

ICT ACCES AND USAGE IN SUB SAHARAN AFRICA: DIGITAL POVERTY ANALYSIS AT INDIVIDUAL LEVEL

Mamadou Alhadji Ly
PhD Fellow Consortium pour la Recherche Economique et Sociale (CRES)-UCAD
CPRafrica conference
Nairobi 18-19 April 2011



PRESENTATION PLAN

I. INTRODUCTION

- Problematic
- Research questions

II. Literature review

III. Methodology

IV. Results

- Conclusion and Policy implications

Introduction

- ❑ The last decade, ICT and Innovation technology are said to be the main drivers of economic growth and social development in developed and transition economies.
- ❑ The facts show that developing countries particularly African countries still occupied the bottom of pyramid in information society.
- ❑ Few researches' are documented at the micro level of access and usage, most of research focused on macro or meso level to analyse the access and usage of ICT (Digital divide).
- ❑ This paper provides a brief definition and measurement of Digital poverty by using both the household and individual Data in 17 countries.

Literature review

□ Theories on the access and use of ICT can be classified into two categories, compared first with the rational component, and secondly with the social component of choice for a media technology.

□ Literature relies on four theories from the two standards. The first two, social presence theory (Short et al. 1976) and the wealth of Media theory (Daft and Lengel 1984, 1986) are the determinants of rational choice and use of media. The last two, symbolic interactionism theory (Mead 1934, Blumer 1969) and social influence theory (Salancik and Pfeffer, 1978) relate social determinants of selection and use of technology.

- ❑ The recent literature in ICT access and usage is attributed to Ajzen and Fishbein work on Reasoned Action Theory (1980), Ajzen and Madden (1986) which suggest that an individual intention of ICT adoption is determined by two basic factors: personal interest and social influence
- ❑ Theory Acceptance Model (Davis 1986) explain the behavior of information system's user: social acceptability and practical acceptability


❑ EMPIRICAL REVIEW

- ❖ There are three approaches which use to deal with ICT acces and usage: Macro, Meso and Micro analysis. We are interested here by the micro analysis.
- ❖ At the the individual level, the main factors put forward to explain the ICT adoption are primarily economic (Tukiainen 2004), demographic, infrastructural, geographical (Tengku 2005), cultural and ethnic (Mc Laren and Zappalà 2002). Skills (Carpenter 1989 and Plotnick 1999)

METHODOLOGIE



The data stems from surveys conducted by RIA in 17 African countries during the end of 2007 and the beginning of 2008. The data is nationally representative on a household level for individuals 16 years of age or older except for Nigeria and Zambia (where the data only allows national extrapolations, due to sampling protocol violations). The survey was stratified into metropolitan, other urban and rural areas. Enumerator areas (EAs) were sampled for each stratum using probability proportional to size (pps) from national census sample frames. EA sample frames were constructed through listing all households within an EA. Households were then sampled using simple random sampling.



The RIA questionnaire was divided in three sections. The first part, the household roster, collected information about all household members. The second part collected household-related information. The head of the household or someone that manages the household answered parts one and two. The third part, the individual section, was answered by an individual, 16 years of age or older, randomly selected from those household members and visitors that slept in the house on the night of the interview

Table 1: Digital Poverty index

ICT access and Usage Variables		Description	Digital Poverty status	Index Value
No ICT access and usage		Neither watching TV, listening to radio, owning a mobile, having access to a fixed line phone or using the Internet	Digitally Excluded	0
Watching TV		Compared to digitally excluded watching TV and or listening to Radio	Digitally Extremely Poor	1
Listening to radio				
Own mobile phone and SIM card		Compared to digitally extremely poor having access to mobile and or fixed-line phone	Digitally Poor	2
Access to fixed line at home or at work				
Use Internet		Compared to digitally poor also using the Internet and or having an email address	Digitally Connected	3
Own e-mail address				
Specific Internet use	Accessing local government and services online	Compared to digitally connected using the Internet for advanced purposes like interacting with local government, e-learning and online banking	Digitally Wealthy	4
	e-learning			
	e-banking			

Table 2: Individual classification criteria according to the level of Digital poverty

Digital Poverty status	Listening Radio	Watching TV	Accessing on fixed line at home or at work or public phone	Having mobile phone and SIM card	Using Internet	Specific Internet Use (accessing local government, services online; e-learning and banking)
Digitally Excluded	No	No	No	No	No	No
Digitally Extremely Poor	Yes	Yes	No	No	No	No
Digitally Poor	Yes	Yes	Yes	Yes	No	No
Digitally Connected	Yes	Yes	Yes	Yes	Yes	No
Digitally Wealthy	Yes	Yes	Yes	Yes	Yes	Yes

Model

- The dependant variable has ordinal outcomes which are ordered to level 1 (Digitally excluded) to level 5 (Digitally wealthy). Then, the ologit model is better to fit this kind of data than the linear regression model (McKelvey and Zavoina 1975; Winsship and Mare 1984).
- The explanotory variables are linked to individual characteristics: sociodemographics and socioeconomic, and countries (the dummy countries variable) which capt the country effect on DPI.

IPN	Digitally excluded [(Pr (DPI==0)]= 0.0319	Digitally Extremely poor [Pr (DPI==1)]=0.198	Digitally poor [Pr (DPI==2)]=0.756	Digitally connected[Pr (DPI==3)]=0.01344	Digitally Wealthy [Pr (DPI==4)]=0.000044
Men_ind_élect*	-.054025 (-20.88)	-.2073551 (-28.20)	.2462345 (27.28)	.0150916 (14.81)	.000054 (6.55)
Female*	.001091 (1.00)	.0051704 (1.00)	-.0057908 (-1.00)	-.0004689 (-1.00)	-1.68e-06 (-0.98)
Age	-.0019398 (-10.59)	-.0091904 (-10.84)	.0102945 (10.86)	.0008327 (9.18)	2.98e-06 (5.81)
Secondary*	-.0203845 (-14.52)	-.0975701 (-15.24)	.1079869 (15.43)	.0099321 (10.80)	.0000357 (5.96)
Primary*	-.0099729 (-8.28)	-.048613 (-8.19)	.053656 (8.33)	.0049122 (6.76)	.0000176 (4.97)
Vocationnal*	-.0234243 (-16.22)	-.1329257 (-15.01)	.1237969 (24.03)	.0324331 (5.55)	.00012 (4.34)
Income_top quartile*	-.0188762 (-15.86)	-.0930103 (-16.44)	.1014931 (16.88)	.0103562 (10.80)	.0000373 (6.15)
Social Network*	-.0140721 (-11.68)	-.0647543 (-12.43)	.0732276 (12.34)	.0055789 (10.36)	.00002 (6.06)
computer scare me*	-.0028647 (-2.06)	-.0137975 (-2.03)	.0153414 (2.05)	.0013162 (1.92)	4.72e-06 (1.86)
Skills *	-.0511846 (-37.67)	-.2425035 (-65.87)	.2716382 (66.95)	.0219712 (17.15)	.0000787 (7.33)
Other urban*	.0105274 (7.35)	.0481571 (7.71)	-.0546507 (-7.62)	-.0040194 (-7.49)	-.0000144 (-5.29)
Rural*	.0231821 (12.11)	.1002944 (13.72)	-.1157967 (-13.39)	-.0076525 (-11.63)	-.0000273 (-6.24)
Non ind*	.0082976 (6.93)	.0389688 (6.15)	-.0437698 (-6.12)	-.0034841 (-5.86)	-.0000125 (-4.64)

	.0045316 (1.54)	.0208188 (1.59)	-.0236117 (-1.57)	-.0017325 (-1.71)	-6.19e-06 (-1.68)
Bénin*					
Bostwana*	-.0101427 (-4.67)	-.051655 (-4.37)	.0556914 (4.58)	.0060844 (3.31)	.0000219 (3.02)
Burkina Faso*	-.0085764 (-4.11)	-.0430946 (-3.91)	.046855 (4.04)	.0047988 (3.14)	.0000173 (2.86)
Cameroun*	.0387578 (7.64)	.1431014 (10.02)	-.1736016 (-9.29)	-.0082283 (-11.09)	-.0000293 (-6.33)
Côte d'ivoire*	.0023707 (0.84)	.0110522 (0.85)	-.0124632 (-0.85)	-.0009563 (-0.89)	-3.42e-06 (-0.88)
Ethiopie*	.0607794 (11.22)	.2035053 (16.72)	-.2530958 (-15.02)	-.0111493 (-13.66)	-.0000397 (-6.51)
Ghana*	-.0063988 (-2.81)	-.0316725 (-2.70)	.0347364 (2.76)	.0033229 (2.31)	.0000119 (2.19)
Kenya*	-.0017759 (-0.76)	-.0085117 (-0.75)	.0094858 (0.76)	.000799 (0.73)	2.86e-06 (0.72)
Mozambique*	.0054111 (1.76)	.0247161 (1.83)	-.0280929 (-1.80)	-.0020271 (-2.00)	-7.24e-06 (-1.93)
Namibie*	-.0050577 (-2.03)	-.0248304 (-1.97)	.0273524 (2.00)	.0025267 (1.74)	9.07e-06 (1.69)
Nigéria*	-.0062703 (-3.23)	-.0307214 (-3.14)	.0338655 (3.19)	.003115 (2.77)	.0000112 (2.60)
Ouganda*	-.0006367 (-0.25)	-.0030297 (-0.25)	.0033873 (0.25)	.0002781 (0.25)	9.96e-07 (0.25)

RESULTS

- The likelihood ratio(LR $\text{Chi}^2(27)=18177.79$) with $\text{Prob}>\text{Chi}^2 =0.0000$ indicates that the model is globally significant.
- All variables are significant except the variable woman.
- Focusing on marginal effects, the availability of electricity in the individual HHm for a unit increase, Ceterus Paribus, reduces the probability of being Dexclu and digitally extremely poor, but increases the other categories dpi

- Age has a significant effect on ICT DPI i.e. the youth are more likely to be digitally wealthy than the elder.
- According to education level attained we notice that secondary education and Vocational level have better effect on ICT access and usage than the Primary level.
- The income is significant. More individual has income less is his probability to be excluded digitally and extremely digitally poor and more his chance of access and usage of new ICTs increase.
- Social Network has the same effect as income and education

- Computer anxiety has a paradox result because it has the same effect as income i.e. it reduces the probability to be digitally excluded and digitally extremely poor. This effect can be attributed to substitution between ICT: with technologic convergence, Today mobile phone is used for Internet acces, listening Radio and watching TV.
- Skills determine significantly acces and usage of ICT, indeed, the more we increase the Internet skills for a unit, other things being equal, the probabilty that an individual being excluded from information society or falls in the extreme digital poverty decrease.

- The digital poverty is a geographic phenomena: leaving the Metropolitan to another urban area, increase the probability to be excluded digitally and to be extremely poor digitally. The same effect is observed when leaving urban area to rural zone.
- The reference country is here South Africa: the probability of access and use of ICT is higher in this country than in other countries in the sample. It is developed than other countries in term of ICT sector. Moreover, countries that do not figure in the regression model were deleted by the software Stata for collinearity problem.

- Individuals living in countries such as Benin, Cameroon, Côte d'Ivoire, Ethiopia and Mozambique are more likely to be excluded from the information society and fall in extreme digital poverty than those living in South Africa all things being equal.
- In fact, these individuals are less likely to access and use ICT both traditional and modern by keeping constant all other variables. Indeed, the probability of being digitally excluded and falling into extreme digital poverty is higher in Ethiopia than in other countries, followed Cameroon, Benin, Mozambique and Ivory Coast. Therefore, the probability for these countries to access and use new technologies decrease significantly.

- By contrast, the people of Botswana, Burkina Faso, Ghana, Kenya, Namibia, Nigeria and Uganda, all things being equal, decrease the probability of being excluded to the Information Society and extreme digital poverty.
- However, individuals are more likely to access and use ICT in these different countries. Thus, Botswana, Nigeria, Namibia, Ghana, Burkina Faso, Kenya and Uganda are the countries where the probability of access and use of ICT among individuals is positively significant.
- In addition, the results also showed a general English-speaking countries are top of the rankings in terms of access and use of ICT. It is outside the reference country (South Africa) Botswana, Nigeria, Namibia and Ghana.

● CONCLUSION

- This paper aims to examine the key factors of access and use of ICTs at the micro level and the impact on digital poverty in SSA. The regression results of ordered logistic model showed that the variable capacity (e-skills) impact significantly on the prediction of the different levels of access and use of ICT.
- In addition, factor income and education level "vocational training" achieved significantly explain the probability of access and use of ICT among individuals.

- There was no significant impact of the gender variable (female) on the prediction of the impact of digital poverty. By contrast, digital poverty is more rural and peri-urban areas than metropolitan area.
- The results showed that individuals with no occupation or seasonal activity are most vulnerable to exclusion from the information society and the extreme digital poverty than those who have a full time job.
- Similarly, age is not linear in predicting the incidence of digital poverty, youth (16-25 years) are more likely to be connected and digitally wealthy than older (51 years and over).

- Moreover, the results showed that people in countries like South Africa, Nigeria, Kenya, Namibia and Senegal are the top five among the 17 countries whose populations are more easily access and use of ICT.
- The countries that occupy the bottom of the pyramid in terms of exclusion from information society are Mozambique, Ethiopia, Rwanda, Tanzania and Zambia.
- This shows that the level of economic development is among others a determinant of access and use of ICT.

THANKS!