Household and Small Business Access & Usage Survey 2011

RIA seeks to build an African base of evidence and knowledge in support of ICT policy and regulation, and to monitor and review policy and regulatory developments on the continent. Part of this effort is the generation of relevant information for policy-makers and regulators. The RIA 2012 e-Access & Usage Survey produced nationally representative indicators at household, individual and informal business levels. The survey used national census sampling frames in co-operation with National Statistical Offices to deliver crucial data in a cost effective way.

RIA Survey Methodology Brief **January 2012**

Lack of Data
Decision-relevant data for ICT policymaking and regulation is often not available in Africa.

Partnership on Measuring ICT for Development
The Survey delivers all indicators required by the Partnership for households and individuals.

Cost Effective
Using Enumerator Areas (EA) of national census sample frames, as well as sampling households and small businesses simultaneously, minimises costs.

Scope
Apart from delivering ICT indicators required by international bodies, the survey delivers data and analysis for several regulatory functions such as pricing regulation, number portability and universal access.

Comprehensive Interaction
The survey explains interactions between households, individuals and businesses on ICT access and usage.

Introduction

This document details the methodology for the RIA 2012 e-Access & Usage survey that delivers nationally representative results for households, individuals, and informal businesses. Using Enumerator Areas (EA) of national census sample frames as primary sampling units, and sampling households and businesses from listings created in the field, allowed the sampling of two very different user groups during a single survey at minimal cost.

Partnership on Measuring ICT for Development

The RIA survey produced all indicators the Partnership requires for measuring ICTs for household and individuals. The ICT indicators were complemented by various relevant aspects for policymakers and regulators such as:

- Untapped demand: the willingness and ability of non-users to pay for services
- Income elasticity of demand
- Multiple SIM card ownership
- Internet adoption: with the focus on mobile internet
- Mobile money adoption and m-banking
- Employment generation and GDP contribution of informal businesses

Sampling

The random sampling was performed in four steps for households and businesses, and a fifth step was necessary for individuals.

- Step 1: The national census sample frames was split into urban and rural Enumerator Areas (EAs).
- Step 2: EAs were sampled for each stratum using probability proportional to size (PPS).
- Step 3: Two listings were compiled for each EA, one for households and one for businesses. The listings served as sample frames for the simple random sections of households and businesses.
- Step 4: 24 Households and 10 businesses were sampled using simple random sampling for each selected EA.
- Step 5: From all household members 15 years or older, and visitors staying the night at the house, one was randomly selected based on simple random sampling.

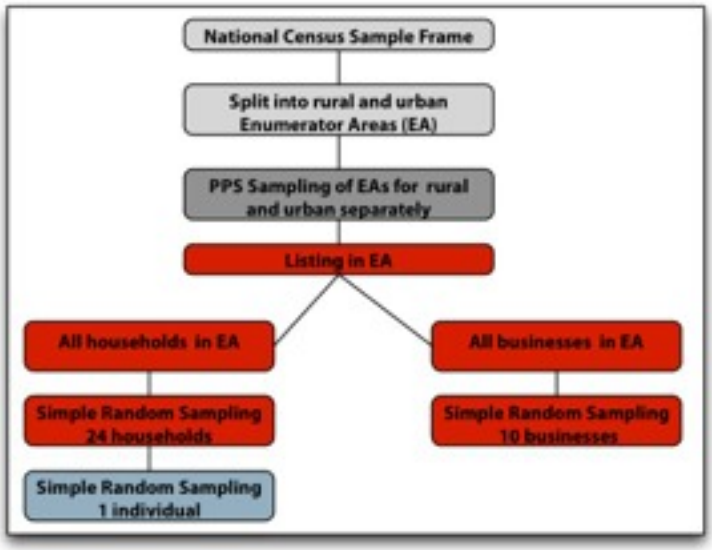

Figure 1: Sampling steps

Figure 2: Example of an Urban EA in Ethiopia

Sample Size

The desired level of accuracy for the survey was set to a confidence level of 95% and an absolute precision (relative margin of error) of 5%. The population proportion P was set conservatively to 0.5 which yields the largest sample size (Lwanga & Lemeshow, 1991). The minimum sample size was determined by the following equation (Rea & Parker, 1997):

$$n = \left(\frac{Z_a \sqrt{p(1-p)}}{C_p} \right)^2 = \left(\frac{1.96\sqrt{0.5(1-0.5)}}{0.05} \right)^2 = 384$$

Inserting the parameters for the survey yields the minimum sample size for simple random sampling. Due to the sampling method chosen for the survey, the minimum sample size has to be multiplied by the design effect variable (Lwanga & Lemeshow, 1991).

Table 1: Targeted and actual sample size	HH Sample		Business Sample	
	Target	Actual	Target	Actual
Botswana	900	919	400	386
Cameroon	1,200	1,199	500	520
Ethiopia	1,600	1,608	600	841
Ghana	1,200	1,203	500	500
Kenya	1,200	1,239	500	513
Mozambique	1,200	1,199	500	495
Namibia	900	967	400	374
Nigeria	1,600	1,552	600	554
Rwanda	1,200	1,200	500	640
South Africa	1,600	1,589	600	627
Tanzania	1,200	1,201	500	491
Uganda	1,200	1,200	500	500
Total	**14,100**	**14,157**	**5,700**	**6,055**

In the absence of empirical data from previous surveys that would have suggested a differed value, the default value of 2 was chosen for the design effect (UNSD, 2005). This yields then, a minimum sample size of 768 per country for households and individuals. The actual sample size for countries is slightly larger than the minimum requirement to compensate for clustering effects. A design effect of 1 is assumed for businesses, leading to a minimum sample of 384 businesses for each country.

Weighting

Three weights were constructed, one each for households, individuals and informal businesses. The weights were based on the inverse selection probabilities [1]. The weights gross up the data to national level.

Household weight: $$HH_w = DW \frac{1}{P_{HH} * P_{EA}}$$

Individual weight: $$IND_w = DW \frac{1}{P_{HH} * P_{EA} * P_I}$$

Business Weight: $$Bus_w = DW \frac{1}{P_{Bus} * P_{EA}}$$

Household Selection Probability: $$P_{HH} = \frac{n}{HH_{EA}}$$

EA Selection Probability: $$P_{EA} = m \frac{HH_{EA}}{HH_{STRATA}}$$

Individual selection Probability: $$P_I = \frac{1}{HH_{m15+}}$$

Business Selection Probability: $$P_{BUS} = \frac{q}{BUS_{EA}}$$

DW = design weight compensation for over-sampling of urban EAs and under-sampling of rural EAs;

HH_{EA} = number of households in selected EA based on information of last census or listing updated by field team;

HH_{STRATA} =number of households in strata (urban, rural);

HH_{m15+} =number of household members or visitors 15 years or older;

m = target number of EAs for each strata, (major urban, other urban, rural);

n = target number of households in EA;

q = target number of businesses in EA;

i=number of household members interviewed.

The target number of households in each EA varied from country to country. Usually 24 households were selected from each EA.

[1] See UNSD (2005) Title? Publisher? page 119 for a detailed discussion on sampling weights.

Table 2: Survey Definitions	
Household	Constitutes a person or group of persons, irrespective of familial relation, who normally live together in the same housing unit or group of housing units and have common cooking arrangements.
Head of household	A head of a household is a person who economically supports or manages the household or, for reasons of age or respect, is considered as head by members of the household, or declares him-/herself as the head of a household.
Member of a household	All persons who lived and ate with the household for at least six months including those who were not within the household at the time of the survey and were expected to be absent from the household for less than six months. All guests and visitors who ate and stayed with the household for six months and more. Housemaids, guards, baby-sitters, etc. who lived and ate with the household, even for less than six months.
Businesses	Any business with a physical presence in the EA, the intent to make a profit

Conclusion

The approach presented here delivers nationally representative ICT indicators for informal businesses. The comprehensive picture emerging from this, combined with household and individual indicators, provides the data required for evidence based policy-making and regulation in Africa.

Table 3: Survey Summary	Household & Individuals	Businesses
Target Population	all households individuals 15+	all businesses
Domains	1 i.e. national level	
Tabulation groups	Urban, Rural	National
Oversampling	Urban 60% Rural 40%	
Clustering	Enumerator Areas (EA) national Census	
None Response	Random substitution	
Sample Frame	Census sample from NSO	
Confidence Level	95%	95%
Design Factor	2	1
Absolute precision	5%	5%
Population Proportion	0.5, for maximum sample size	
Minimum Sample Size	768	384

References

- Lwanga, S. and Lemeshow, S. (1991), *Sample Size Determination in Health Studies – A Practical Manual*, World Health Organisation, Geneva.
- Rea, L. and Parker, R. (1997), *Designing and Conducting Survey Research – A Comprehensive Guide*, Jossey-Bass Publishers, San Francisco.
- Thompson, S. (2002), *Sampling*, Second Edition, Wiley Series in Probability and Statistics.
- UNSD (2005), *Designing Household Surveys Samples: Practical Guidelines*, United Nations, New York.

Contact

Dr. Christoph Stork
Research ICT Africa (RIA)
The Studios, Unit 409, Old Castle Brewery
6 Beach Road, 7925, Woodstock
Cape Town, South Africa
Phone: +27214476332
Fax: +27214479529
Email: cstork@researchictafrica.net
www.researchictafrica.net