity*, *education* and *age*.

CONNECTIVITY

Access to internet enabled devices such as smartphones is only part of the challenge. Connectivity, defined here as reliable access to 3G/4G data services, is the keystone for accessing services beyond voice and text. It is therefore one of the biggest determinants in how practitioners can target mobile and internet based services in refugee communities.

EDUCATION AND AGE

This study has shown that age and education are strong influencers of smartphone ownership and increased use of mobile-based applications and services. Younger refugees are more likely to own a smartphone, with the average age of an owner being 28 in Kakuma and 30 in Nakivale. Increases in levels of education also affect smartphone ownership, with University graduates the most likely to own a smartphone, followed by those who completed secondary education. Based on these influencers, the following infographic acts as a reference for determining how age, education and connectivity influence access to different mobile devices and the service delivery platforms available for supporting target refugee communities.

Mobile device type	+	Delivery platforms	=	Access to services
Smartphones		App store / Touch screen + ✉ 📞 🌐	3G/4G HIGHER	• Interactive wesites • Full social media and messaging outreach • Dedicated apps and services
Feature phones		Internet access / Custom apps + ✉ 📞		• Basic websites • Social media outreach through apps such as Facebook Lite • Some instant messaging services
Basic phones		Text messaging / Voice calls	2G LOWER	• Call centres / helplines • SMS-based and voice services such as info updates and reminders

YOUNGER — AGE — OLDER
CONNECTIVITY
EDUCATION

Introduction

There are more refugees and asylum seekers in East Africa than Europe combined, the majority of which are Africans fleeing conflict from neighbouring countries[4]. For many, mobile phones and the internet are vital tools used to communicate with friends and family left behind, and to support the journey to a safer location[5].

Despite this, much literature on the use of mobile technology for migration focuses on migration into Europe, with little research conducted to assess the technology uses and needs of refugees traveling too, from and within East Africa. Whilst refugees traveling from the Middle East rely tools such as Facebook, WhatsApp and Google Maps to support their journey to Europe, there is an assumption that refugees traveling within Africa are much more limited in the apps and social networks they can use. Poor or incomplete mobile connectivity across the region, lack of access to smartphones and low levels of technical literacy are all cited as factors that restrict technology adoption by refugees in East Africa[6].

The infographic on the following page underlines the paucity of mobile solutions developed for refugees in the global south, compared to Europe and the global north, despite the responsibility of many countries in East Africa to host refugee communities from across the region. Without these technology services, refugees in East Africa have more limited access to potentially lifesaving information during their journey and financial, learning and job opportunities once they arrive in host countries.

More needs to be done to understand how mobile technology can better support refugees and internally displaced persons in East Africa, where protracted displacement has become a characteristic of the region for over 20 years, and almost no hard data exists on what mobile apps and other internet-based innovations are most needed by refugees. The evidence not only points to a digital divide between refugees hosted in East Africa and those living in Europe, but also a knowledge gap in understanding how mobile technology can support displaced populations and how their needs might differ from refugees traveling to and living in the global north.

Against this backdrop, Samuel Hall received a research grant from the Humanitarian Innovation Fund (HIF) to explore how refugees traveling within East Africa use mobile technology and the internet to support migration, and to what extent current tech solutions meet their needs. The study takes a significant step towards deciphering the degree to which mobile phone coverage, access to smartphones, awareness of mobile-based services and technical literacy affect the role mobile technology can play in supporting refugees.

Conducted over six months, the study took place in Kenya and Uganda, home to some 1.7 million refugees. Both countries are two of the largest refugee hosts in the East and Horn of Africa (alongside Ethiopia and Sudan) and positioned at the nexus of regional migration.

Kakuma refugee camp in Northern Kenya and **Nakivale refugee settlement** in South Western Uganda were selected as the two locations for this study. Both host a diverse range of nationalities from across the region, including refugees from Somalia in the east, to the Democratic Republic of Congo in the west. Their diversity provides an opportunity to better understand the role mobile technology plays for refugees traveling to, from and within the region, and how it can support the lives of refugees once they reach settlements. A deeper rationale for the selection of Kakuma and Nakivale refugee settlements can be found in the literature review that from part of this research series[7].

The findings in this report shed light on how those working with refugees, from civil society, to government organisations, can support the development of innovative solutions – uniquely tailored for refugees in East Africa – and help close the growing digital divide between refugees with access to mobile applications and the internet, and those without.

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[4] ReDSS/Samuel Hall (2016) A review of durable solutions in the East & Horn of Africa
[5] Gillespie et.al. (2016) Mapping Refugee Media Journeys Smartphones and Social Media Networks
[6] RMMS/DRC (2016) Getting to Europe the 'WhatsApp' way
[7] Samuel Hall (2017) Innovating Mobile Solutions for Refugees in East Africa: Selection of Refugee Locations for Further Research

A new digital divide: Are refugees in Sub-Saharan Africa being left behind?

Since 2015 over **100 innovations** have been built for refugees worldwide

SAMUEL HALL.
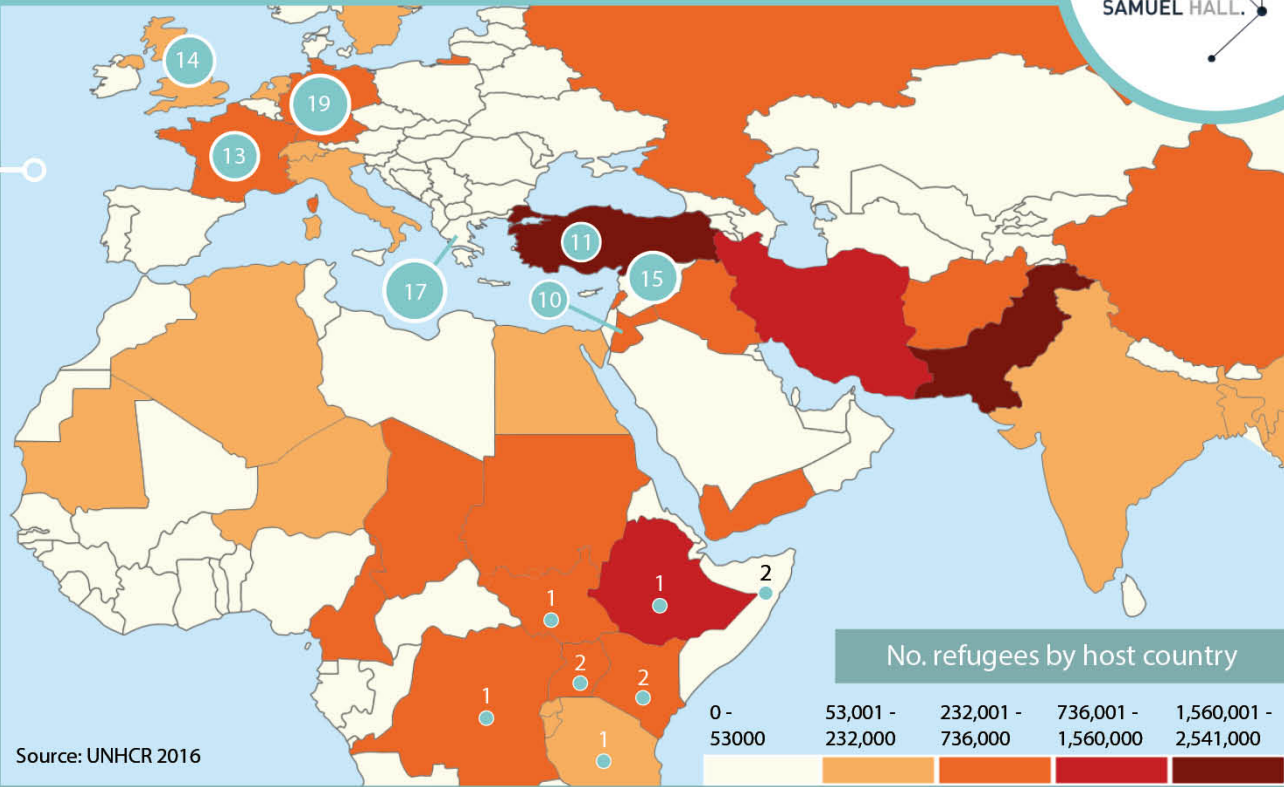
Top 7 country innovators

Germany — 19
Greece — 17
Syria — 15
United Kingdom — 14
France — 13
Turkey — 11
Jordan — 10

Map markers: 14, 19, 13, 17, 11, 10, 15, 1, 2, 1, 1, 2, 2, 1, 1

Source: UNHCR 2016

No. refugees by host country

| 0 - 53000 | 53,001 - 232,000 | 232,001 - 736,000 | 736,001 - 1,560,000 | 1,560,001 - 2,541,000 |

Of the innovations developed

47% have an app

45% are websites

8% are hardware
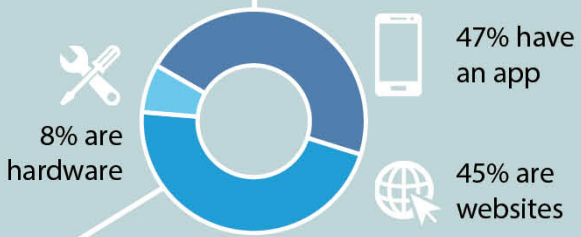
Innovations cover 3 categories

| 5% Pre-departure | 23% Transit | 72% Arrival & settling |
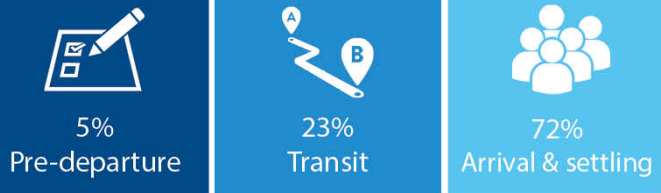
Social media apps can play a supportive role

17 Social media and messaging apps globally available

But how many refugees have access **?**

Key questions on the role of innovation for refugees in SSA:

What are the most pressing needs for refugees in SSA and how can innovation help?

How many refugees have access to smartphones?

What innovations in Europe and elsewhere can support refugees in SSA?

Total Refugee population by region Vs. Innovation availability by region

Total Refugee population by region:
- Sub-Saharan Africa (SSA) — 30%
- Middle East & North Africa — 27%
- Asia and Pacific — 15%
- Europe — 14%
- Americas — 13%

Innovation availability by region:
- Europe — 67%
- Middle East & North Africa — 21%
- Americas — 6%
- Sub-Saharan Africa (SSA) — 4%
- Asia and Pacific — 2%

Innovations to support refugees in SSA are far behind Europe despite the need and growing access to technology

Smartphone penetration by 2020
- SSA — 57%
- Europe — 74%

Apps built for refugees
- SSA — 2
- Europe — 52

Source: GSMA 2016, eMarketer 2015

Report outline and objectives

RESEARCH OBJECTIVES

The purpose of this report is to provide a better understanding of the technical and socioeconomic barriers and opportunities for using mobile phone technology and the internet to support refugees within East Africa.

The reports overarching objective is to clarify assumptions on mobile phone and internet access by refugees in East Africa and highlight how innovations in mobile technology can be used to develop more efficient mechanisms for delivering practical support to refugees and displaced communities.

It is hoped that this study, when used by those working at the nexus of technology and migration, will lead to the development of a suite of resources and innovative mobile-based solutions that are uniquely tailored to refugees in East Africa.

This study, therefore, addresses the following questions:

1. What are the most pressing needs that refugees/migrants face in East Africa and is there a way for mobile technology and the internet to address these needs?
2. What are the technological and socioeconomic challenges and opportunities for delivering apps and services to refugees in the settlements?
3. What mobile applications (apps) and services are available and relevant to refugees in selected refugee settlements, including humanitarian agencies and other actors that support them?
4. In light of the actual needs of refugees/migrants and the challenges in accessing technology, what existing apps and services are available to support migrants in the East Africa, or are new initiatives required?

REPORT OUTLINE

To achieve this, the report will present three chapters that clarify assumptions on mobile phone ownership, access and use in Kakuma and Nakivale by examining:

- Mobile phone access and access to the internet;
- The importance of mobile technology to address refugee needs;
- Refugee awareness of phone-based applications (apps) and services.

The final two chapter will then explore how mobile technology and the internet can better support priority refugee needs in Kakuma and Nakivale, and present existing mobile or internet-based applications or services found elsewhere in the world that might be adapted to meet these needs and their implications for the wider region.


A TYPICAL INTERNET CAFÉ IN KAKUMA 2

Research methodology

SAMPLING STRATEGY

To better understand how refugees in Kakuma and Nakivale use mobile technology, and the extent to which current mobile-based services meet their needs, both quantitative and qualitative data collection methods were used.

Primary data collection included a large-scale quantitative survey, focus group discussions (FGDs), key informant interviews and case studies. **696** quantitative surveys were conducted in Kakuma; **669** in Nakivale (1365 in total). Refugees were purposefully selected based on nationality, age, gender and population distributions in each location (see pages 11 and 12). This data was collected using local teams of refugee enumerators, who used local knowledge to identify respondents through 'snowball sampling', whereby each respondent recommends subsequent contacts from their own social network to participate in the study. For the quantitative survey, respondents were then sampled from each zone in Kakuma and Nakivale. Figure 1 displays the distribution of surveys conducted at each location, captured using GPS.

Figure 1: Distribution of interview locations for quantitative surveys conducted in Kakuma and Nakivale
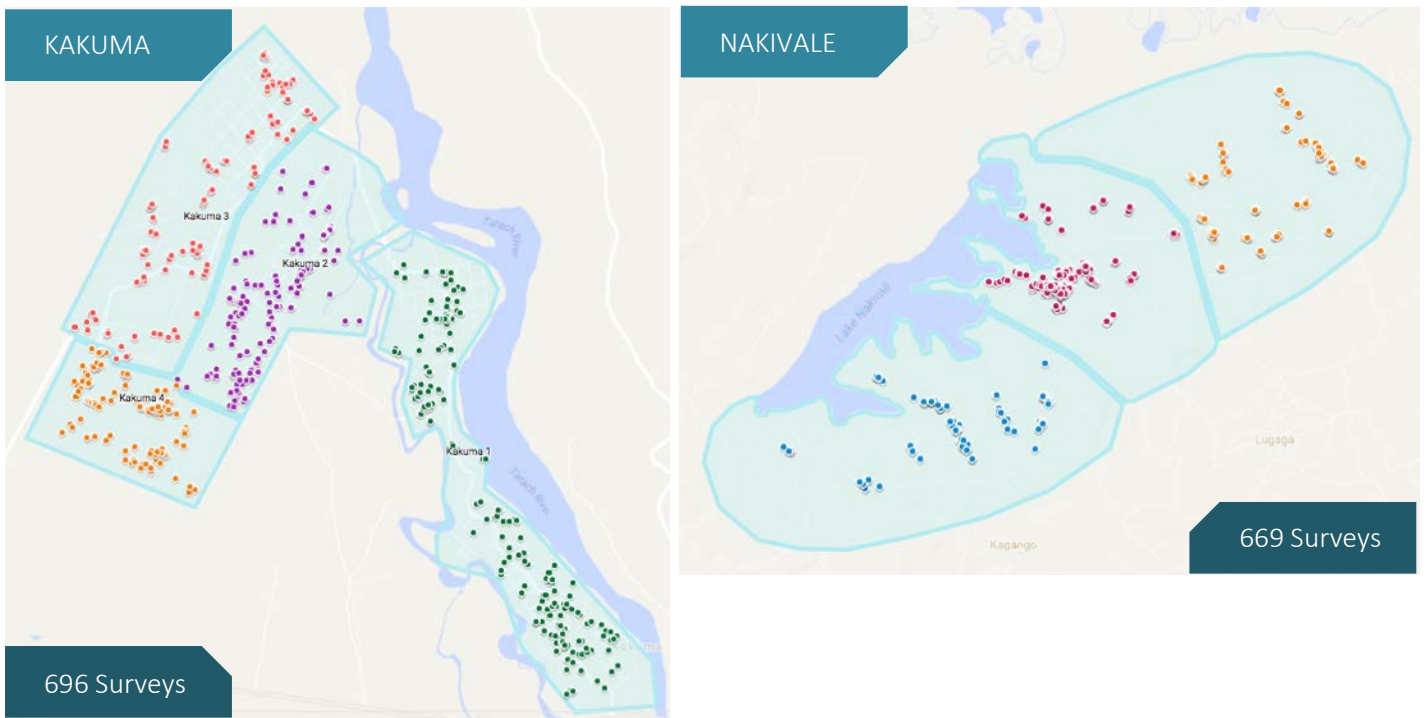
To compliment the quantitative survey, a total of 10 focus group discussions were conducted in this study. Five in Kakuma and five in Nakivale. In order to reflect the mix of age and ethnicities at each location, the following groups were purposefully selected. Each FGD contained six participants.

Kakuma					Nakivale			
FGD	Nationalities	Ages	Location		FGD	Nationalities	Ages	Location
1	South Sudanese	18-25	Kakuma 1		1	Somali	18-25	Base Camp
2	Somali	18-25	Kakuma 2		2	Congolese	18-25	Base Camp
3	Congolese	26-45	Kakuma 2		3	Burundian	26-45	Juru
4	Somalia	45+	Kakuma 3		4	Congolese	26-45	Juru
5	South Sudanese	45+	Kakuma 4		5	Rwandese	26-45	Rubondo

Data collected in Kakuma and Nakivale represents the first dataset of its kind to focus on understanding the use of mobile technology and the internet within refugee populations in Kenya and Uganda. All of the data collection tools used in this study can be found in Annex A.

SURVEY STATISTICS

The following is a summary of the data collected based on a sampling strategy centred around age, gender and population distributions in each refugee location.

Figure 2: Age

Age of survey population in Kakuma

- 32.1% — 18 to 24
- 45.8% — 25 to 44
- 16.5% — 45 to 64
- 5.6% — 65 +

Age of survey population in Nakivale

- 31.1% — 18 to 24
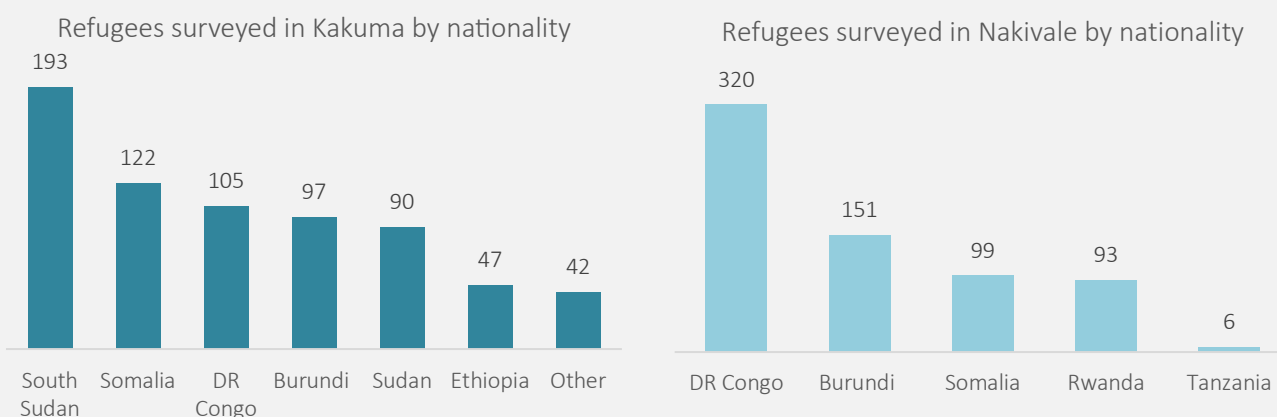- 42.9% — 25 to 44
- 20.5% — 45 to 64
- 5.5% — 65 +
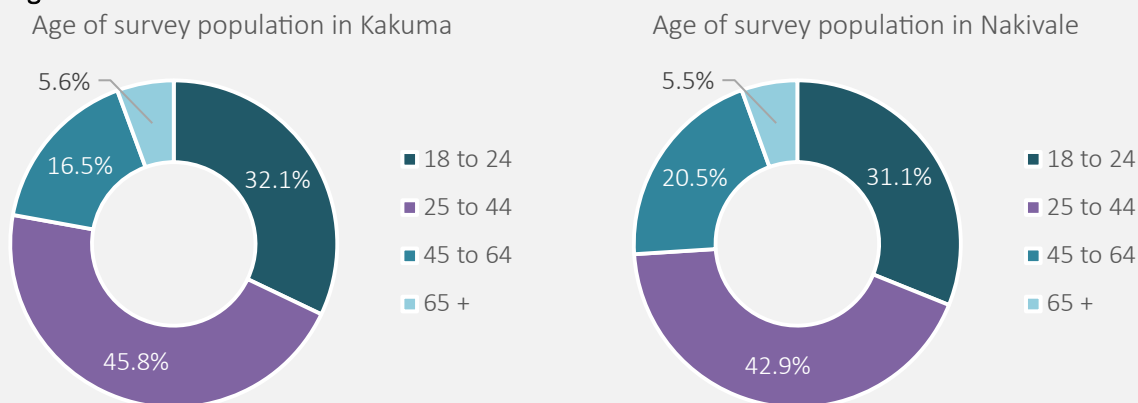
Both Kakuma and Nakivale are home to a relatively young population of refugees, a characteristic typical of East Africa[8]. The larger percentage of respondents aged 25 to 44 reflects a greater willingness of older refugees (those over 24) to speak with enumerators during the study.

Figure 3: Gender

Kakuma — Male 49.4% | Female 50.6%

Nakivale — Male 50.1% | Female 49.9%
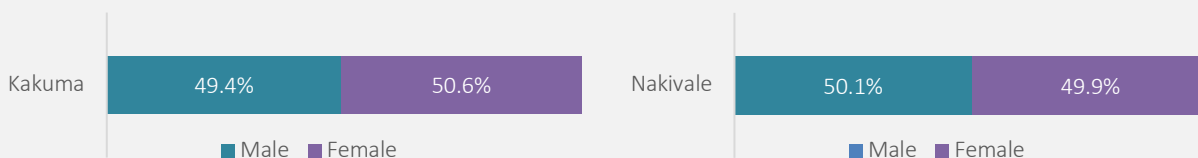
The proportion of men and women interviewed at both locations reflects the relative gender balance that exists.

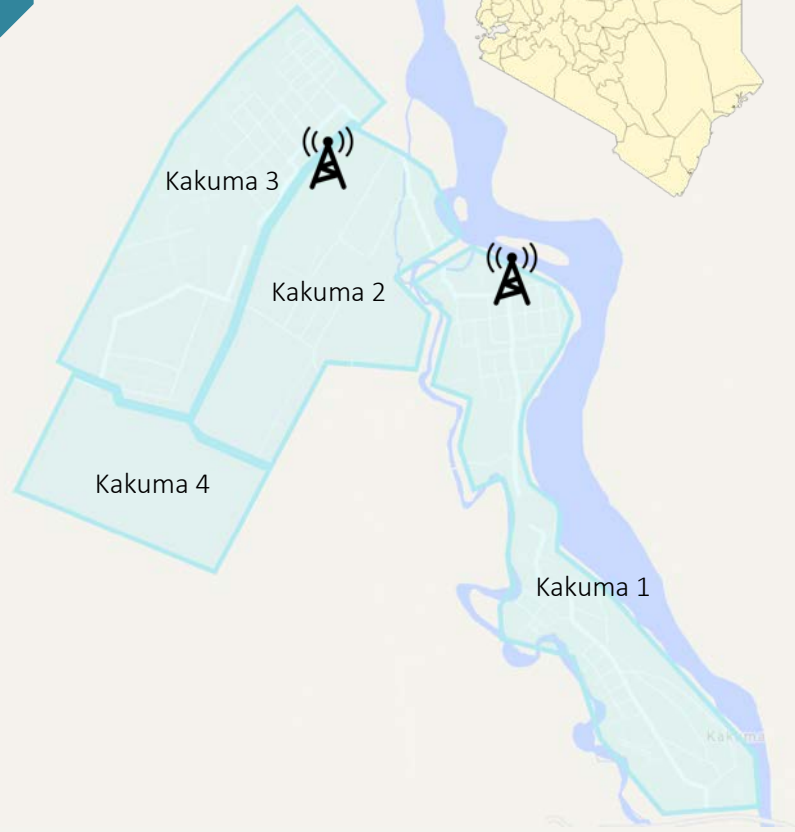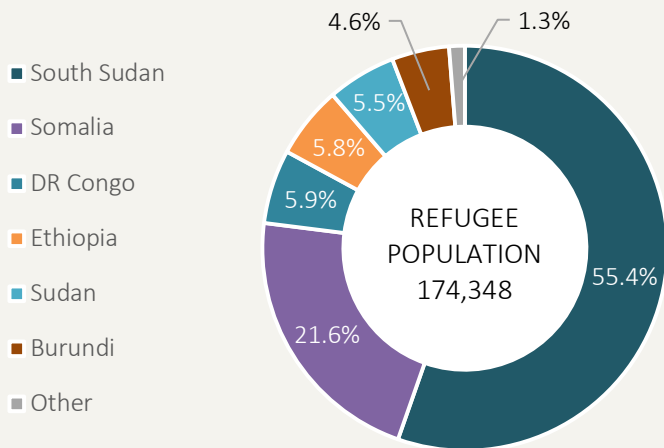### Figure 4: Nationality distribution:

Refugees surveyed in Kakuma by nationality

- South Sudan: 193
- Somalia: 122
- DR Congo: 105
- Burundi: 97
- Sudan: 90
- Ethiopia: 47
- Other: 42

Refugees surveyed in Nakivale by nationality

- DR Congo: 320
- Burundi: 151
- Somalia: 99
- Rwanda: 93
- Tanzania: 6

The population spread of refugees surveyed is broadly indicative of the major refugee nationalities present in each location.

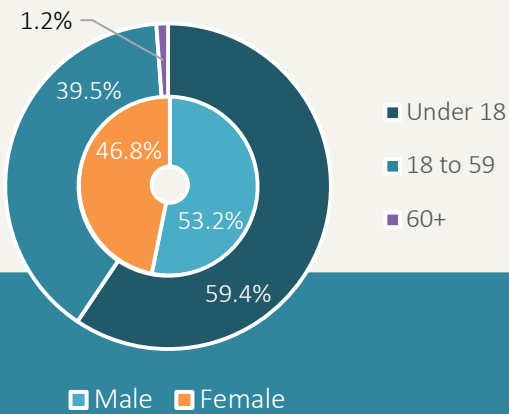[8] Staude.L. (2017). East Africa's young: An asset or a problem?

POPULATION SIZE AND NATIONALITY

REFUGEE POPULATION 174,348

- South Sudan — 55.4%
- Somalia — 21.6%
- DR Congo — 5.9%
- Ethiopia — 5.8%
- Sudan — 5.5%
- Burundi — 4.6%
- Other — 1.3%

Kakuma 3

Kakuma 2

Kakuma 4

Kakuma 1

POPULATION BY GENDER AND AGE

- Under 18
- 18 to 59
- 60+

1.2%
39.5%
46.8%
53.2%
59.4%

☐ Male ☐ Female

Kakuma refugee camp is in Turkana county in North Western Kenya, positioned close to the borders of Ethiopia, South Sudan and Uganda. Built in 1992, it was originally a refuge for Sudanese fleeing persecution. Today the camp has four settlement zones (Kakuma 1 to 4) and is home to over 174,000 refuges from all over the Horn and East of Africa.

Conditions in the camp are arid, with temperatures regularly exceeding 30 degrees Celsius in the dry seasons.

Despite its relative isolation, Kakuma refugee camp has increasingly become part of the wider Kenyan economy. In 2017, the camp contributed 3% to Turkana county's economic output (GDP)[ii].

A BRIEF HISTORY OF MOBILITY IN KAKUMA

Safaricom, which is Kenya's largest mobile network operator, is also the primary operator in Kakuma refugee camp. Airtel also provides widespread network coverage in the camp and competes with Safaricom to deliver services.
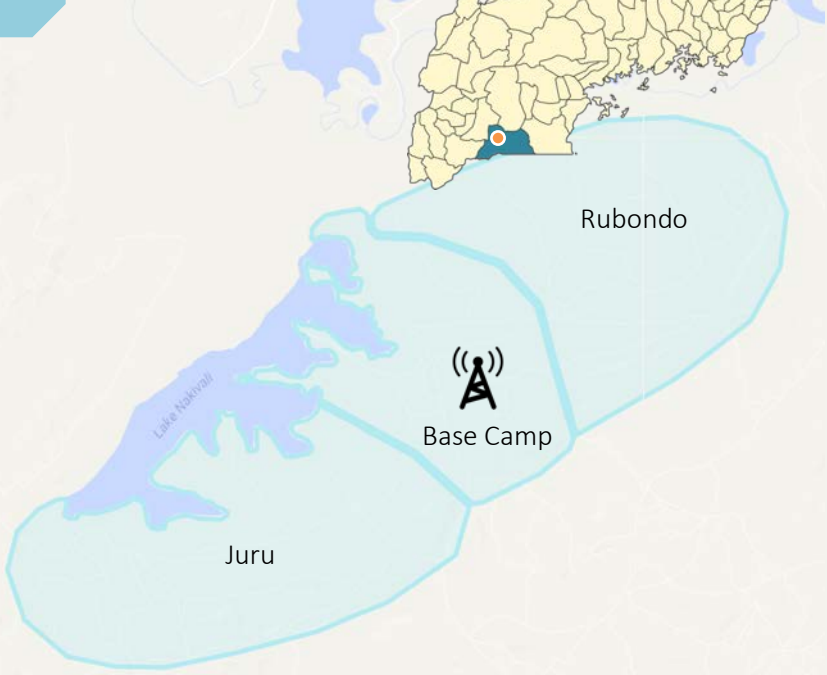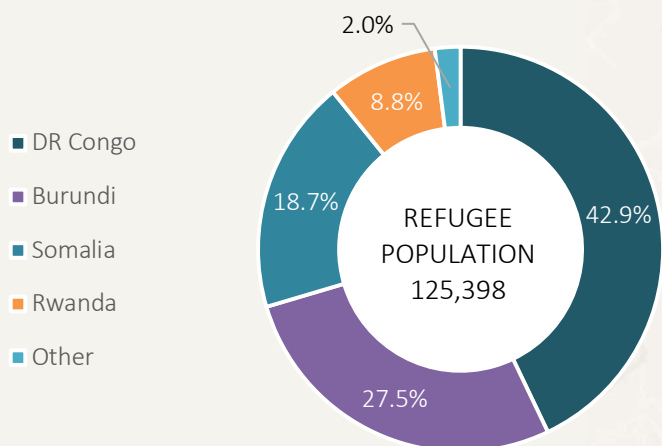
Kakuma camp has two cell phone towers, located in Kakuma 1 and 2, both installed by Safaricom.

Despite the presence of these towers, camp residents suffer from poor network coverage in some zones. While Kakuma 1 and 2 can access Safaricom's 3G and 4G network, coverage in parts of Kakuma 3 and 4 is more restrictive, resulting in intermediate 2G connectivity.
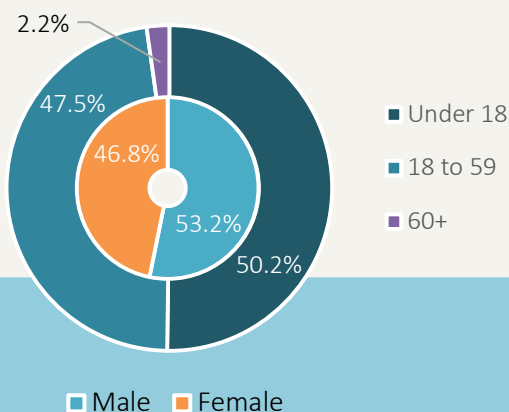
i. UNHCR (2017)
ii. World Bank (2017)

11

POPULATION SIZE AND NATIONALITY

REFUGEE POPULATION 125,398

- DR Congo
- Burundi
- Somalia
- Rwanda
- Other

2.0%
8.8%
18.7%
42.9%
27.5%

Rubondo

Base Camp

Juru

POPULATION BY GENDER AND AGE

2.2%
47.5%
46.8%
53.2%
50.2%

- Under 18
- 18 to 59
- 60+

☐ Male ☐ Female

Nakivale refugee settlement is located in Isingiro district in South Western Uganda, close to the borders of Rwanda and Tanzania. Established in 1958, Nakivale is one of the oldest refugee settlements in Africa and is home to approximately 125,000 refugees from across the region.

Nakivale is sub-divided into three administrative zones: Base Camp, Juru and Rubondo, with Base Camp the most densely populated.

The settlement is agriculturally productive and fed largely by neighbouring lake Nakivali.

Situated in a rural location, access to Nakivale is only possible by road.

A BRIEF HISTORY OF MOBILITY IN NAKIVALE

MTN and Africell are the dominant mobile operators in Nakivale and been in present in area for around 10 years.

The settlement has only one cell phone tower, installed by Africell in 2013 and located at the center of the settlement in Base Camp. As a result, the majority of refugees use Africell because it has a better signal strength as compared to MTN.

Many of those living in Rubondo and Juru zones must travel to Base Camp to get a good mobile connection, or access to the internet.

REFERENCES:
i. UNHCR (2017)
ii. World Bank (2017)

Poor or incomplete mobile connectivity across the region, lack of access to mobile devices and low levels of technical literacy have all been cited as factors that restrict adoption of mobile phone and internet based services by refugees in East Africa.

However, almost no first-hand evidence has been collected to determine the extent to which these factors influence access to mobile technology and the internet, and if other factors such as age, gender, financial status and education, which are often key indicators of social access and inclusion, also play an influential role.
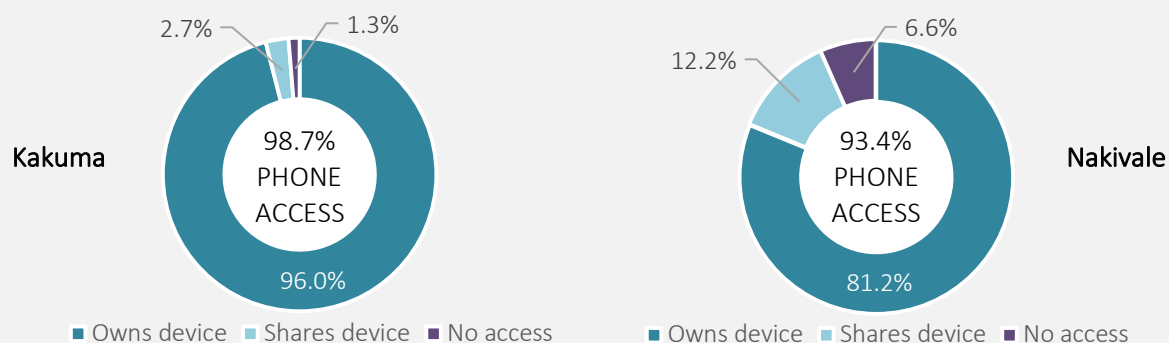
This chapter explores some of the key challenges to mobile phone access and access to the internet, based on primary data collected through interviewing refugees in Kakuma cam

p and Nakivale settlement. It does so by examining:

- Levels of mobile phone access and ownership
- Refugee age, gender and education as a factor in mobile phone ownership
- Refugee income as a factor in mobile phone ownership
- Barriers to accessing the internet

MOBILE PHONE ACCESS AMONGST REFUGEES

In order to ascertain levels of mobile phone ownership, refugees at our study locations were asked if they owned or had access to a mobile phone (Figure 5).

Figure 5: Levels of mobile phone access in Nakivale and Kakuma refugee settlements

Kakuma

2.7%   1.3%

98.7%
PHONE
ACCESS

96.0%

■ Owns device ■ Shares device ■ No access

Nakivale

12.2%   6.6%

93.4%
PHONE
ACCESS

81.2%

■ Owns device ■ Shares device ■ No access

Mobile device ownership amongst those interviewed is high, standing at 81% in Nakivale and 96% in Kakuma refugee settlements. Only a small percentage of refugees have no access at all to a mobile device. Mobile phone access in Kakuma is especially high, with almost 99% of respondents either owning, or sharing a mobile device.
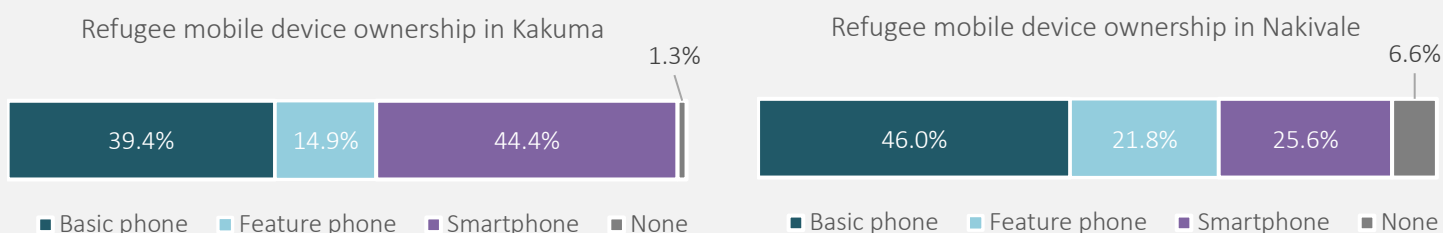
"My phone is very important to my life because it unites me with my family members back at home in South Sudan and my relatives in other countries like the USA and Germany. I use it to reach my friends here in the camp in case there is any emergency. It is also my only source of entertainment; I use it to play games when bored with life. Sometimes I also use it to order goods from Nairobi".

EXTRACT FROM FGD WITH YOUNG SOUTH SUDANESE: KAKUMA 4, AUGUST 2017

Access to mobile phone technology, especially smartphones capable of running applications and browsing websites, provide a gateway through which humanitarian organisations can deploy innovative services targeted towards refugees Although the number of refugees who own (or have access to) a smartphone is not known across East Africa, over half of the services for refugees recorded in a recent study by Samuel Hall are built

around a smartphone application[9]. To determine the level of smartphone penetration within the population, refugees were asked the type of mobile device they owned (Figure 6).

Figure 6: Mobile ownership by device type

Refugee mobile device ownership in Kakuma

39.4%	14.9%	44.4%	1.3%

■ Basic phone ■ Feature phone ■ Smartphone ■ None

Refugee mobile device ownership in Nakivale

46.0%	21.8%	25.6%	6.6%

■ Basic phone ■ Feature phone ■ Smartphone ■ None

Although owners of basic phones are dominant in Nakivale, smartphone owners still represent a significant user base. Smartphone ownership in Kakuma, however, is almost double that of basic phone users. Furthermore, levels of smartphone ownership in both Kakuma and Nakivale are markedly higher than national averages. Smartphone penetration in Kenya stands at 26%; in Uganda, it is just 4%[10]. This represents significant opportunities for developing smartphone and internet based services for refugees.

Despite these opportunities, care needs to be taken not to exclude those who may not yet be willing or able to join the smartphone revolution. It is also important to ensure more vulnerable refugee groups are not excluded from the benefits of new services delivered over smartphone.

With these considerations in mind, this study now looks at the impact of refugee age, gender and level of education on mobile phone access and ownership in Kakuma and Nakivale.

REFUGEE AGE, GENDER AND EDUCATION AS A FACTOR IN MOBILE PHONE OWNERSHIP

Are younger people more likely to use mobile phones and the internet? Is gender, or level of education an influencing factor?

THE INFLUENCE OF AGE

Based on responses collected from the quantitative survey, Table 1 summarises the average age of male and female mobile phone owners in Kakuma and Nakivale refugee camps.

Table 1: Average age of mobile device ownership by refugee settlement and gender

	Kakuma		Nakivale	
Mobile Device Type	Male	Female	Male	Female
Basic phone	36	42	39	37
Feature phone	34	33	34	34
Smartphone	28	29	32	28

Findings confirm a common assumption that younger refugees are more likely to own a smartphone, with the average age of ownership being 28 in Kakuma and 30 in Nakivale. This compares to an average age of 39 for basic phone ownership and correlates with similar findings of global smartphone ownership from PewResearch[11]. There is also relative equality – between and across both refugee settings – in the average age that men and women have access to different mobile devices.

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[9] Hounsell. B. (2017) Refugee Digital Divide: Innovation for Africa's Displaced Falls Behind
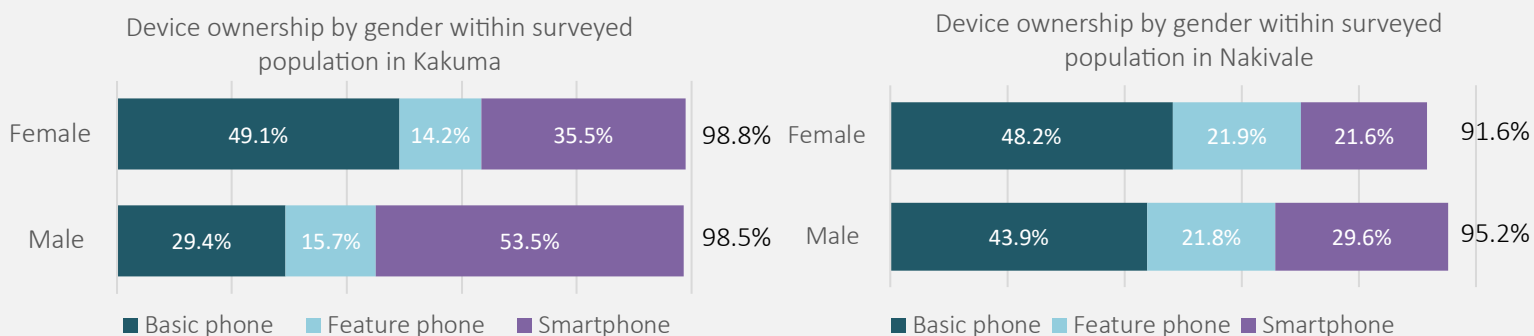[10] PewResesrch (2016), Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economics, pp. 16
[11] Ibid

THE INFLUENCE OF GENDER

To explore the influence of gender on mobile device ownership, Figure 7 compares female and male ownership in each settlement.

Figure 7: Mobile device ownership amongst men and women as percentage of refugee population surveyed
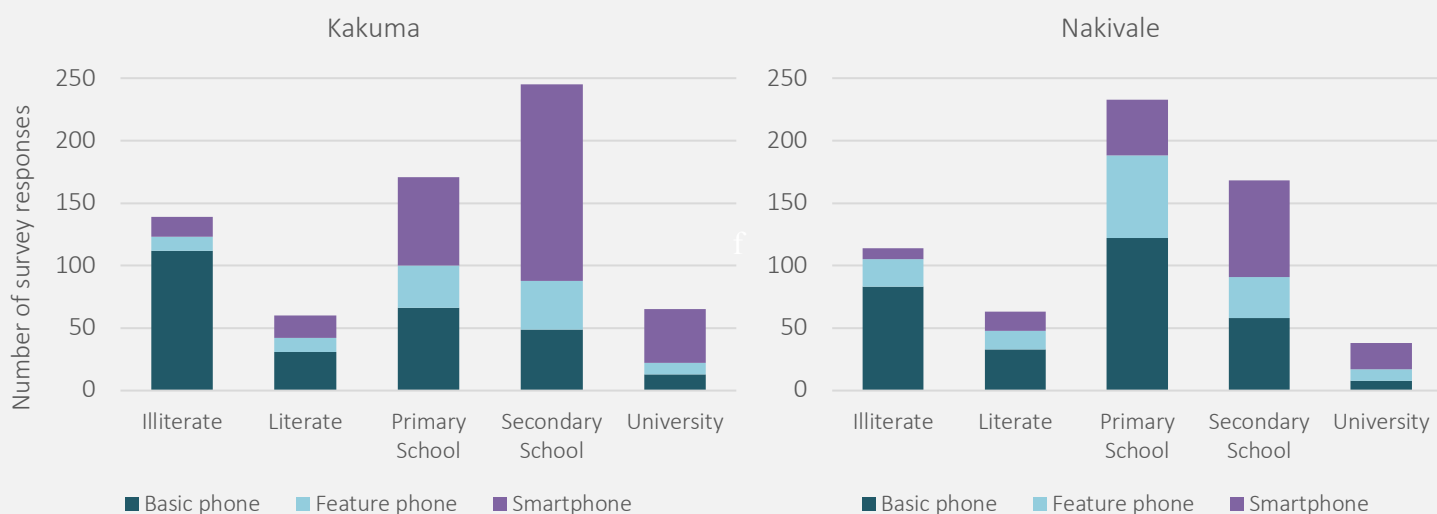
Device ownership by gender within surveyed population in Kakuma

	Basic phone	Feature phone	Smartphone	
Female	49.1%	14.2%	35.5%	98.8%
Male	29.4%	15.7%	53.5%	98.5%

Device ownership by gender within surveyed population in Nakivale

	Basic phone	Feature phone	Smartphone	
Female	48.2%	21.9%	21.6%	91.6%
Male	43.9%	21.8%	29.6%	95.2%

There is almost complete gender parity in mobile device access in Kakuma, with women in Nakivale only around 3% less likely to own, or have access to a mobile device. Gender inequalities however do exist based on access to smartphones. Men in both refugee settings are more likely to own a smartphone; women a basic phone. This difference is particularly marked in Kakuma, with men almost 20% more likely to own a smartphone. These findings support similar reports of a wider 'gender divide' on smartphone access across East Africa[12, 13]. Taking account of such biases will present challenges to implementers wishing to target male and female mobile users equitably.

THE INFLUENCE OF EDUCATION

Several global studies confirm that mobile device ownership, particularly of smartphones, increases with academic achievement. However, it is worth questioning whether or not this is replicated in refugee settlements where access to education and levels of literacy can differ significantly from national averages.

Analysis confirms that, whilst levels of education and literacy do not directly impact ownership of a mobile device, there is a direct relationship between level of education and smartphone ownership (Figure 8). University graduates are the most likely to own a smartphone, followed by those who completed secondary education.

Figure 8: Mobile phone ownership by refugee level of education

Kakuma / Nakivale — Number of survey responses by education level (Illiterate, Literate, Primary School, Secondary School, University) split by Basic phone, Feature phone, Smartphone.

12 PewResesrch (2016), Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economics, pp. 19
13 GSMA (2017), Mobile as a Lifeline: Research from Nyarugusu Refugee Camp, Tanzania

Increasing education levels may therefore have a positive impact on Smartphone ownership and access to services these devices offer. However, both Kakuma and Nakivale face many challenges in improving access to education. UNHCR supports the education of around 73,000 students through 22 primary schools in Kakuma camp[14]. This number plummets when moving to secondary schools, with just 6% of school age children attending only 5 secondary schools available. Only a handful of refugees access tertiary education through University sponsorship programmes. Addressing such high drop-off rates, however, requires coordination between government and non-governmental agencies across all levels.

REFUGEE INCOME AS A FACTOR IN MOBILE PHONE OWNERSHIP

It is generally accepted that those with higher incomes are more likely to own a mobile phone. With the median monthly income for refugees in Kakuma equivalent to $50 USD[15], and the average around $42 USD in Nakivale[16], ascertaining how income levels affect phone ownership may help implementing partners better determine when to deploy mobile-phone based solutions in low-income communities. To test this assumption respondents in this study were asked about their *personal daily income* (Figure 9) and how they acquired their mobile device (Figure 10).

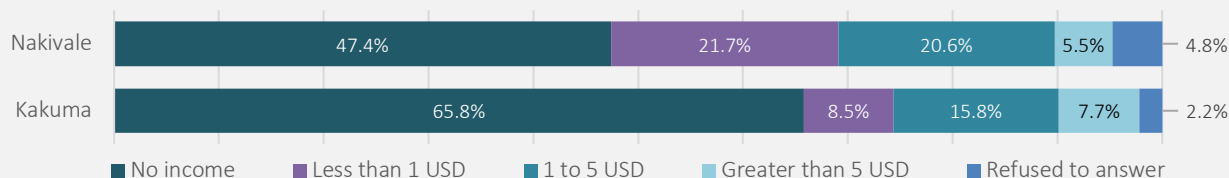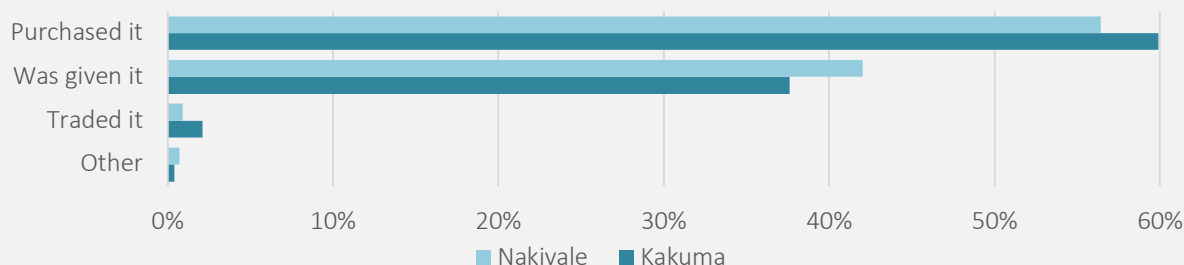Figure 9: Personal daily income in US Dollars and method by which phone was attained

Figure 10: Method by which mobile phone was attained

Although the majority of refugees in both Kakuma and Nakivale purchased their mobile device, a significant number were also gifted, typically from family members. When asked how much respondents paid for their mobile phone, around 33% spent between $5 and $25 USD in Kakuma, with 75% spending in the same range in Nakivale. In contrast, 19% of refugees surveyed in Kakuma spent over $100 USD on their mobile device; compared to only 7% of refugees in Nakivale.

As might be expected, smartphones were the most expensive devices. The majority of smartphones in Kakuma (60%) were purchased for over $80 USD, whereas 60% of smartphones in Nakivale were purchased for between $25 and $60 USD. This demonstrates a marked spending difference between the two locations, despite refugees in Nakivale self-reporting daily incomes roughly comparable to Kakuma. Lower expenditure on smartphones in Nakivale might be attributed to decreased demand for such devices (based on education levels or other factors, discussed below), or the cheaper cost of smartphones in the settlement. More research is needed, however, to determine if such a relationship exists.

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[14] UNHCR (2017) UNHCR Kakuma Education Dashboard, May 2017
[15] UNHCR (2016) Refugees Vulnerability Study Kakuma, Kenya
[16] World Bank (2015) An Assessment of Uganda's Progressive Approach To Refugee Management

Given the high smartphone penetration rate in Kakuma and Nakivale settlements relative to national averages is each country, it is important to understand the average income of smartphone owners as a potential indicator of wider adoption within refugee communities. To do this, the self-reported daily income of respondents owning smartphones were analysed (Figure 11).

Figure 11: Percentage of refugees who purchased their smartphone based on average daily income (USD)
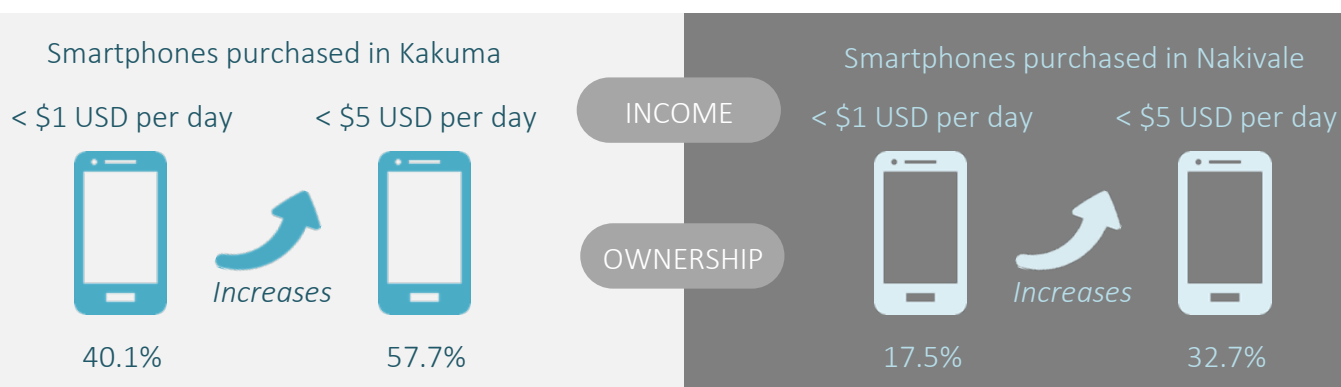
A significant percentage of smartphone owners in Kakuma who purchased their device earn less than $1 USD per day. Whilst those with similar incomes is less than half this figure in Nakivale, the number of refugees who purchased their smartphone almost doubles for those earning between $1 and $5 USD. In comparison, over half of all refugees in Kakuma who purchased their phone earn up to $5 USD a day.

This supports previous findings at the national level in Uganda, Kenya and more broadly across East Africa that show a direct relationship between increased levels of income and smartphone ownership[17]. However, income levels for smartphone ownership in the refugee settings studied are considerably lower than national averages, which currently stand at $520 USD per month in Kenya[18] and $112 USD in Uganda[19].

"I have a smartphone because it helps me in doing my work. I am a security officer and I use it to report cases either via WhatsApp, or by making direct calls, and get instructions from my boss through the WhatsApp group. I also use other apps such as Facebook and Messenger to talk with my friends. My phone is everything to me. I am even planning to go back to school and I will use it to access online books".

EXTRACT FROM FGD: KAKUMA 3, AUGUST 2017

These findings highlight the importance of mobile devices in the lives of refugees and the financial commitments very low-income earners are prepared to make to access internet enabled devices such as smartphones, a topic discussed in Chapter 2.

Owning a smartphone is only part of the challenge to access applications and services provided over the internet. In the following section, we explore the barrier refugees face in accessing the internet.

BARRIERS TO ACCESSING THE INTERNET OVER MOBILE

The internet is the gateway to the myriad online applications and services used by millions; from social media sites such as Facebook and Instagram, to instant messaging services including Skype, WhatsApp and Telegram. Furthermore, search engines from google, amongst others, are sources of information that have revolutionised the way in which information is shared.

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[17] Pew Research Centre (2016), Smartphone ownership and Internet usage continues to climb in emerging economies.
[18] Kenya National Bureau of Statistics (2017), Economic Survey 2017, p. 74. (Figure based on formal public and private sector earnings)
[19] UNHS (2017), Uganda National Household Survey 2016/2017, p. 106

Many refugees across the world make use of these online apps and services to support their forced migration, and help with settlement/integration once they reach host countries. For many refugees, mobile phones are the primary channel used to communicate with friends and family left behind. Remittances sent over mobile phone using services such as M-Pesa in Kenya and Airtel Money in Uganda can act as an economic lifeline when livelihood options are difficult, or impossible to find.

To access the internet, most refugees have two options: use a smartphone (or to a lesser extent a feature phone), or log on to a computer at a local cyber café. For those using Smartphones, multiple barriers to accessing the internet remain. To better understand the key challenges faced by refugees, this study asked respondents to identify the top three barriers they face in accessing the internet (Figure 12). These are discussed below.

Figure 12: Barriers to accessing the internet reported by refugee respondents in Kakuma and Nakivale
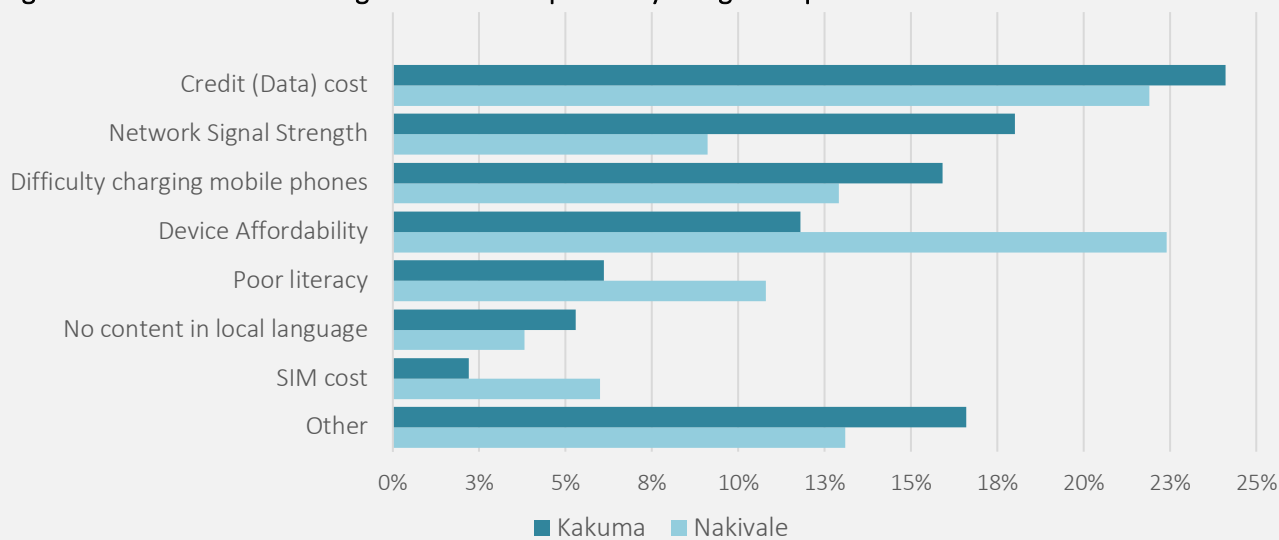
THE COST OF MOBILE DATA AS A BARRIER TO ACCESS

The affordability of mobile data credit was cited as one of the biggest barriers to accessing the internet in both Kakuma and Nakivale. Mobile phone airtime is not subsidised for refugees in Kenya or Uganda, despite refugees earning lower than the nation average.


VOICES FROM KAKUMA: THE COST OF DATA

Kai fled from South Sudan as a child and is now a primary school teacher in Kakuma Zone 1. He pre-pays his phone with mobile data using scratch cards purchased from kiosks located throughout the camp.

"*I use my smartphone a lot to talk with family and friends through Facebook Messenger and WhatsApp, especially my father who is still in South Sudan. I spend around 200 Shillings a day buying mobile data, which is around half of my daily income. It's not cheap, but it's a life-line to the world outside*".

"*Per minute, mobile data is cheaper than going to a cyber café and I can use the data when I want. It gives me more freedom*".

Understanding how much refugees are able to pay to access the internet – their spending limit – will help humanitarian and development practitioners design mobile-based services that take into account data usage that works within beneficiary budgets. To ascertain levels of expenditure, refugees were asked how much they typically spend accessing the internet each week (Figure 13).

Figure 13: Average weekly expenditure on accessing the internet in US Dollars
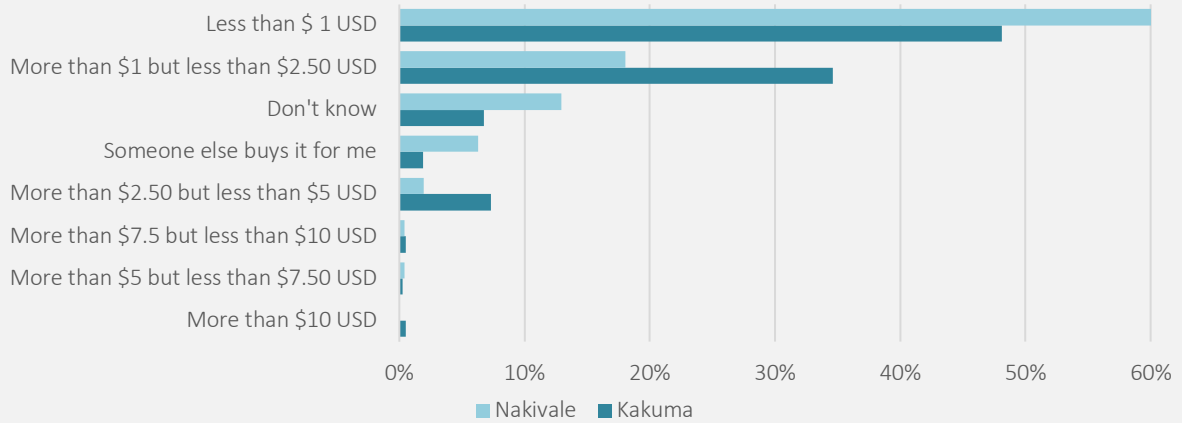
Although spend on mobile internet access was reported to be over $10 USD per week in some cases, the majority of refugees in Nakivale and Kakuma spend up to $2.50 USD per week (78% and 82% respectively). This represents a significant drain on personal resources, with almost three quarters of refugees surveyed reporting no personal income, or earnings of less than $1 USD per day. A typically pre-paid data bundle from mobile network operator, Safaricom, in Kenya costs $1 USD for 200Mb of data. This allows for many thousands of text-based messages over WhatsApp of Facebook Messenger, but data is quickly used when photographs are downloaded, or videos posted by friends and family are viewed.

MOBILE NETWORKS AS A BARRIER TO ACCESS

As a sign of an increasingly connected world, mobile network coverage for refugees closely follows the global average[20]. Recent studies by UNHCR show that the large majority of refugees in Kenya and Uganda live in areas with mobile network coverage. In Kenya, over 72% of refugees have access to 3G connectivity (22% in Uganda), with much of the rest in both countries covered by 2G[21]. Whilst this is good news for refugees with access to mobile phones, services delivered over 2G do not provide internet access. 2G is therefore more restricted than 3G in the access to services it offers.

Connectivity increases for refugees living in urbans centres; on average, 90% of urban refugees are covered by 3G networks, giving them the same opportunity as locals to access mobile-based internet services.

Both Nakivale refugee settlement and Kakuma camp are located in isolated regions with limited state-built infrastructure. To better understand if this isolation impacts access to the internet, refugees were asked if they had access to the internet and, if so, whether this access was over 3G/4G or WIFI (Figure 14).
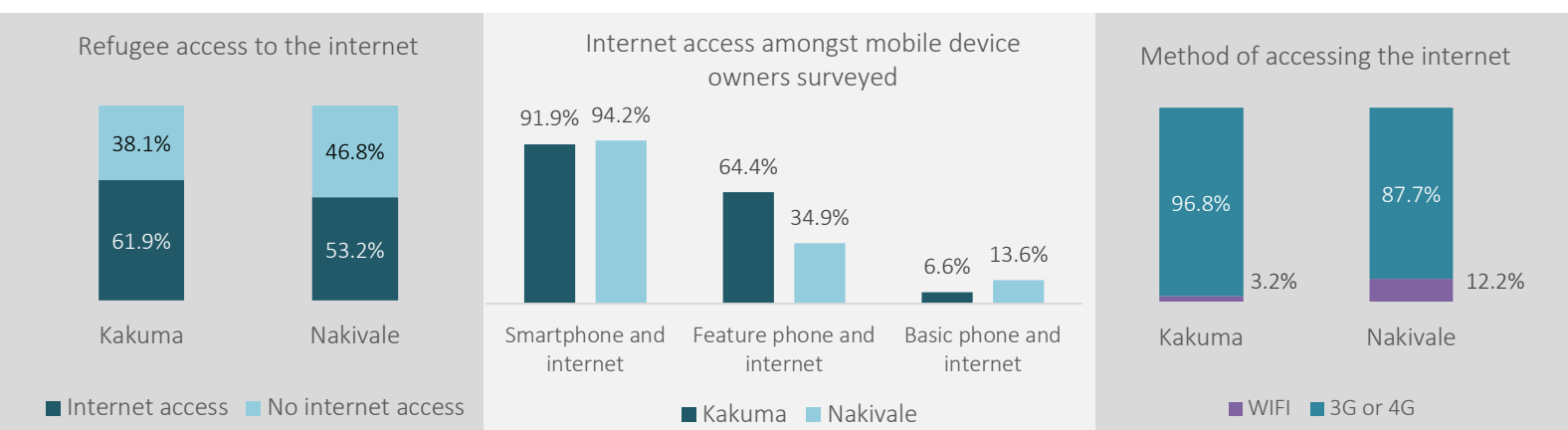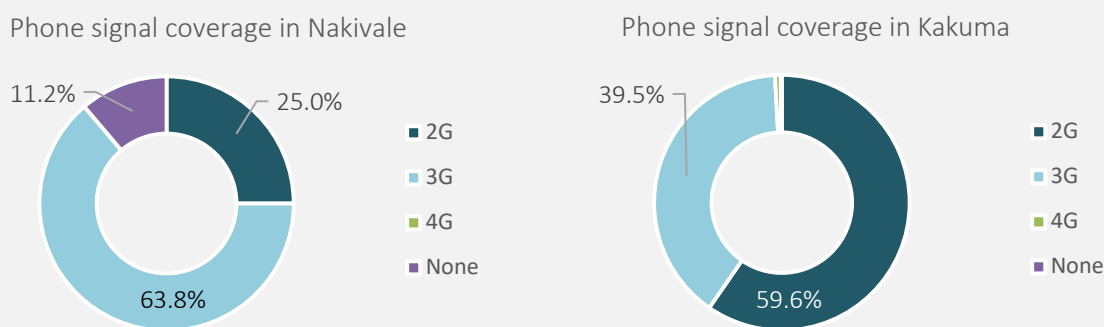
[20] UNHCR (2016) Connecting Refugees: How Internet and Mobile Connectivity Can Improve Refugee Well-Being and Transform Humanitarian Action.
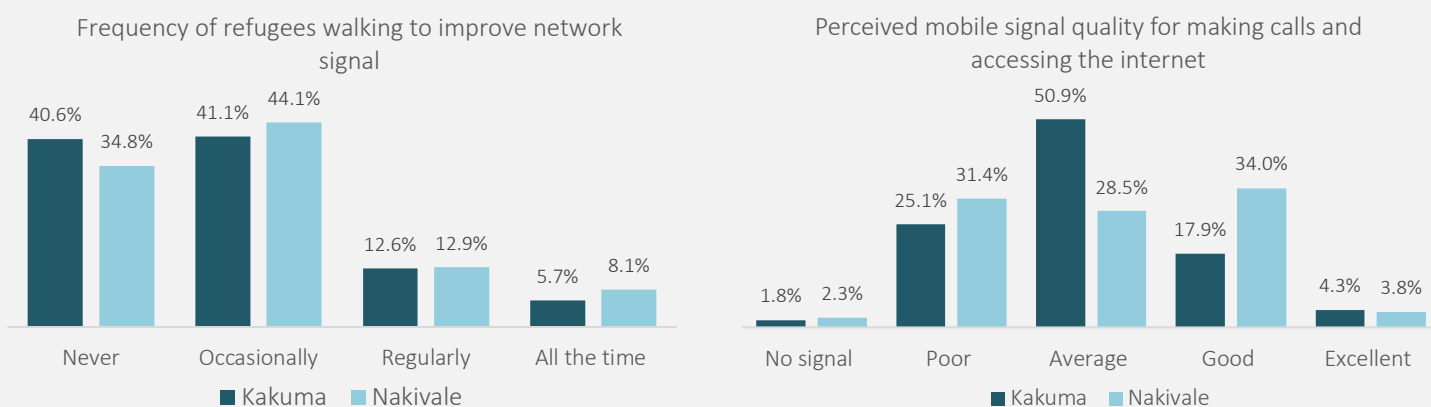[21] Ibid

Although internet access is above 50% in both locations, significant numbers of refugees in Kakuma and Nakivale do not access the internet. With almost no WIFI in Kakuma and limited WIFI access in Nakivale, the vast majority of those accessing the internet do so using their mobile device. Access to 3G or 4G data services is therefore a prerequisite to getting online. As part of this study's quantitative survey, enumerators used the Android app, *Signal Strength*, to record the type of mobile phone signal and the corresponding signal strength at each interview location (Figure 15).

Figure 15: Mobile phone signal coverage in Nakivale and Kakuma refugee settlements

Phone signal coverage in Nakivale

- 11.2%
- 25.0%
- 63.8%

Legend: 2G, 3G, 4G, None

Phone signal coverage in Kakuma

- 39.5%
- 59.6%

Legend: 2G, 3G, 4G, None

Signal coverage varies greatly between Kakuma and Nakivale, reflecting the very different geographic, urban and telecoms infrastructures of the two locations. Kakuma camp is geographically dense and has cell phone towers located in two of its four zones. However, although Kakuma has almost complete mobile phone signal coverage, only 40% is sufficient to provide internet access via 3G. Conversely, whilst 3G connectivity dominates Nakivale, around 11% of the settlement has no cell phone coverage at all. It should be noted that, in Nakivale, cell phone connectivity centres around Base Camp, as this is where the settlements main cell tower is located. Signal strength and connectivity decreases as distance from Base Camp grows.

This often means that refugees must walk to find the right type of signal, or a stronger one. To understand the impact that mobile connectivity has on refugees' ability to access the internet, respondents were asked to rate the quality of signal in their community and how often the needed to walk around to get a sufficiently good signal (Figure 16).

Frequency of refugees walking to improve network signal

	Kakuma	Nakivale
Never	40.6%	34.8%
Occasionally	41.1%	44.1%
Regularly	12.6%	12.9%
All the time	5.7%	8.1%

Perceived mobile signal quality for making calls and accessing the internet

	Kakuma	Nakivale
No signal	1.8%	2.3%
Poor	25.1%	31.4%
Average	50.9%	28.5%
Good	17.9%	34.0%
Excellent	4.3%	3.8%

Despite their structural differences, results in Nakivale and Kakuma are similar. Over three quarters of refugees interviewed judged their phone signal to be either *average* or *poor*, with just under 20% either regularly, or constantly having to walk from their homes to get an adequate signal.
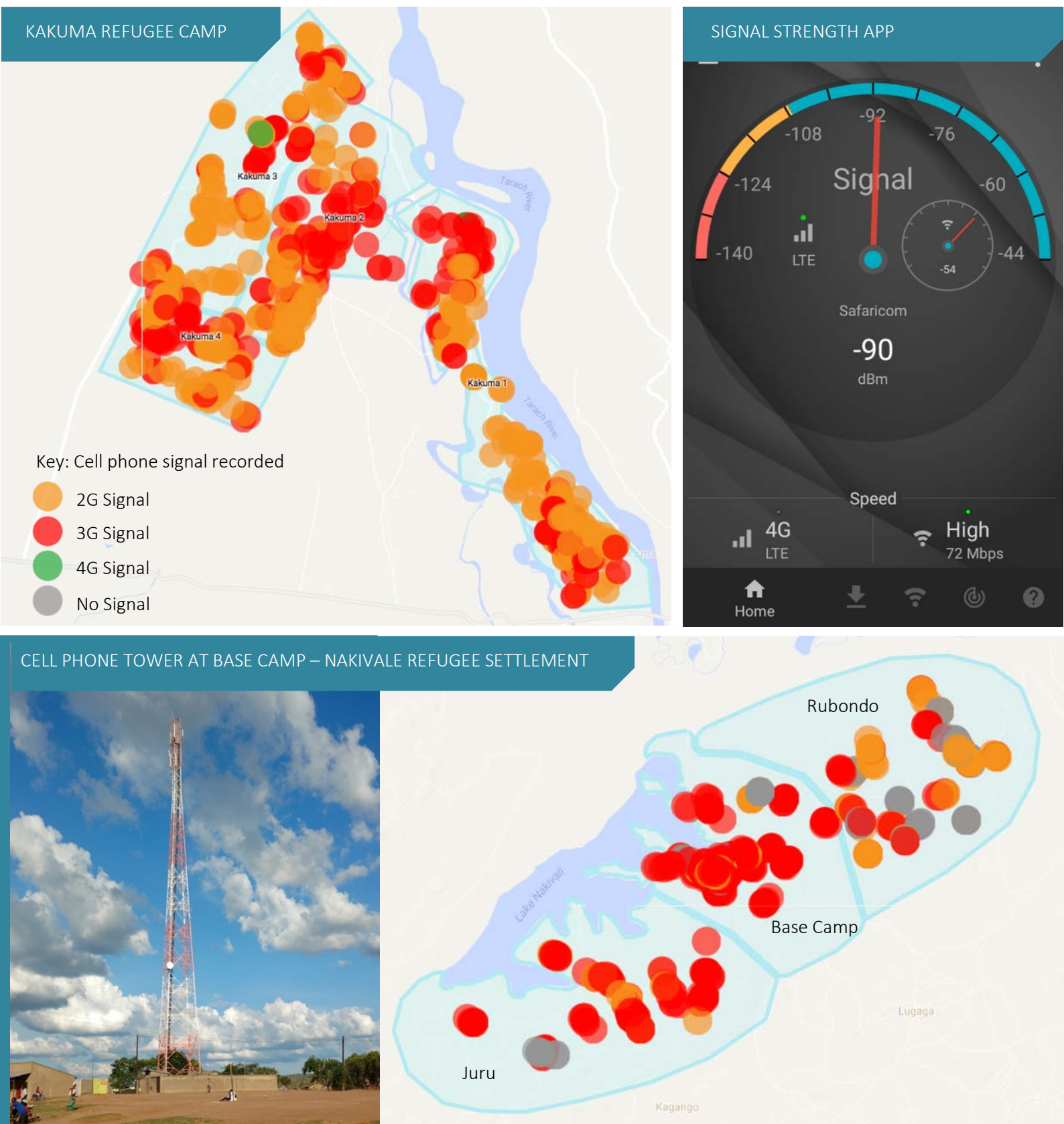
"I have a smartphone but I cannot use it as much as I want because of poor network. I have four lines, Africel, MTN, Airtel and Rwandese Tigo, but they all don't have good network here. Sometimes I have to walk out of the house to an open field, which is far and dangerous at night".

EXTRACT FROM FGD: NAKIVALE, BASE CAMP ZONE, AUGUST 2017

This comment from Aniso, a Somali refugee from Nakivale in her late twenties, is typical from the refugees interviewed during focus group discussions and underlines the disconnect between smartphone access and cell phone coverage. Both are needed to maximise the benefits of delivering services to refugees through mobile.

To better illustrate this point, the figures below provide heat maps of cell phone signal type as recorded using the *Signal Strength* app in Kakuma and Nakivale (Figure 17).

Figure 17: Cell phone connectivity recorded in Nakivale and Kakuma refugee settlements

KAKUMA REFUGEE CAMP

Key: Cell phone signal recorded

- 2G Signal
- 3G Signal
- 4G Signal
- No Signal

SIGNAL STRENGTH APP

CELL PHONE TOWER AT BASE CAMP – NAKIVALE REFUGEE SETTLEMENT

As can be seen from the heat map In Kakuma, 2G connectivity dominates the camp, interspersed with clusters of 3G connectivity. Mobile operators Safaricom and Airtel are the main provides of cell phone connectivity, with kiosks offering airtime top-up and other services readily available throughout the camp.
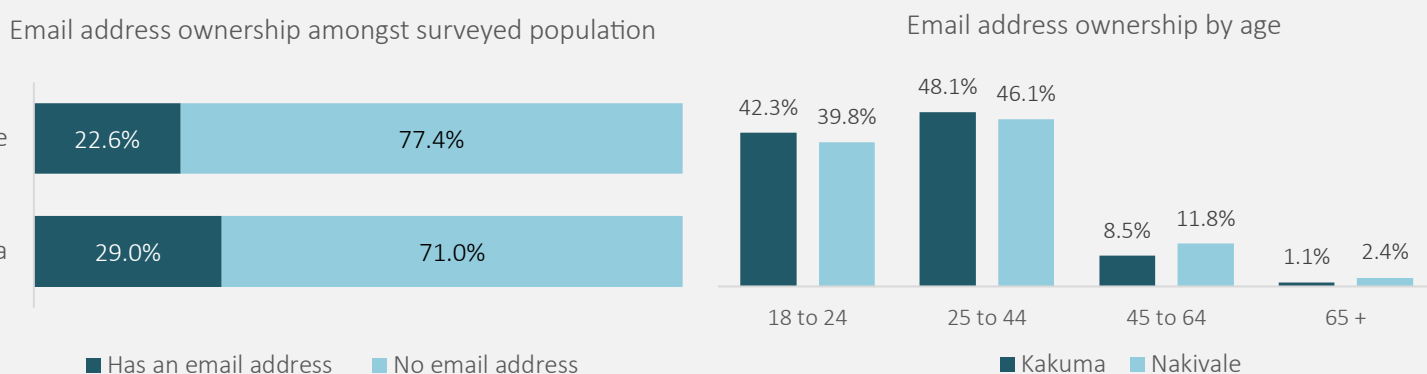
In Nakivale, MTN and Africell (formally Orange) are the dominant mobile operators. Although not indicated on the map, due to the location of the main cell phone tower in Base Camp, signal strength generally decreases as the distance from Base Camp grows. This accounts for many of the no signal recordings taken in Juru and Rubondo. As a result refugees interviewed in Juru and Rubondo, regularly cited having to travel to Base Camp to get a stable mobile connection in order to communicate with friends and family and to download files from the internet.

EMAIL AS A BARRIER TO ACCESS

Many online applications and services, such as Facebook and Skype, require an email address to create an account and login. Apps stores such as Google Play also insist on a verified email address before access is granted. Ownership of an email address can therefore be a significant barrier for many refugees needing to access online services that provide a social and financial network that reaches far outside the refugee settlement.

Those wishing to develop services that rely on existing platforms such as Facebook, or those developing customised smartphone-based applications, must therefore be cognisant of email access in their target locations. Refugees in Kakuma and Nakivale were asked if they owned an email address (Figure 18).

Figure 18: Email address ownership amongst refugee respondents

Email address ownership amongst surveyed population

Nakivale	22.6%	77.4%
Kakuma	29.0%	71.0%

■ Has an email address   ■ No email address

Email address ownership by age

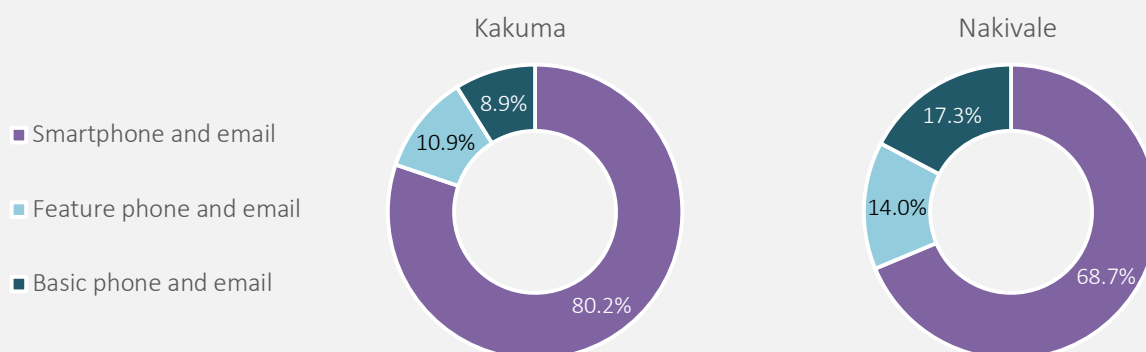|	18 to 24	25 to 44	45 to 64	65 +
Kakuma	42.3%	48.1%	8.5%	1.1%
Nakivale	39.8%	46.1%	11.8%	2.4%

■ Kakuma   ■ Nakivale

Similar trends in access can be seen across Kakuma and Nakivale, with less than 30% of refugees interviewed reporting owning an email address. Of those with email, 85% and 90% of respondents in Nakivale and Kakuma respectively are under the age of 45, with 25 to 44 year olds the most likely to have an email address in both locations.

During focus group discussions, many older refugees (those over 45 years of age) had little awareness or knowledge of email. Amongst younger refugees, awareness of email was almost universal, even though access was not always possible.

Many younger refugees said that they used the email address of other family members to access online services or download apps. However, most younger people cited not owning a smartphone as the primary reason for not owning an email address.

To verify these observations, refugees who reported owning an email address were cross-referenced with the type of mobile device they had access to (Figure 19).

Figure 19: Email ownership by mobile device type

Kakuma

- ■ Smartphone and email
- ■ Feature phone and email
- ■ Basic phone and email

Kakuma: 8.9%, 10.9%, 80.2%

Nakivale: 17.3%, 14.0%, 68.7%

There is a clear positive correlation between smartphone access and email ownership. In Kakuma, 80% of those owning an email address also own a smartphone. This represents 52% of all smartphone users surveyed. In Nakivale, 60% of smartphones owners have email, which totals almost 69% of those with access to an email address. Owners of basic phones in Nakivale access the internet and email using WIFI though local internet cafés and a Community Technology Access Centre located in Base Camp.

VOICES FROM NAKIVALE: THE VALUE OF SHARING

FILE SHARE APP

Limited access to 3G, poor signal quality, high connectivity costs (mobile airtime) and lack of an email address all create barriers to using mobile applications and services of social and economic benefit to refugees in Kakuma and Nakivale.

One innovative solution cited by refugees in Nakivale uses direct file transfer between smartphones through apps such as *Flash Share*. Flash Share is an application that uses Bluetooth to directly transfer photos, apps and other files between two devices. The app is free to download and once installed has several benefits:

1. Users without email addresses can download apps from friends without needing to access app stores
2. Airtime costs are zero as bluetooth does not use 3G/4G.
3. Apps, photos and other files can be shared even in areas with poor mobile connectivity, or no 3G access.

Apps such as *Flash Share* create a social network of sharing based on localised peer-to-peer connections. Apps that are deemed interesting or useful spread across these networks virally. Word of mouth plays an important role in endorsing apps and promoting their use. Humanitarian of development practitioners looking to distribute smartphone-based applications should consider such networks as key outreach and distribution channels, especially in areas with poor mobile connectivity.

Apps such as *Flash Share* can also be powerful tools to share information on events inside the settlement and further afield. Eric is a Burundian refugee now living in Juru Zone in Nakivale:

"It's very difficult to get a good mobile connection in our village, but a neighbour of mine works as a labourer in Base Camp, where he often downloads news clips and YouTube videos. It's one of the main ways I keep myself updated on what's happening back home and here in Uganda. We've had a bad drought this year, which has caused tensions throughout our community. My neighbour showed us a news clip reporting on protests in Base Camp over the poor food distribution we're receiving during these hard times. It's good to know that people outside of Nakivale can see we're going through hardship".
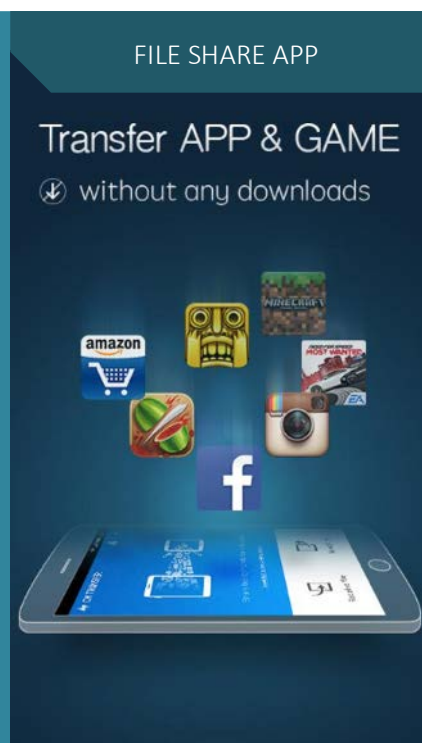
Although Kakuma and Nakivale have geographic, urban and infrastructural differences, there are many similarities in the way refugees access mobile technology and the internet, and the challenges faced in attaining such access. The following conclusions can be drawn across both refugee settlements.

Access to mobile devices is nearly universal in Kakuma and Nakivale

Mobile device access amongst refugees interviewed is high, standing at 99% in Kakuma camp and 93% in Nakivale refugee settlement. Only a small percentage of refugees have no access at all to a mobile handset. Device ownership stands at 96% and 81% in Kakuma and Nakivale respectively.

Although owners of basic phones are dominant in Nakivale, smartphone owners still represent a significant user base (26%). In contrast, smartphone ownership in Kakuma, is almost double that of basic phone users, standing at 44%. Furthermore, levels of smartphone ownership in both Kakuma and Nakivale are markedly higher than national averages, offering a wide platform of potential users for smartphone-based services.

Younger refugees are more likely to use smartphones than older refugees

The average age of smartphone ownership is 28 in Kakuma and 30 in Nakivale. This compares to an average age of 39 for refugees owning a basic phone and correlates with similar findings of global smartphone ownership from PewResearch[22]. There is also relative equality – across both refugee settlement locations – in the average age that men and women have access to mobile devices.

Refugees with a higher levels or education are more likely to own a smartphone than those with lower levels of education

Whilst levels of education and literacy do not directly impact ownership of a mobile device, there is a direct relationship between level of education and smartphone ownership, with university graduates the most likely to own a smartphone, followed by those who completed secondary education.

Increasing education levels may have a positive impact on Smartphone ownership and access to services these devices offer. However, both Kakuma and Nakivale face many challenges in improving access to education, with only a handful of refugees able to access tertiary education through University sponsorship programmes.

Refugee income does not have a direct influence on smartphone ownership

The majority of smartphones in Kakuma (60%) were purchased for over $80 USD, whereas 60% of smartphones in Nakivale were purchased for between $25 and $60 USD. A significant percentage of smartphone owners in Kakuma who purchased their device (41%) earn less than $1 USD per day. In Nakivale, the number of refugees who purchased their smartphone almost doubles (to 32%) for those earning more between $1 and $5 USD. These findings highlight the importance of mobile devices in the lives of refugees and the financial commitments very low-income earners are prepared to make to access internet enabled devices such as smartphones

The majority of refugees access the internet using 3G-connected smartphones.

Although the majority of refugees surveyed have internet access, many still do not. With almost no WIFI in Kakuma and limited WIFI access in Nakivale, the vast majority of those accessing the internet do so using their mobile device. Access to 3G or 4G data services is therefore a prerequisite to getting online. As a result, smartphone users are over 80% more likely to access the internet than owners of basic phones.

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[22] Pew Research Centre (2016), Smartphone ownership and Internet usage continues to climb in emerging economies.

THE LONG ROAD TO NAKIVALE

Home to more than 120,000 refugees, Nakivale settlement receives new arrivals from neighboring countries such as Democratic Republic of Congo, Burundi, Rwanda, and South Sudan on a monthly basis. Between November 2014 and January 2016, Nakivale received 14,170 new arrivals, the majority, Burundians (UNHCR 2016). The continuing inflow is slowly reaching the settlements maximum capacity.

Little is known about how mobile technology and the internet can support the short and longer-term needs of refugees in Kakuma and Nakivale. Private, state, and non-governmental actors looking to leverage mobile technology for humanitarian support and longer-term development must first identify such needs and understand if mobile is the right delivery mechanism. To ensure mobile-based apps or services developed for refugees are ultimately adopted by target communities, implementers must understand how refugees currently use their mobile devices and if demographics such as age, gender and education affect how mobile technology is used.

This chapter explores theses key themes by providing insights into:

- Refugee needs, both in transit to host countries and once settled;
- Common uses of mobile technology in refugee settlements, and;
- The impact of age and education on the use of mobile phone-based applications and services

REFUGEES IMMEDIATE NEEDS

Refugees comprise some of the world's most vulnerable populations with basic, social and economic needs that are often influenced by the challenges faced traveling to a host country and the environmental conditions encountered once arrived. To better understand the immediate needs of refugees in Nakivale and Kakuma, respondents in the study were asked to highlight three priority needs they currently faced. The top 10 responses are summarised in Figure 19.

Figure 20: Immediate support needs identified by refugees in Kakuma and Nakivale
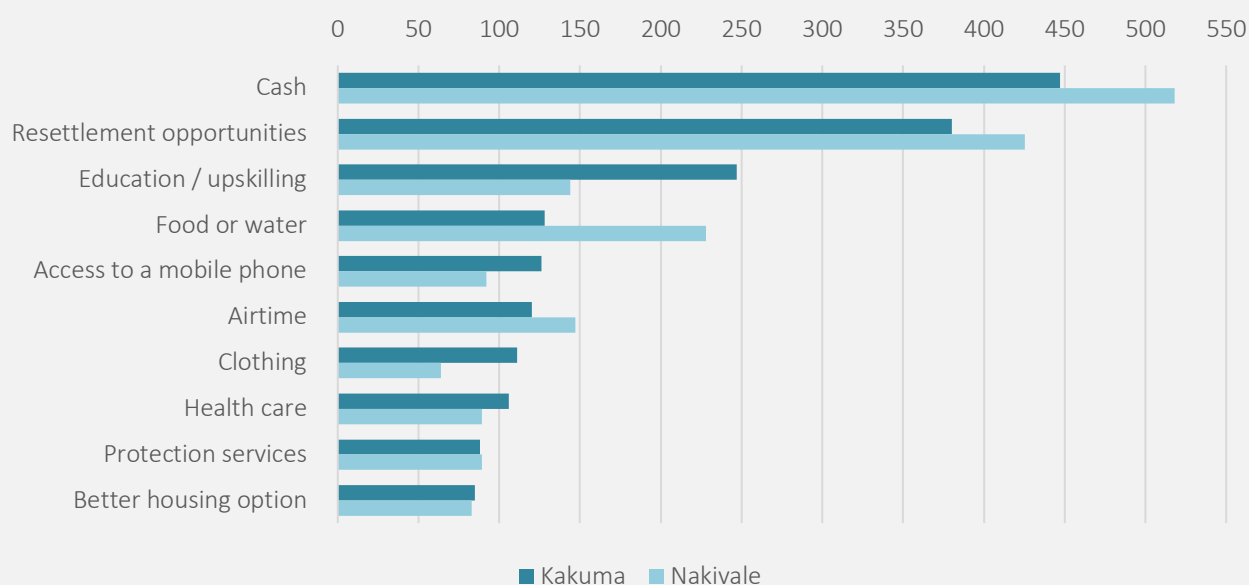
Cash and resettlement opportunities were cited as the most pressing needs of refugees in both Kakuma and Nakivale across all age groups surveyed. Mobile money services are a common way for refugees to exchange cash and buy goods and services. Mobile money platforms such as M-Pesa in Kenya and Airtel Money in Uganda allow users to send electronic cash using text message, which can be redeemed for physical cash at mobile money kiosks located throughout the refugee camp or settlement. Such services are commonplace in East Africa, with the overwhelming majority of Kenyans using M-Pesa.

Education and language learning were cited as the third most pressing need of refugees in Kakuma. Food and water were cited as a tertiary priority in Nakivale, largely due to a drought in the region earlier in 2017.

Reliable access to food and water is a constant challenge for refugees, particularly those living in camps, with many households relying on food distribution from international aid agencies. Through a schemed provided by the World Food Programme, refugees in Kakuma are able to buy items, such as milk and vegetables, that are not provided at the camps distribution centres. Called Bamba Chakula (as Swahili phrase meaning *get food*), the programme uses a mobile-phone-based cash voucher scheme to purchase items from participating stores. This provides significantly more freedom for refugee households to decide what they want to eat and does not require physical cash distribution by World Food Program as all transactions are conducted using a mobile phone. Bamba Chakula is not present in Nakivale, however.

Despite often difficult living conditions, education remains a priority for many refugees looking to learn new skills that can improve livelihood opportunities. Through focus group discussions many younger refugees cited their desire to learn English as one of their greatest short-term needs. English is considered a universal language in both Kakuma and Nakivale, and a means through which different nationalities and cultures can better find work and integrate with one another.

Access to a mobile phone and airtime were perceived as a more important need than healthcare and better housing options in both settings. In fact, access to affordable airtime was considered a higher priority in Nakivale than education or upskilling.

Caleb, a young Rwandan refugee who has settled with his mother and younger sister in Nakivale's Rubondo zone, describes the dilemma between airtime and education:

"I want to learn more about computers. My school doesn't cover this, so I'm learning more thorough videos on the internet. Education is important to me, but I needed airtime first. Not just to learn, but to keep in touch with my family in Rwanda as well".

EXTRACT FROM FGD: NAKIVALE, RUBONDO ZONE, AUGUST 2017

Figure 21 highlights responses from refugees asked which types of services they would like to see delivered over their mobile phone. There is a direct match between the top two needs prioritised by refugees (financial support and education) and the services they wish to see delivered over a mobile device (62% and 55% of all refugee responses in Kakuma and Nakivale respectively).

Figure 21: Services refugees would like to see delivered over mobile phone in Kakuma and Nakivale
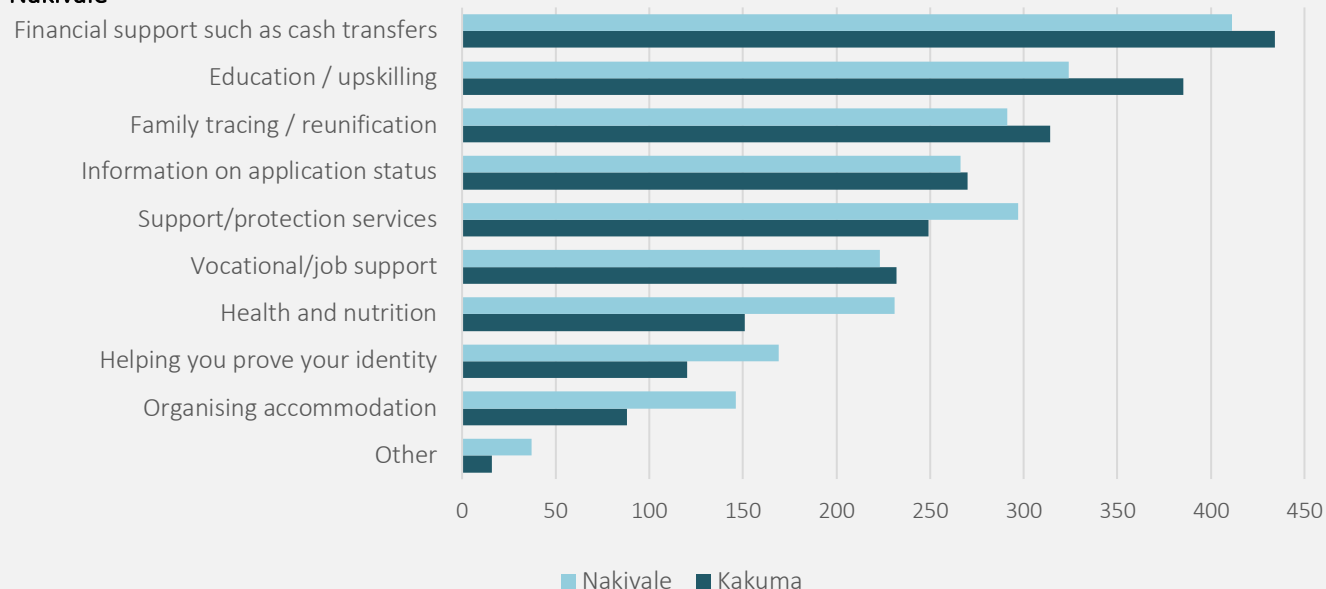
REFUGEE USE OF MOBILE TECHNOLOGY ON THE MOVE

Refugees fleeing conflict or persecution in East Africa can travel great distances to find safer havens in neighbouring countries or beyond. Despite the high levels of mobile phone ownership reported by respondents in this study, very little is known about the role mobile technology and the internet can play in supporting refuges traveling from their home countries to settlements such as Nakivale and Kakuma.

Mobile phone ownership in East Africa continues to grow rapidly, with mobile subscription rates increasing from 36% of the East Africa Community population in 2010, to 74% in 2017, reflecting improved mobile infrastructure and widespread adoption[23]. However, low mobile phone penetration and poor signal coverage over the past decade may have had an important impact on how refugees have been able to use mobile phone technology. This study asked refugees if they had used a mobile device to support the journey from their home country. Responses were cross-referenced with the length of time respondents had spent living in each settlement to establish if earlier dates of migration impacted mobile phone use en route (Figure 22).

Figure 22: Time spent in settlement/camp vs use of mobile device during transit
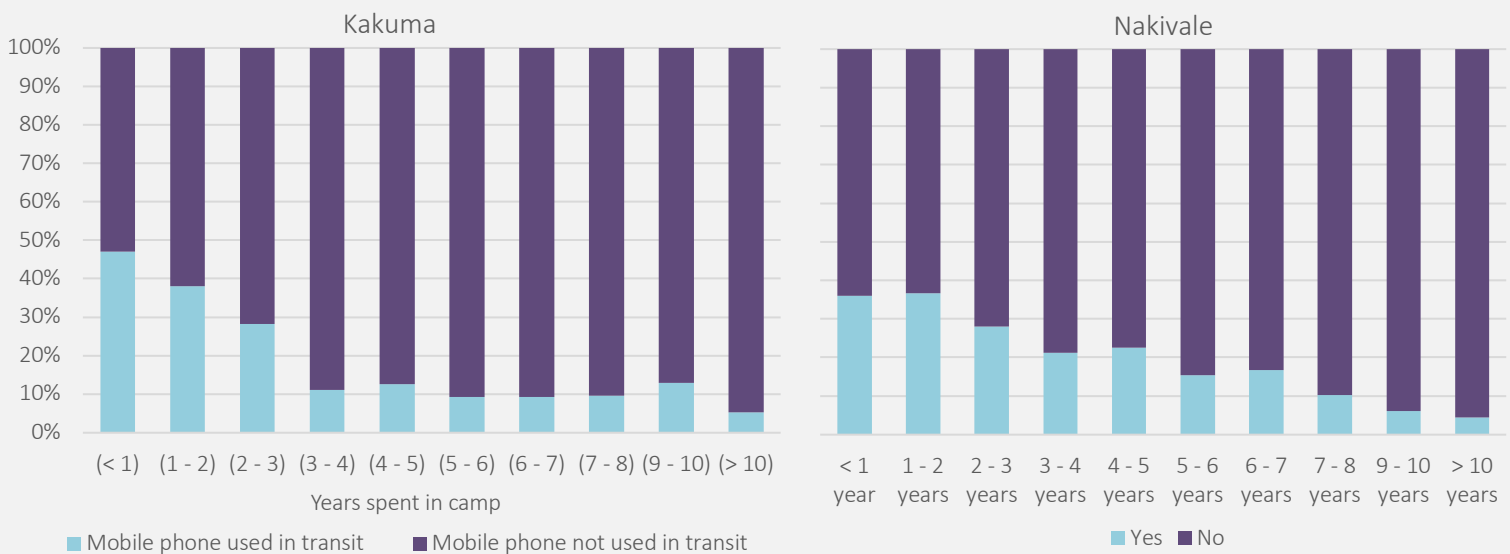
The number of refugees using mobile phones to support their journey appears to decrease with the time respondents have spent in either Kakuma camp or Nakivale settlement. This is especially true for refugees that travelled to these locations before 2014. Although the sample size for refugees spending less than three years in the settlement is relatively small (186 respondents) the findings indicate that refugees access to mobile phone technology was much more restricted in the recent past.

For those using mobile phones to support their journey, the majority in both Kakuma and Nakivale do so to communicate with friends and family and to gather information about their journey and the route ahead. Two thirds of refugees travelling to Nakivale also reported using their mobile phones to support navigation to the settlement. Sharif, a Somali refugee now living in Kakuma, explained how he used his mobile phone to support his journey.

"My family travelled from Somalia to Dadaab in Kenya in 2000 when I was 10. We didn't have a mobile phone back then and my father relied on directions from locals at the villages we stopped at on the way. In 2015, I made my own way to Kakuma. My phone can just make calls and texts, but I was able to call contacts in Kakuma who helped with directions and made preparations for me before I arrived in the camp. My family also sent me money on M-Pesa which helped me buy the things I needed as I travelled".

EXTRACT FROM FGD: KAKUMA 1, AUGUST 2017

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[23] GSMA (2015) The Mobile Economy; Sub-Saharan Africa 2015
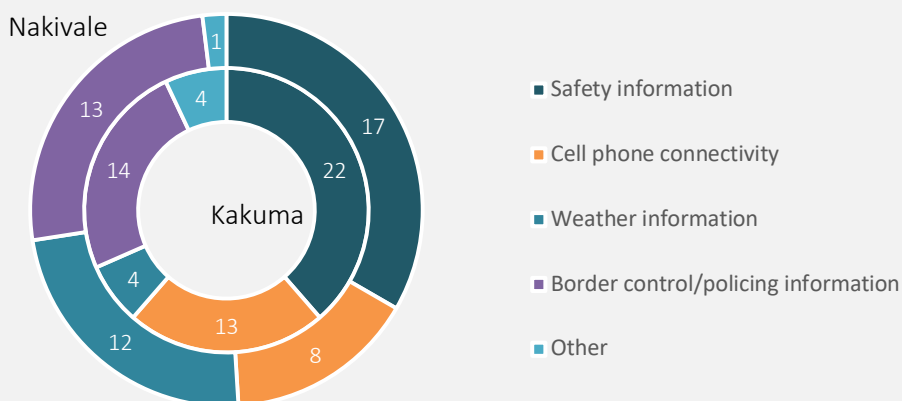
Of the refugees who confirmed using their mobile device to support travel to their host country, only 17% of refugees in Nakivale and 34% of those in Kakuma stated that their mobile phone affected how they proceeded in their journey (Figure 23).

Figure 23: Self-reported use of mobile technology by refugees on the move
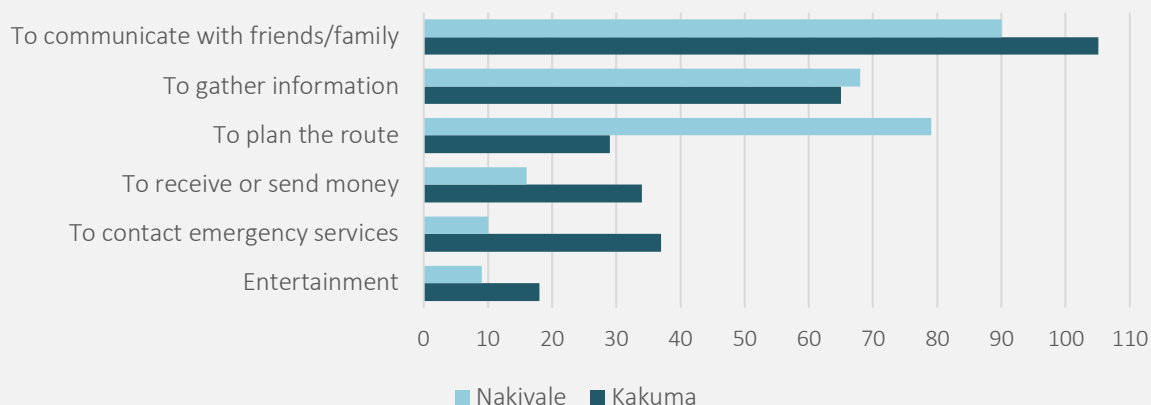
When asked how using their mobile phone affected their journey to Kakuma or Nakivale, over as third of respondents reported changing their planned migration route based on safety information they had received on the road ahead (Figure 24). Better regional mobile connectivity may therefore have a significant impact on improving the safety of refugees fleeing conflict or persecution.

Figure 24: Information obtained using mobile phone by refugees in transit

Refugees (122 in Kakuma and 118 in Nakivale) who confirmed using a mobile phone to support their journey where also asked for how much of their journey they had cell phone connectivity to make calls, text, or access the internet (Figure 25).

Figure 25: Approximate level of mobile phone connectivity experienced by refugess in transit
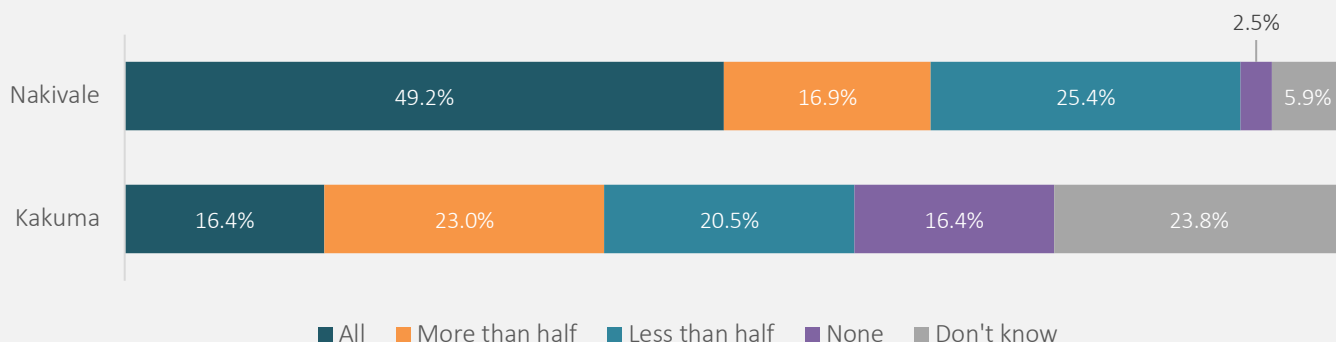
Almost 50% of refugees surveyed in Nakivale stated they were able to make and receive calls throughout their journey. Less than 17% of respondents in Kakuma reported the same experience. The map in Figure 26 provides an overview of mobile phone signal coverage (minimum 2G) and major migration routes to refugee settlements and urban capitals in Uganda and Kenya. The map provides insights on the potential reason for such strong differences in mobile connectivity experienced by refugees traveling across the region.

Figure 26: Mobile phone signal coverage and major migration routes in Kenya, Uganda and the surrounding region
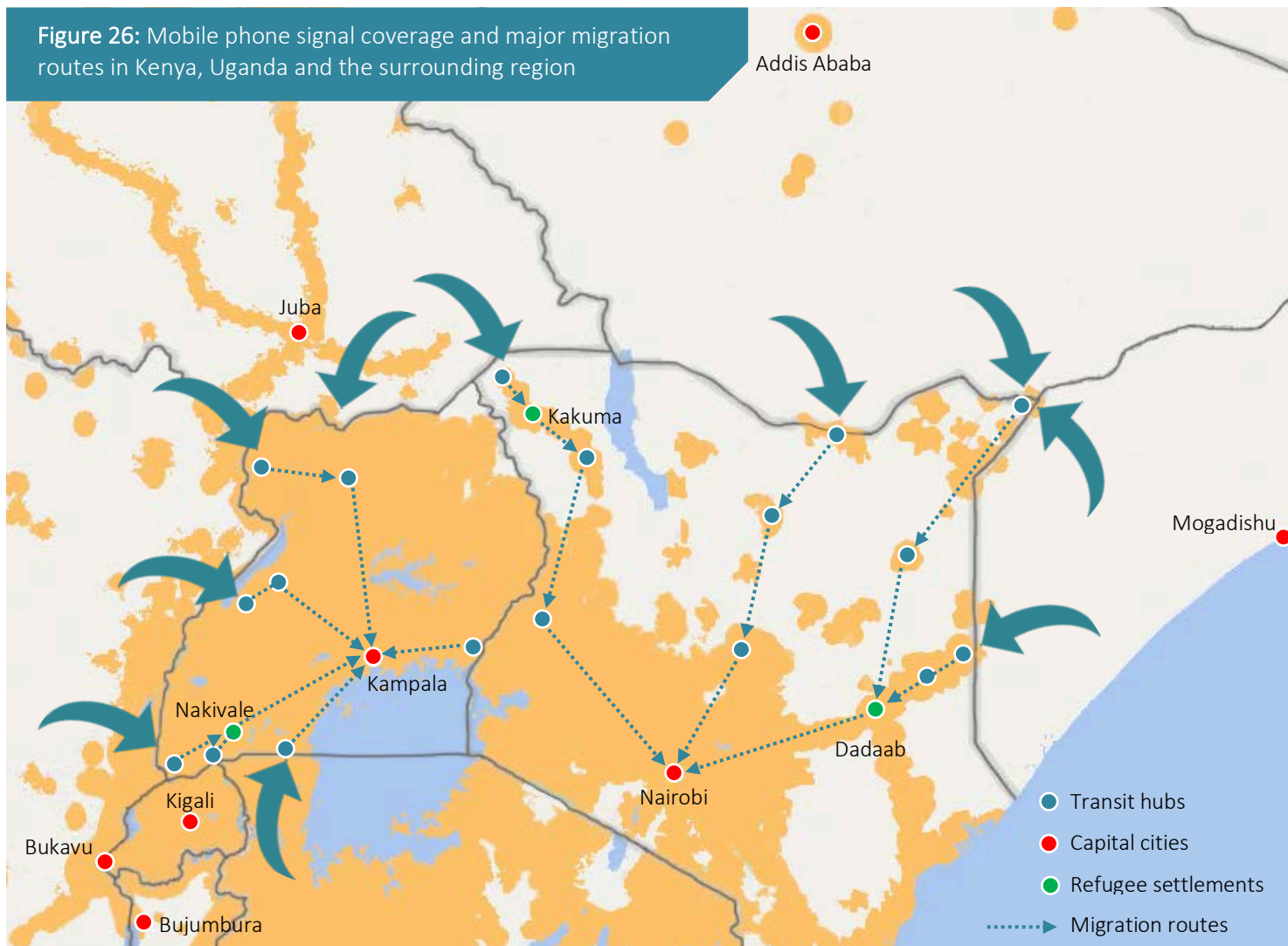
Mobile connectivity north and east of Kakuma is extremely limited. Refugees traveling from South Sudan, Ethiopia, and Somalia therefore face challenges in obtaining a mobile phone signal. This makes receiving or sending texts or calls a challenge and access to the internet will be difficult. Where connectivity does exist in these areas, it follows major roads, transit points and urban hubs across the region. Such areas constitute *islands of connectivity* where migrants can access much-needed mobile-based services to support their journey.

In contrast, refugees/migrants entering Uganda from Burundi, Rwanda, DR Congo and Tanzania, have relatively good signal coverage as they make their way into the country. This higher degree of connectedness is reflected in low number of respondents (less than 3%) who reported no network signal throughout their journey to Nakivale.

REFUGEE USE OF MOBILE TECHNOLOGY IN CAMPS AND SETTLEMENTS

Once refugees and their families are granted asylum in a host country, they must begin to re-build their lives. Given the high levels of mobile phone ownership and diversity of phone use amongst refugees in Nakivale and Kakuma, mobile phone and internet technology has the potential to support the social, economic and physiological process of adjustment and integration.

To better understand the role mobile technology currently plays in this process, refugees where asked what they most commonly accessed the internet for (Figure 27).

Figure 27: Refugee self-reported use of the mobile internet
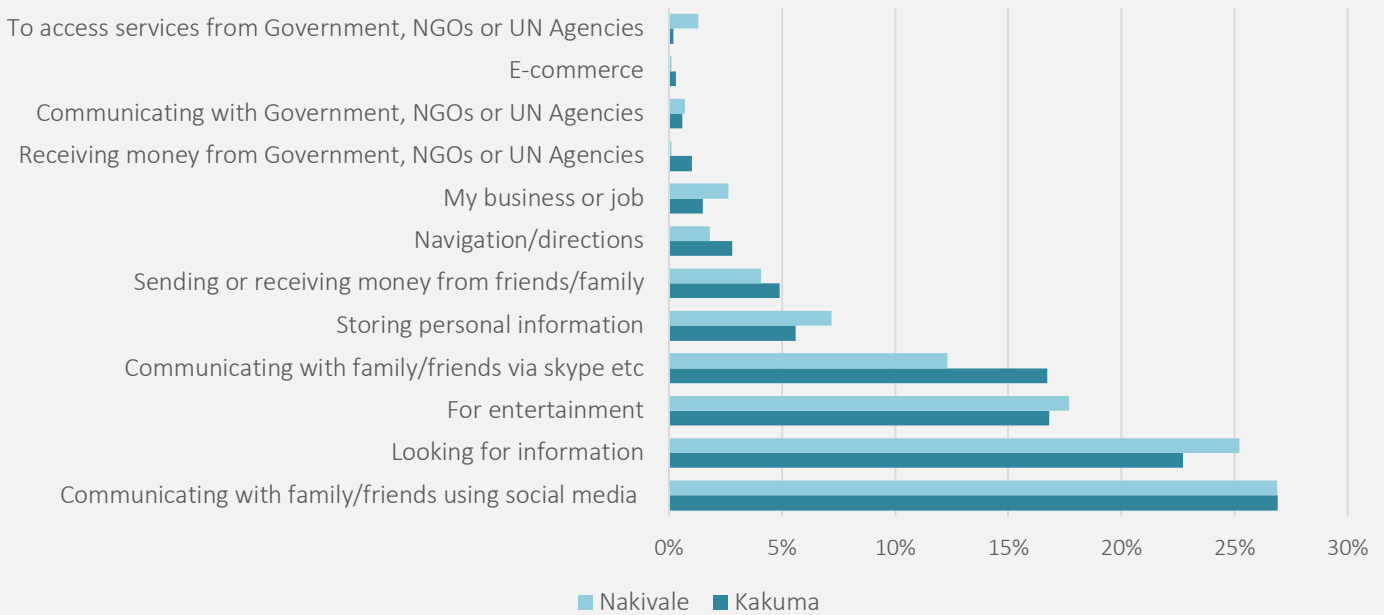
Communicating with friends and family, attaining information, and accessing entertainment dominate how refugees in both Kakuma and Nakivale use the internet. All three of these activities are well served by dedicated mobile phone-based applications. With social media and instant messaging services comprising around 40% of all reported internet-based activities, the findings underline the importance of communicating with family and friends, many of whom may not be physically present, but provide continued emotional and financial support.

"I have grown up here in Nakivale, but I still have a lot of family back at home. I have never met them in person, but can see them on WhatsApp and Facebook. Connecting with them on social media makes me feel like I live together with them. Although I may never go back home, it keeps me connected to my roots".

EXTRACT FROM FGD: NAKIVALE, BASE CAMP ZONE, AUGUST 2017

Figures 28 and 29 highlight the most used social media and messaging apps reported by respondents when asked which platform they used at least once a week to communicate with friends and family.

Figure 28: Social media apps used at least once a week by refugees in Kakuma & Nakivale
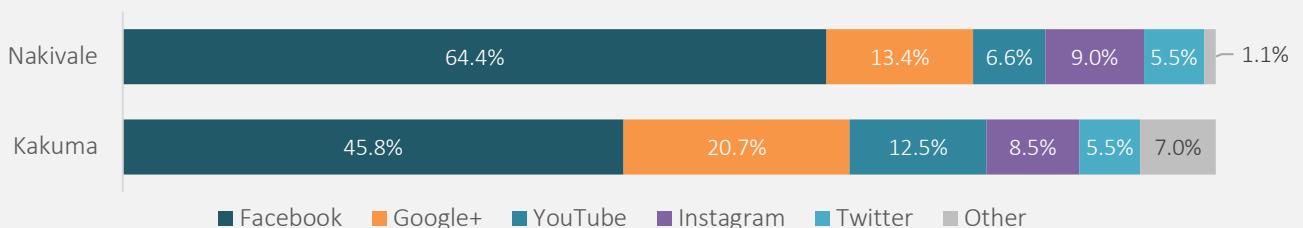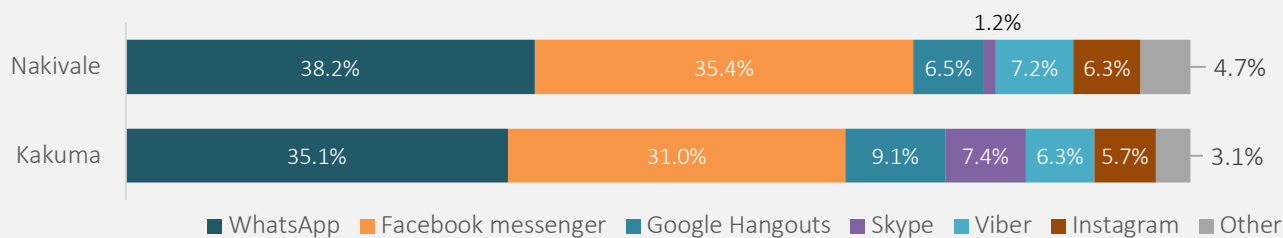
Figure 29: Messaging apps used at least once a week by refugees in Kakuma & Nakivale

	WhatsApp	Facebook messenger	Google Hangouts	Skype	Viber	Instagram	Other
Nakivale	38.2%	35.4%	6.5%	1.2%	7.2%	6.3%	4.7%
Kakuma	35.1%	31.0%	9.1%	7.4%	6.3%	5.7%	3.1%

Facebook, WhatsApp and Google provide the majority of communication platforms used by refugees and were often cited as trusted channels for communicating with friends and family during focus group discussions. YouTube was also cited as the most popular platform of entertainment. Because of their high coverage, these platforms may be useful outreach channels for other less used mobile services, such as communicating with NGOs and UN agencies, or finding information on job/livelihood opportunities.

However, as highlighted earlier in this report, accessing such apps requires internet access. Whilst over 90% of refugees owning a Smartphone in Kakuma and Nakivale access internet-based applications and services, this figure drops to around 10% for basic mobile phone owners. This study has already established that younger refugees and those with higher levels of education are more likely to own an internet-enable smartphone. The remainder of this chapter examines if such a correlation exists between age, education, and the likelihood of refugees using internet based mobile applications and services.

THE INFLUENCE OF AGE AND EDUCATION ON THE USAGE OF MOBILE APPS

Refugees in both Kakuma and Nakivale rely on internet enabled mobile devices to access the internet (typically smartphones) and the applications used reflect social and economic priorities, amongst others. Understanding the influence of age and education, not only smartphone access, but also on the likelihood of using relevant mobile apps, will help implementers to better target mobile-based services for specific demographic groups in order to maximise their relevance, outreach and impact.

The age and level of educational achievement of refugees interviewed in the study were cross-referenced with the average number of mobile applications reported to be regularly used by respondents (Figure 30).

Figure 30: The influence of education and age in the usage of mobile apps and services

Education versus average app usage — Age verus app average usage (Kakuma, Nakivale)
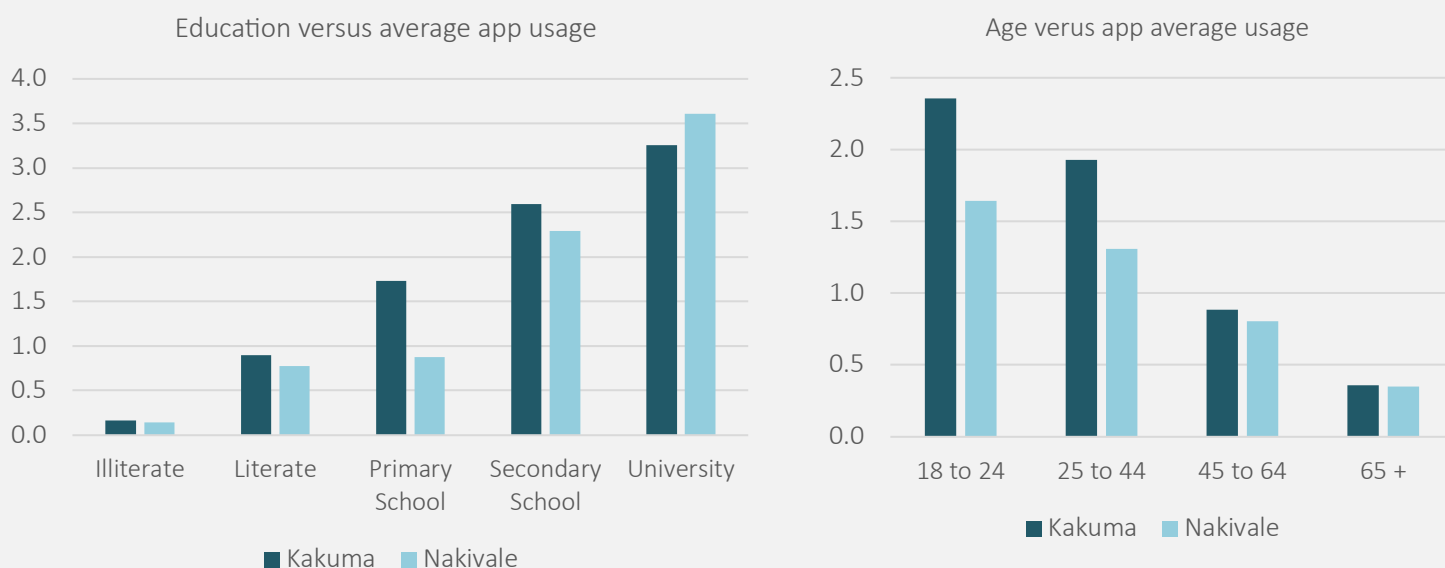
The findings show a clear correlation between the age of refugees and the average number of applications used. Respondents aged between 18 and 24 regularly use the largest number of applications on average (around 2), with those over 64 unlikely to use any mobile phone based service other than text and voice.

Many older refugees in focus group discussions cited poor familiarity with smartphones as the largest barrier to using mobile-based services. Others, like 61-year-old Lina from South Sudan, rely on support from family members to access the services they need:

"I only have a simple phone to make calls to my husband, who still works. I don't know much about the internet, or how to use a smartphone, but my niece uses her phone with me so that I can talk to my younger brother in South Sudan. We also write messages on WhatsApp to my son who is in Nairobi. It's the easiest way to talk to him!"

EXTRACT FROM FGD: KAKUMA 2, AUGUST 2017

In addition to age as a factor in app use, a strong correlation exists between education and mobile app usage across both survey locations. Literacy is fundamental to application use, and increasing levels of educational attainment translate directly into greater use of different mobile and internet based services.

For example, refugees with a university degree use, on average, 2 to 3 more applications than those who completed primary school education, with some university graduates using as many as nine of the different online mobile apps or services outlined in Figure 27. This suggests that education may influence refugee awareness of mobile applications and their confidence in using them. However, more research is needed to establish a definitive connection.

It is clear from these findings that humanitarian and development practitioners looking to deliver services over mobile devices must give careful consideration to education levels and age groups in target communities. Primary school education appears to be a pre-requisite for app usage, with refugees up to their mid-forties likely to use one or more online mobile apps or services.

VOICES FROM NAKIVALE: THE STORY OF ANISIBEL IZERA

Izera Anisibel is a talented 22-year-old Burundian refugee currently struggling to make ends meet for her siblings and herself in Nakivale refugee settlement. Her parents and 4 siblings fled Burundi in 2015 when violence escalated and their lives were in danger. This was especially the case for her farther, a journalist, who was targeted by the government for writing about Burundi's politics. "***Apart from my dad being a target, we were under constant threat from soldiers, who targeted Burundian girls for murder and abuse. So, we had to escape***". Life has been difficult for Anisibel and her family since she lost her father one year after arriving in Nakivale. She is now the family's main breadwinner.

SMARTPHONE PHONE USE IN NAKIVALE

Anisabel is a trained journalist, a community worker, a storyteller and a musician. She is an art enthusiast whose smartphone has played a significant role in honing her skills in many areas. She is currently working with the American Refugee Council in the communication department as a caseworker. "***My smartphone is my life. I use it to communicate to my friends and relatives in other countries though WhatsApp or Viber. It also supports me in doing my work as I have to upload fieldwork photos on Instagram. Additionally, I use it to send mobile money to my two siblings who stay in Kampala and Mbarara***". Anisabel has currently enrolled for an online design course and she relies on her phone to access reading materials.

BARRIERS TO USING SMARTPHONE

Several factors limit Anisable's access to the applications and services she uses on her smartphone. "***Mobile reception in Nakivale is always poor in most places. My phone is usually on EDGE, but sometimes it has 3G, which is never stable. With such poor reception, I am always forced to change SIM cards when going to Rubondo or Juru otherwise I wouldn't be able to communicate with anyone***".

Walking to higher ground to get better reception has become Anisabel's habit when she is at home. A habit she professes is "***very dangerous at night because as a woman anything can happen. I'm always afraid I might get assaulted***". Despite reliance on her smartphone for most tasks, there are some activities Anisable must do in a cyber café, such as printing reading materials, watching online videos, and even sending e-mails when she runs out of data bundles on her phone. "**Buying bundles for my phone is much more expensive than paying for the same services at the community technology centre (CTA). The main challenge is that we only have one CTA which is always filled to capacity**".

ASPIRATIONS REGARDING MOBILE TECH

"*I would love to own a laptop and my own modem so that I can do my studies from the comfort of my house. I am a storyteller and whenever I feel low I just want to write and I can only do it when I have my own computer. We also need more computer centres in the settlement to support other young refugees who don't have access to smartphones and can't afford the mobile data*

Refugees comprise some of the world's most vulnerable populations with basic, social and economic needs that are often influenced by the challenges faced traveling to a host country and the environmental conditions encountered once arrived. As with access to mobile devices and the internet, there are many commonalities in the needs of refugees in both Kakuma and Nakivale, as well as how refugees see mobile technology and the internet supporting these needs.

Financial support and resettlement opportunities are the most pressing needs in both Kakuma and Nakivale

These two needs were cited as priorities across all age groups surveyed. Mobile money services such as M-Pesa were frequently referenced by refugees as a common way to exchange cash and buy goods and services, and through which financial support could be provided by humanitarian organisations. Perhaps due to the importance of mobile money, access to a mobile phone and airtime were perceived as more needed than healthcare and better housing options in both refugee settings.

Refugees primarily use the mobile internet for accessing information and communication with friends and family

Facebook, WhatsApp and Google provide the majority of communication platforms used by refugees and were often cited as trusted channels, comprising around 40% of all internet-based activities. The findings underline the importance of communicating with family and friends, many of whom may not be physically present, but provide continued emotional and financial support. Because of their high coverage, these platforms may be useful outreach channels for other, less used mobile services, such as communicating with NGOs and UN agencies, or finding information on job/livelihood opportunities. Social media may be an excellent platform for delivering new services, but it is important not to leave basic phone users behind.

The number of apps refugees use increases with their level of education

Respondents aged between 18 and 24 regularly use the largest number of applications on average (around 2), with those over 64 unlikely to use any mobile phone based service. Many older refugees in focus group discussions cited poor familiarity with smartphones as the largest barrier to using mobile-based services.

The number of mobile apps used by refugees decreases with age

A strong correlation exists between education and mobile app usage across both survey locations. Literacy is fundamental to application use and increasing levels of educational attainment translate directly into greater use of different mobile-based services. For example, refugees with a university degree use, on average, 2 to 3 more applications than those who completed primary school education, with some university graduates using as many as nine different mobile apps or services. This suggests that education may influence refugee awareness of mobile applications and confidence in using them.

Refugees arriving in camps or settlements within the past three years are more likely to have used a mobile phone to support their journey

This is especially true for refugees that travelled to Kakuma or Nakivale before 2014 and indicates that refugees' access to mobile phone technology was much more restricted in the recent past. For those using mobile phones to support their journey, the majority in both Kakuma and Nakivale did so to communicate with friends and family and to gather information about their journey and the route ahead. Of the refugees who confirmed using their mobile device to support travel to their host country, only 17% of refugees in Nakivale and 34% of those in Kakuma stated that their mobile phone affected how they proceeded with their journey.

Nakivale has one Community Technology Access Centre located in Base Camp. The Centre was established in 2010 to offer training in digital literacy, vocational and technical skills and job searches, amongst other internet based services.

With a total of 20 computers, capacity in the centre is limited, diverting users to small, relatively expensive cyber cafes elsewhere in Base Camp. Because Juru and Rubondo have no computer centres or privately owned cyber cafes, residents must travel to Base Camp to access internet services.

Poor cell phone connectivity, limited WIFI access and the remote location of some communities, are just a few of the challenges organisations face in communicating with refugees. Understanding the channels refugees in Kakuma and Nakivale use to get their information will help organisations better target their outreach strategies.

Furthermore, awareness of applications and services available to communities is essential to their uptake. UN organisations and NGOs have worked for many years in both refugee settings, yet little is known about community awareness of mobile applications and services already developed. This chapter explores these questions by providing insights on:

- Refugee sources of information
- Existing mobile-based services developed by aid agencies in Kakuma and Nakivale, and refugee awareness of these services

SOURCING INFORMATION

Many refugees are limited in the channels they can use to gather information, and often rely on close personal networks, or on information provided by aid agencies[24]. Figure 31 provides the information channels used by refugees in Nakivale and Kakuma based on survey data collected.

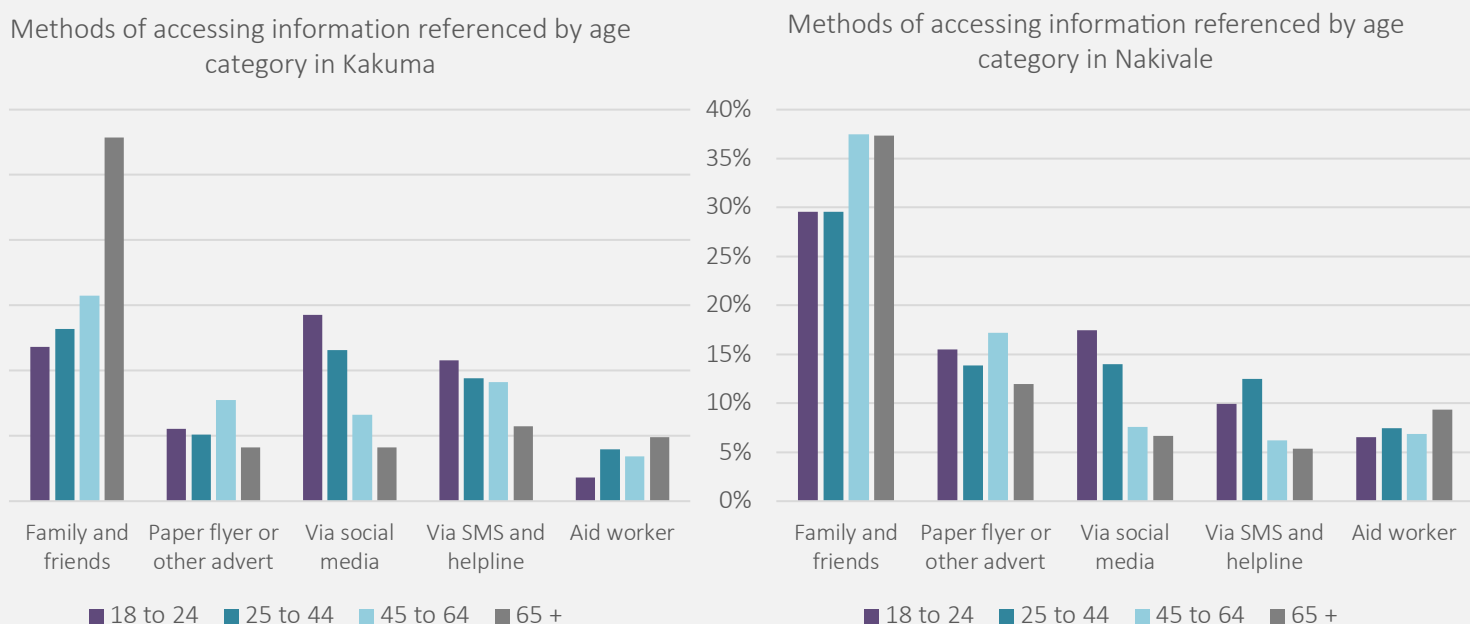Figure 31: Sources of information used by refugees in Kakuma and Nakivale settlements
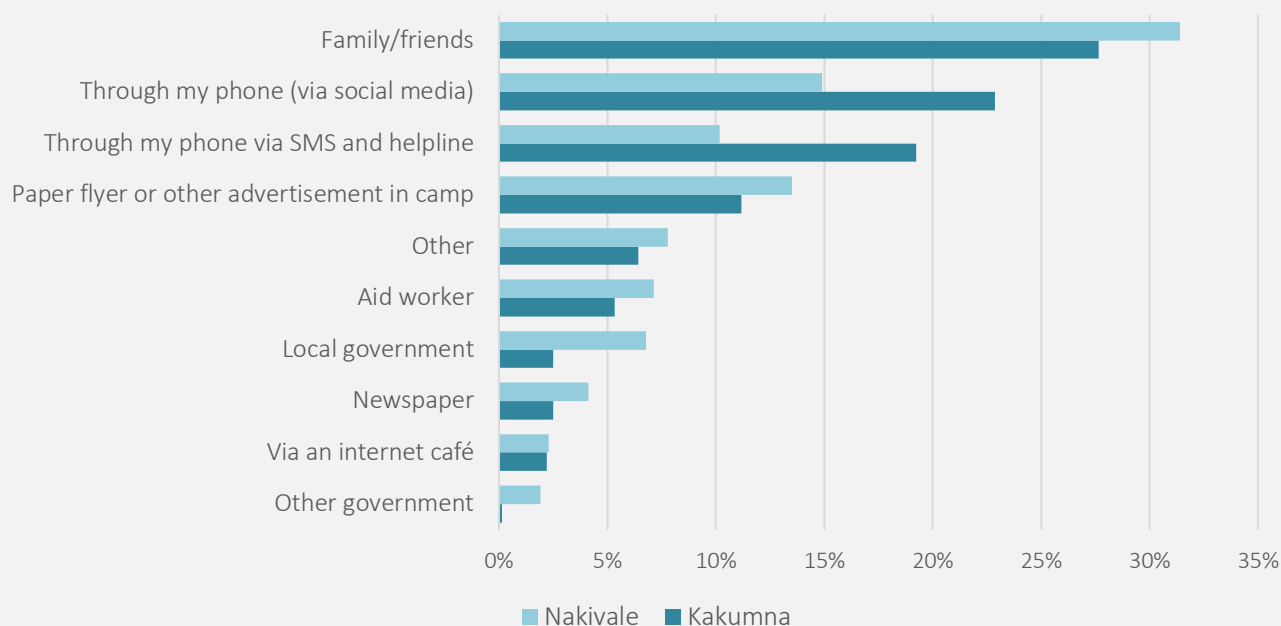
Refugees in Kakuma and Nakivale strongly rely on networks of family and friends as their as their source of information. These physical networks are widened through online social media platforms, such as Facebook, with almost a quarter of respondents in Kakuma and 15% of those surveyed in Nakivale citing social media as an information source. Phone-based help lines and SMS channels are also used as an important information source and act as a conduit to aid organisations amongst others.

Although mobile phones are a significant information source, more traditional non-digital information channels also act as an important communication medium. For example, physical advertisements and notices are common place in both Kakuma and Nakivale and provide alternatives for those without phone access.

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[24] Fratzke.S. & Salant.B. (2017) Tracing the channels refugees use to seek protection in Europe.

Because age is a strong factor in smartphone ownership (and therefore social media access), the five most cited information channels used by refugee respondents, were categorised by age to determine if age influences preferences for certain sources. Figure 32 indicates that older people (those over 44 years of age), rely more heavily on personal networks and non-digital information sources than their younger counterparts, who access information more readily using their mobile phone.

Figure 32: Communication channels accessed by refugees to access information

Methods of accessing information referenced by age category in Kakuma

Methods of accessing information referenced by age category in Nakivale

In fact, refugees in Kakuma under the age of 45 are more likely to source information through their mobile device than through other channels. Additionally, almost of half of refugees under 25 years access information using their mobile phone.

In contrast to Kakuma, information sourced through SMS and social media is less prevalent in Nakivale, but is still accessed by around a quarter of refugees under the age of 45. The stronger reliance on paper flyers or adverts in Nakivale may reflect the poor cell phone connectivity in Rubondo and Juru zones. Indeed, when the location of respondents in Nakivale is accounted for, SMS and social media are commonly used in the more heavily connected Base Camp zone.

These findings indicate that, next to personal networks, information channels provided through mobile phone platforms such as social media and SMS are much-utilised tools through which implementers can raise awareness about applications and services available in target communities.

AWARENESS OF EXISTING MOBILE PHONE BASED SERVICES

Through key informant interviews with humanitarian organisations, desk review and focus group discussions in refugee communities, this study compiled a list of technology centred and mobile phone based services running in Kakuma refugee camp and Nakivale settlement. Based on the key the support services identified, each intervention was categorised as follows and visualised in Figure 33. A full list of the services identified can be found in Annex 1.

- Vocational job support: Improving refugee access to livelihoods
- Education/upskilling: Initiatives using mobile technology to provide targeted education
- Healthcare/health advice: Information and services targeting health and wellbeing issues
- Identity processing: Online, technology based approaches to support refugee identification

- Financial support: Mobile phone-based financial support services targeting refugee populations
- Information and support services: Including protection and legal advice, as well as family tracing

Figure 33: Mobile and internet based services available in Kakuma camp and Nakivale settlement

Whilst financial support services, information services and education/upskilling are the most prevalent, it is clear from the findings that significantly fewer mobile services are present in Nakivale than Kakuma. Although there is no definitive reason for this discrepancy, relatively poor mobile connectivity, the remoteness of the settlement and the lower level of humanitarian support offered by agencies in Nakivale (compared to Kakuma) were all cited as factors during key informant interviews.

Based on the categories identified, refugees in Kakuma and Nakivale were asked if they knew of any initiatives by aid agencies using mobile phones to deliver services. The results were grouped by age to determine if the variable influenced awareness (Figure 34).
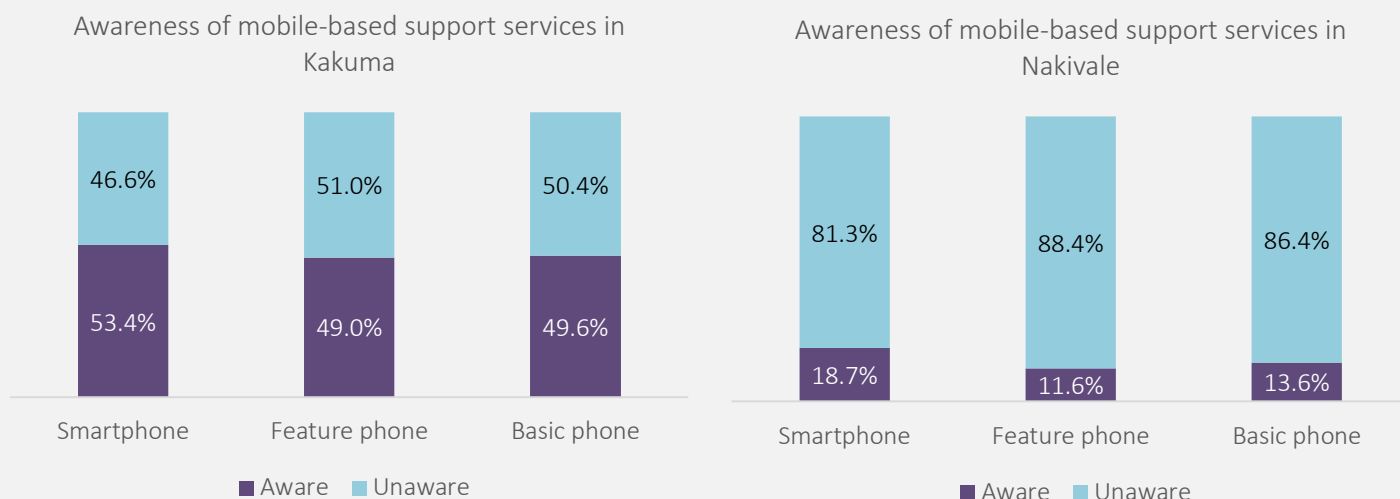
Figure 34: Refugee awareness of aid agencies using mobile phones to deliver services by age group
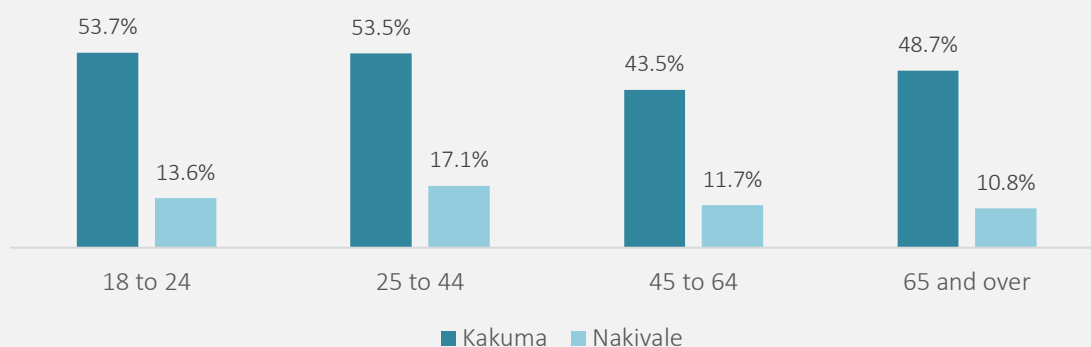
Perhaps due to the higher number of initiatives running in the camp, refugees in Kakuma were considerably more aware of mobile phone-based services than those in Nakivale (a ratio of around 4 to 1). However, unlike access to smartphones and the use of mobile applications, age does appear to influence refugees' awareness of support services delivered over mobile phone in either location.

This study has shown that smartphone owners have greater access to the internet, social media and messaging service. To determine if such access affects awareness of mobile-based support services, the awareness levels of refugee respondents were cross-reference with the type of mobile device they had access to. Results in Figure 35 show that, although smartphone owners are slightly more aware of mobile support services, there is no significant relationship between awareness of mobile based support services and the type of mobile device owned.

**Figure 35: Awareness of mobile support services based on type of mobile phone ownership**

Awareness of mobile-based support services in Kakuma

	Smartphone	Feature phone	Basic phone
Unaware	46.6%	51.0%	50.4%
Aware	53.4%	49.0%	49.6%

■ Aware ■ Unaware

Awareness of mobile-based support services in Nakivale

	Smartphone	Feature phone	Basic phone
Unaware	81.3%	88.4%	86.4%
Aware	18.7%	11.6%	13.6%

■ Aware ■ Unaware

Case study: iMonitor

Developed by UNHCR in Kakuma, iMonitor is a smartphone application that enables refugees to report infrastructural issues in their community directly to UNHCR for repair. iMonitor reduces the time taken to initiate repairs by creating a real-time reporting link between communities and the UNHCR, who then work with implementing partners to effect repairs more quickly. The application is built around existing software (called Kobo-collect), typically used to collect survey data on handheld devices. As such, it is a good example of how existing solutions can be modified to meet different needs. iMonitor works in three stages:

1. Volunteers find notable issues in their community in need of repair. For example, a communal water tap that has been leaking heavily and wasting an important natural resource.
2. The issue is reported using the iMontor smartphone app directly to UNHCR in Kakuma
3. The report is automatically recorded on an online database and assigned a job number. If necessary implementing partners are then informed that a repair is required within the community identified.
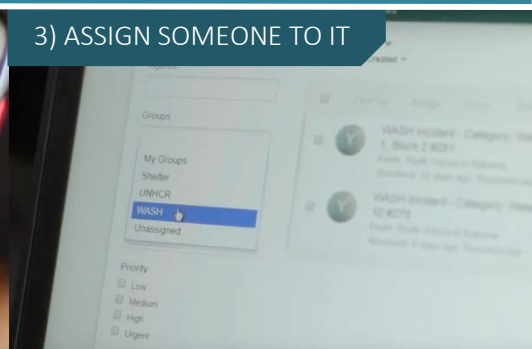
1) FIND A PROBLEM

2) REPORT IT
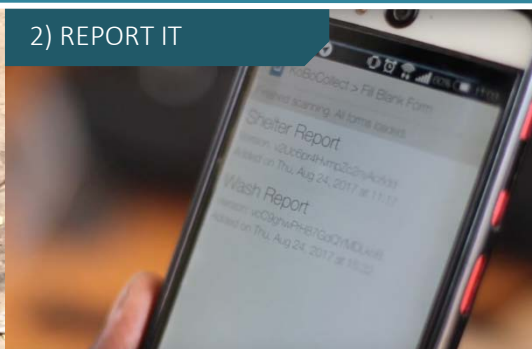
3) ASSIGN SOMEONE TO IT

4. Once the repair is complete the system is updated to reflect the repair.

At the time of this report, the application was being piloted in Kakuma 1 through a local, youth-based civil society organisation.

4) FIX THE ISSUE

Mobile technology and the internet play a fundamental role in how refugees source information. It also supports other forms of information exchange. Mobile is therefore an essential tool for raising awareness of applications and services developed by organisations to support refugee communities, which is essential to their uptake.

Refugees source information from family and friends, but social media and SMS play a strong role

Personal networks are widened through online social media platforms, such as Facebook, with almost a quarter of respondents in Kakuma and 15% of those surveyed in Nakivale citing social media as an information source.

Refugees in Kakuma under the age of 45 are more likely to source information through their mobile device than through other channels. Additionally, almost of half of refugees under 25 years in Kakuma and a third in Nakivale access information using their mobile phone. Social media and SMS are therefore much-utilised tools through which implementers can raise awareness about applications and services available in target communities.

Kakuma has considerably more mobile services dedicated to refugees than Nakivale

Financial support services and education upskilling are the most actively delivered over mobile. However, Nakivale settlement hosts considerably fewer active mobile phone, or internet-based services than Kakuma camp. Relatively poor mobile connectivity, lower smartphone ownership, the remoteness of the settlement and the lower level of support offered by humanitarian agencies in Nakivale (compared to Kakuma) are all potential contributing factors.

Community awareness of mobile based applications and services developed for refugees is low

Perhaps due to the paucity of mobile services targeting refugees in Nakivale, general awareness of such applications amongst the population surveyed is less than a third of that recorded in Kakuma (50% in Kakuma compared to 15% in Nakivale). Practitioners developing mobile or internet based solutions for refugees must therefore be cognisant of the information channels (both on and off-line) used in communities to raise awareness of such services.

Age does not influence awareness of mobile-based services

Although younger refugees in Kakuma are considerably more aware of services available than their peers in Nakivale – unlike access to smartphones and use of mobile applications – age does appear to influence refugees' awareness of support services delivered over mobile phone in either location.

The type of mobile device owned by refugees does not influence awareness of mobile-based services

This study has shown that smartphone owners have greater access to the internet, social media and messaging services. However, although smartphone owners are slightly more aware of support services delivered over mobile, there is no direct relationship between awareness of these services and the type of mobile device owned.

Whilst widespread awareness of mobile services that support refugee communities is critical for their uptake, it is also important to understand what existing services are available to support refugee's most immediate needs. These services may be available domestically, or they may have been developed to support refugees hosted in other countries. Although not specifically designed for refugees in Kakuma or Nakivale, these services, with adaptation to local contexts, may meet the pressing needs of refugees in Kenya, Uganda and across the region.

To determine which application and services are most relevant, refugees were asked which services they would like to see delivered over mobile phone in Kakuma and Nakivale, as well as their most urgent needs. There was a direct match between the top four needs prioritised by refugees and the services they wish to see delivered over a mobile device (translating to 62% and 55% of all refugee responses in Kakuma and Nakivale respectively). These needs were financial support, education and upskilling (especially language learning), information on refugee and resettlement status and Family tracing /reunification. Figure 36 indicates the relative proportions of respondents for each need identified.

Figure 36: Top four needs identified by refugees for delivery over a mobile device
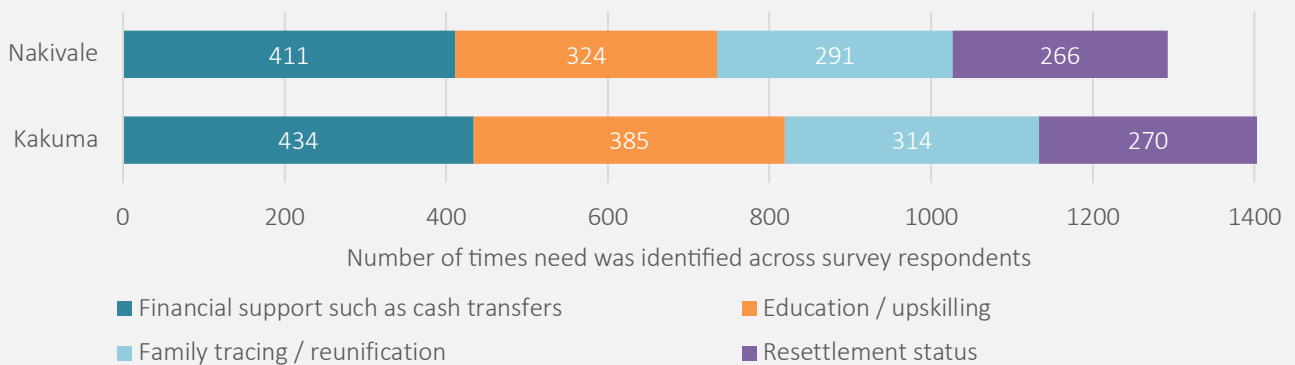
Once priority needs have been found, it is then possible to identify mobile applications and services that can meet these needs, by mapping them against mobile phone based applications and services available in refugee settings around the world. It should be noted that the desk review, whilst extensive, is not exhaustive and other applications and services may be available that have not been included in this report. Some services are available globally (including East Africa) and have be categorised accordingly. Other services are present in multiple countries. For this reason, the sum of services in each region may larger than the total stated for each category.

Figure 37: Mobile apps and services by region that address the top four needs of refugees in Kakuma & Nakivale

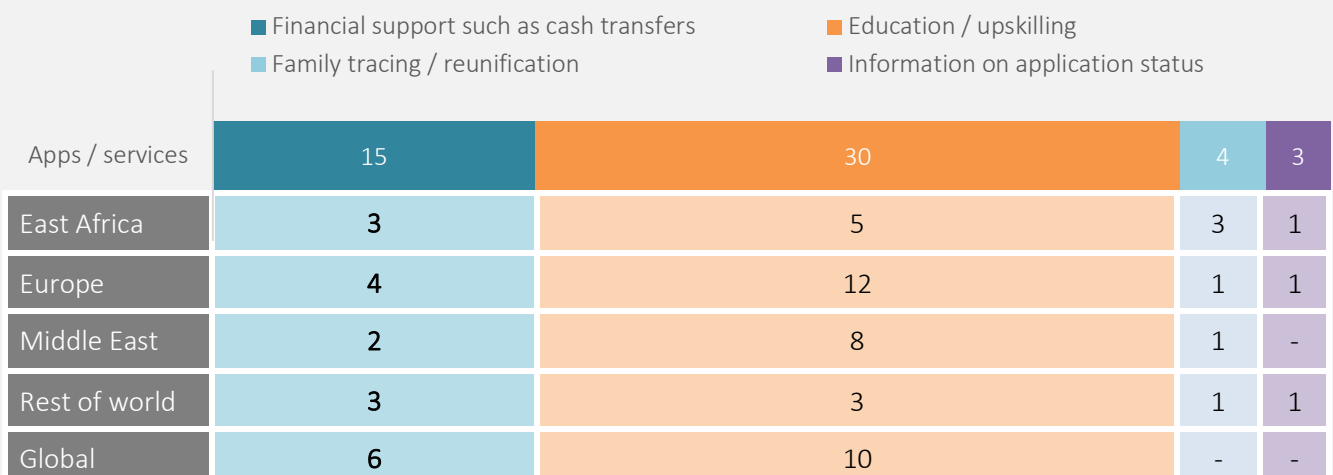|	Financial support such as cash transfers	Education / upskilling	Family tracing / reunification	Information on application status
Apps / services	15	30	4	3
East Africa	3	5	3	1
Europe	4	12	1	1
Middle East	2	8	1	-
Rest of world	3	3	1	1
Global	6	10	-	-

Figure 37 shows that the preponderance of mobile applications and services developed for, or used by, refugees are located in the Middle East and Europe. This imbalance can, in part, be attributed to the large numbers of migrants entering Europe and the Middle East during 2015 and 2016 and the associated media coverage that fuelled interest from many groups, including technologist. This has led to the rise of organisations such as Techfugees, who's mandate is to develop technology focused solutions for refugees (often using smartphones) through organising coding events known as *Hackathons*. Countries such as Germany have been at the centre of intense development and innovation around refugee-focused mobile solutions, which has led to the creation of a plethora of start-ups and social enterprises[25]. It is as yet unclear how many of these endeavours will prove sustainable over the longer term, but, if adapted, many of the services developed may prove beneficial to refugees hosted across East Africa in each of the priority support categories identified by refugees in this study.

MOBILE SERVICES PROVIDING FINANCIAL SUPPORT

Refugees in East Africa and elsewhere in the world are able to make use of a wide range of internet and mobile banking services, underlining the applicability of mobile technology as a delivery mechanism for financial support. Many of the financial services provided to refugees make use of existing applications that leverage pre-pay cards and other forms of established online banking services, making them globally available to refugees to both send and receive remittances, domestically and abroad. Dedicated services for refugees in East Africa typically rely on partnerships between multinational businesses such as Safaricom and MasterCard, and multilateral organisations such as UNHCR and the World Food Programme. As this is often not sufficient to fulfil all their needs, many refugees in Uganda, Kenya and elsewhere in the region rely on peer to peer money transfer, using services such as M-Pesa and Airtel Money. In most cases however these services do not provide financial concessions to refugees and high transfer fees can reduce the impact of remittances received.

MOBILE SERVICES PROVIDING EDUCATION/UPSKILLING

By far the largest number of applications and services available for refugees online or on mobile support education/upskilling. Within this category, 40% (12) of the mobile and online services researched focus on language learning and translation. These range from household names such as Google Translate, to targeted services such as *WhatsGerman*, which uses WhatsApp to provide free basic language instruction for new refugees and asylum seekers arriving in Germany. This study was unable to find any dedicated language or translation apps for refugees in either Kakuma or Nakivale. Modifying mobile services such as *WhatsGerman* to the context of East Africa, would directly address pressing language learning needs. Furthermore, no additional technical development is required if existing social media or messaging platforms can be leveraged.

Existing education applications being piloted in Kakuma include the *Eneza App*, which is supported by The Xavier Foundation and Safaricom amongst others. The *Eneza App* is designed to provide affordable life-long learning through mobile technology and also supports basic phones. All five of the education services provided over mobile and available in East Africa could be found in Kakuma. No such applications are currently available in Nakivale, which may benefit greatly from initiatives such as the *Eneza App* if support can be found.

MOBILE SERVICES PROVIDING FAMILY TRACING/REUNIFICATION

Due to the complexities of tracing family members across countries separated by sometimes violent, or otherwise difficult circumstances, mobile phone technology and the internet provide a unifying platform for bridging geographic, cultural and language divides[26]. Whilst no one service is able to provide global support for refugees separated from family members, several organisations provide mobile, or website-based platforms that span regions. Of the three technology-based family tracing/reunification services found in East Africa, two are

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[25] betterplace lab (2016), ICT4Refugees. A report on the emerging landscape of digital responses to the refugee crisis
[26] Samuel Hall (2017), Coming together: A critical analysis of key issues, actors and tools in the current global landscape of Family Tracing & Reunification

present in Kakuma and the third in Nakivale. Although two of these services are provided by globally recognised organisations; Refugees United (REFUNITE) and UNICEF, the third, called the *Find Me App*, is currently under development to reconnect refugees separated inside Kakuma refugee camp. Described as a grass roots project, the application is an example of how smaller developers can be motivated to build context specific solutions that address localised needs.

MOBILE SERVICES PROVIDING INFORMATION ON RESETTLEMENT STATUS

Very few services exist for refugees to understand their application status and resettlement opportunities outside of official UN or government channels. This category is perhaps most in need of innovative thinking to deliver tangible solutions to refugees, especially as focus group discussions have shown that lack of information on resettlement outcomes and the need to travel to specific centres to obtain updates from case workers creates underlying anxiety amongst refugees unsure of their status and when they might be resettled in countries abroad.

"I have to travel from Kakuma 4 to Kakuma 1 with my 6-month-old son to visit the UNHCR centre. Once I'm there I can wait for several hours for information on my status and when I might be resettled; often nothing's changed. I would still rather speak to someone in person, but If I could get regular news over my mobile phone, that would save me the trip and the bus fare. If it's good news, I can come to the centre to find out more".

EXTRACT FROM FGD: KAKUMA 4, AUGUST 2017

The UNHCR is in the process of addressing some of these concerns and now provides a toll-free helpline for refugees in Kakuma who can access information about their case without coming to the UNHCR centre. It is unclear if this service will be deployed to other refugee camps and settlements in the region.

The are several examples of mobile services that support refugee resettlement in host countries once asylum has been granted. Although these services are not directly able to support the allocation of resettlement opportunities, they provide valuable support for refugees looking to integrate into local communities. For example, the *New Roots* app developed in Australia provides refugees with a smartphone guidance on managing finances, tips for emotional well-being and contacts for emergency services. Other apps include *Refugermany*, which provides a range of smartphone-based guides on accessing accommodation, using local transportation, health advice and accessing schools to name a few.

Given the far-reaching access to mobile phone technologies available to refugees in this study, many of the mobile phone based solutions for supporting refugee resettlement and integration (from call centres to smartphones) might easily be adapted to support refugees hosted, or settling in Uganda, Kenya or the wider region.

Although Kakuma and Nakivale have very different geographic, urban and infrastructural differences, there are many similarities in the way refugees access and use mobile technology and the internet, and the challenges they face in attaining such access. Furthermore, there are close similarities in refugee needs across both locations, as well as in the role mobile phone technology can play in addressing these needs. Based on analysis of the data collected, Table 2 outlines key trends where responses to survey questions in Kakuma and Nakivale differ by less than 10%.

TABLE 2: OBSERVED TRENDS BASED ON STATISTICALLY SIGNIFICANT QUANTITATIVE DATA	
1	The majority of refugees access the internet using 3G-connected smartphones, not WIFI.
2	Younger refugees are more likely to use smartphones than older refugees, they are also more likely to access the internet.
3	Smartphone ownership increases with level of education, as does the number of mobiles apps and services refugees use.
4	The majority of refuges who own a mobile device earn less than $1 USD per day. Furthermore, income above $5 USD per day does not significantly influence smartphone ownership.
5	Refugees arriving in refugee settlements within the past three years are more likely to have used a mobile phone to support their journey.
6	Neither age, nor the type of mobile devices owned by refugees influences awareness of mobile-based services.
7	Refugees primarily use the mobile internet for accessing information and communication with friends and family.
8	Refugees largely source information from family and friends, but social media and SMS play strong supportive roles.

The close correlation of the eight trends identified in Nakivale and Kakuma suggest a broader relationship between; (1) refugee needs that can be addressed through mobile; (2) barriers to mobile phone and internet access and; (3) mobile phone usage across settlements and between countries in East Africa. This is perhaps not surprising as many settlements share similar characteristics, such as limited infrastructure, rural settings with poor access, relatively young populations and, in some cases, a diverse range of nationalities.

When taken as indicators for the potential adoption of mobile and internet-based solutions, these trends have important programming and policy implications for those working with refugee communities and should be considered as part of future programme designs.

Despite the large number of similarities in refugee responses between Kakuma and Nakivale, difference remain. Three differences in particular stand out that influence both access and use of mobile technology and the internet.

- **Mobile phone connectivity is more restricted in Nakivale than Kakuma:**
  Whilst almost all respondents in Kakuma were able to obtain a 2G or 3G mobile phone signal, around 11% of the refugees surveyed in Nakivale settlement had no cell phone coverage at all. With the strongest connectivity clustered around the settlements central, Base Camp zone, implementers wishing to deliver mobile solutions in Nakivale must account for increasingly poor connectivity in Rubondo and Juru zones as

distance from Base Camp increases. Peer to peer transfer of applications using Bluetooth offers one way for refugees who own smartphones to access services in areas of limited cell phone connectivity.

- **Smartphone access in Kakuma is close to double that in Nakivale:**
  Around 45% of the refugees surveyed in Kakuma own smartphone, almost double the ownership rate recorded in Nakivale. Mobile solutions developed for Nakivale must therefore taking into account the distribution of mobile device types within target communities and the higher ownership of more functionally limited phones.

- **Kakuma has considerably more mobile services dedicated to refugees than Nakivale:**
  Nakivale settlement hosts considerably fewer active mobile phone, or internet-based services than Kakuma camp. Relatively poor mobile connectivity, lower smartphone ownership, the remoteness of the settlement and the lower level of support offered by humanitarian agencies in Nakivale (compared to Kakuma) are all potential contributing factors. Perhaps due to the paucity of mobile services targeting refugees in Nakivale, general awareness of such applications amongst the population surveyed is only a third of that recorded in Kakuma. Practitioners developing mobile-based solutions for refugees must therefore be cognisant of the information channels (both on an off-line) used in communities to raise awareness of such services.

KEY INDICATORS FOR DETERMINING MOBILE PHONE-BASED SERVICE DELIVERY FOR REFUGEES

Although access to any type of mobile device provides a channel (voice/text) through which humanitarian organisations and others can deliver services to refugees, smartphones clearly offer the most effective way to connect to social media through the internet and, in turn, with refugee communities to address a diverse array of needs.

Based on the key trends identified in this report, the strongest indicators of access to mobile technology and related services are; *connectivity*, *education* and *age*.

CONNECTIVITY

Access to internet enabled devices such as smartphones is only part of the challenge. Connectivity, defined here as reliable access to 3G/4G data services, is the keystone for accessing services beyond those relying on voice and text. It is therefore one of the biggest determinants for how practitioners can target mobile and internet based services in refugee communities.

EDUCATION AND AGE

This study has shown that age and education are strong influencers of smartphone ownership and increased use of mobile applications. It is therefore important to understand if they are independent from the one another.

Analysis shows that, whilst those aged between 18 to 24 are most likely to own a smartphone (and use more apps); refugees aged from 25 to 44 years are more likely to have obtained a university education. This is intuitively correct, as students will not attend university until at least 18, but shows that age and education levels are not overly correlated.

Based on these influencers, the following infographic (Figure 38) acts as a reference for determining how age, education and connectivity influence access to different mobile devices and the service delivery platforms available for supporting target refugee communities.

Figure 38: Determining influencers of access to mobile phone-based services for refugees
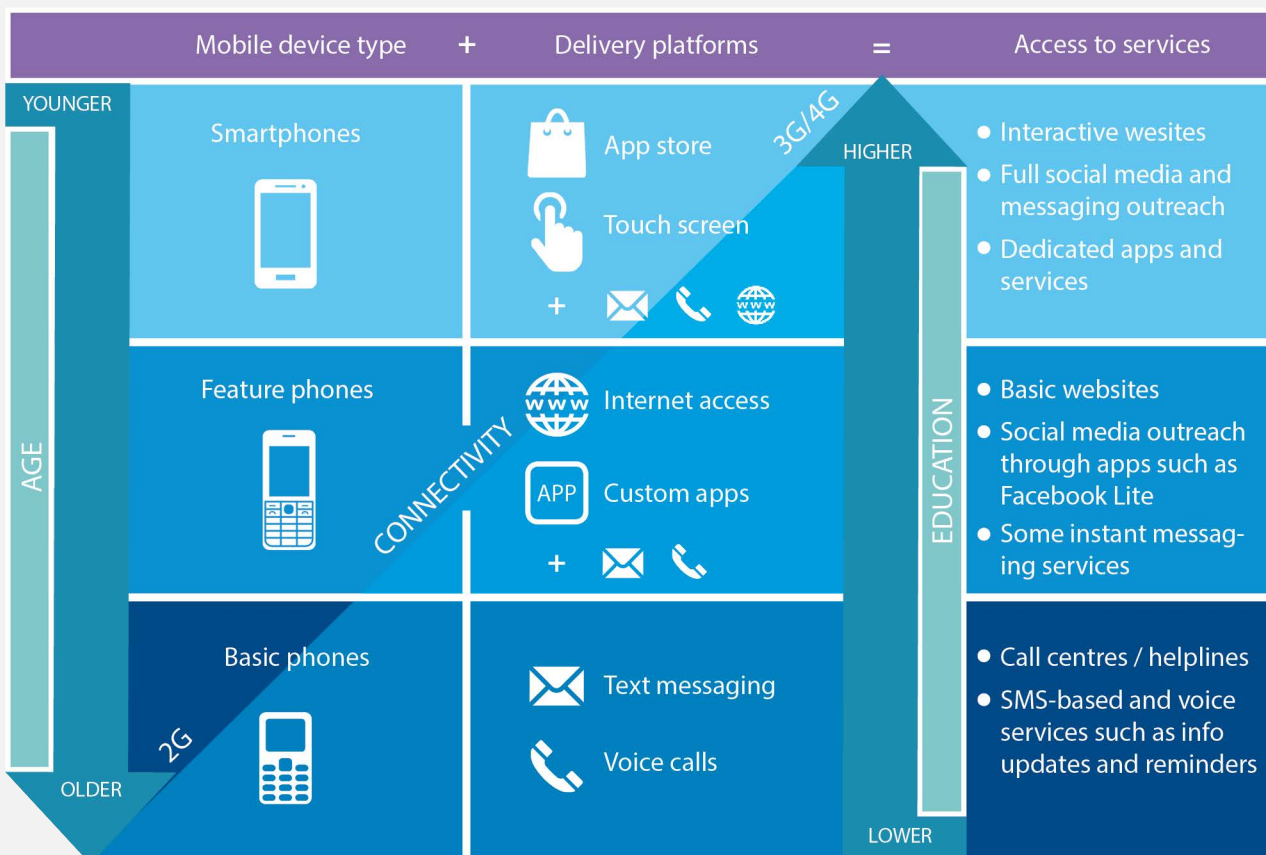
In addition to acting as a reference, the infographic highlights key trade-offs practitioners will likely face in developing mobile phone and internet based services for demographically diverse refugee communities, living in settlements with limited mobile infrastructure – such as Kakuma and Nakivale – which are indicative of wider refugee settlements across the region.

Despite these challenges, mobile technology and the internet play a vital role in accessing the growing network of applications and services available to refugees across the world. With smartphone ownership in the both Kakuma and Nakivale settlements notably above the national average, there are opportunities for humanitarian organisations and private enterprises to tap into the groundswell of active smartphone users. Better mobile connectivity and easier access to the internet may provide the key to unlocking killer apps and services that might change, for the better, the way refugees in East Africa live their lives.

Acknowledgements

About Samuel Hall

Samuel Hall is social enterprise dedicated to migration research. We work directly in countries affected by migration.

Our mandate is to produce research that delivers a contribution to knowledge with an impact on policies, programmes and people.

Samuel Hall has offices in Afghanistan and Kenya, and a presence in France, Germany, Tunisia, Turkey and the United Arab Emirates. For more information, please visit www.samuelhall.org

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