eKichabi: Information Access through Basic Mobile Phones in Rural Tanzania

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Motivation

In Tanzania, phone ownership is widespread (upwards of 90% in study area), but there's no way to look up numbers.

How do unknown (to one another) users find one another?

Phonebook!
Previous Work

Brian Dillon, Joshua Blumenstock, Jenny Aker, starting 2014

Survey of ~1500 businesses, distributed paper phone books

Found positive economic effects of having access, and of being listed

This project stems from 2 sources...
Develop and deploy a electronic phonebook – eKichabi

Assess:

• Feasibility – is it possible?
  *Is USSD a suitable technology for deploying a search- and browse-based information service in rural Tanzania?*

• Usability – is it usable?
  *How well can the target users search for phone numbers, and what are the approaches users take to find a number?*

• Acceptability – is it viable in the long term?
  *Does the electronic version of the phone directory meet people’s needs, and is it something they will use on a day to day basis?*
Why USSD?

The Third Universal App (Perrier et al.)

In designing for *basic* mobile phones, a number of options:

- **SMS** – stateless, and text based
- **IVR** – stateful, and voice based
- **USSD** – stateful, and text based – best of both!

Primary considerations: Cost, and Usability
Methodology
June 2017  *Phase 0*: Application Prototyping

early July 2017  *Phase 1*: Focus Groups (n=40)

late July 2017  *Phase 2*: Initial Deployment (n=107)

early Aug. 2017  *Phase 3*: Phone Surveys (n=107)
Phase 0: Application Prototyping

Three usage modes:

• Browse by Location

• Browse by Sector

• Search
Select an option:
1. Browse by Location
2. Browse by Sector
3. Search
4. Help

Select District
1. Babati Mjini
2. Chamwino
3. Chemba
4. Dodoma Urban
5. Kiteo
0. Next
99. Back

Select Village
1. Busi
2. Keikei
3. Kinyasi
4. Kiteo
5. Kwadelo
0. Next
99. Back

Select Village
1. Busi
2. Keikei
3. Kinyasi
4. Kiteo
5. Kwadelo
0. Next
99. Back

Select Business
1. Ally Kiosk
2. Amiri Shop
3. Chavai Kiosk
4. Fundi Baiskeli
5. Genge la Mama Mtaa
0. Next
99. Back

Ally Kiosk
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Location:
Kiteo - Matinga
Phone: T653965711

User Input: 1
User Input: 5
User Input: 4
User Input: 1
User Input: 1
User Input: 1
Business Found
Phase 1: Focus Groups

6 villages over 1 week, several groups per village

3-12 participants per group

Discussed paper and electronic Kichabi

Iterated on application design
Phase 2: Initial Deployment

Four villages, 10-30 participants per village – 107 participants total

Diverse range of ages, genders, literacy, experience with phones

Enrollment:
Meeting of ~2 hrs, covering short code, whitelisting, main 3 browsing modes, and plenty of examples

Study lasted 30 days, participants used their own phones
Phase 3: **Phone Surveys**

- Follow-up with deployment participants
- Addressed topics unavailable from logging
- Gathered anecdotes
Usage
Session Frequency Per Participant (30 day duration)

- Daily: 21.7%
- Infrequent: 25.5%
- Frequent: 52.8%
Usage Modes

Number of Sessions by Usage Mode

- **Help**: 15 sessions (22%)
- **Search**: 22 sessions (43%)
- **Browse District**: 610 sessions (31%)

Legend:
- Complete Sessions
- Incomplete Sessions
Survey Findings

“I looked up the business in Itiso and called a boda boda guy to seek the transport.”

“I am a crop trader, and I called merchants in Dodoma to inquire about prices for my crops. I called several businesses to find who would give me the best prices.”

“I called a seed vendor in Kondoa, and negotiated over the phone, then he drove the seeds [to my village].”
Application Accessibility

Search – surprising that it was popular!

Potentially easier for those with poor eyesight.

Familiarity with other USSD applications improves fluency

Mobile Money

Airtime Top-up
Feasibility – Successfully demonstrated deployment of USSD-based information seeking application with thousands of entries.

Usability – Application was usable. Scrolling through long lists, and text entry for search were all handled.

Acceptability – Fulfilled an unmet need for business information to participants. Useful in many situations...
Future Work

Self-enrollment into the system

Scalability – more hierarchy in menus increases confusion

Cost and business models for expansion
Thank You
Clusters

Completion Rate by Size of Cluster

![Graph showing the average completion rate by size of cluster. The x-axis represents the number of sessions in a cluster, ranging from 1 to 10. The y-axis represents the average completion rate, ranging from 0 to 100%. The graph shows a general increase in completion rate as the size of the cluster increases, with a peak around 8 sessions.](image-url)
Usage

Histogram: Sessions Per Participant
Usage
Average Session Duration

- Complete Session Duration
- Incomplete Session Duration

Help
Search
Browse by District
Browse by Sector

Average Session Duration (sec)
Context

Two sources of collaboration for this project...

Technologists interested in infrastructure appropriate implementations

Work on studying existing apps, and barriers to usage

Interest in building accessible mobile apps for all

Development economists interested in the impact of information

Extension of previous work developing a paper phonebook, with more publications on the impact on the way