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PROPOSAL:

Model for ICT access and use surveys in Africa, Asia and Latin America

ICT Indicators for the Global South: Beyond Access

(ICTi4Africa, ICTi4Asia & ICTi4LatAm,)

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EXECUTIVE SUMMARY

It is well accepted that access to and use of ICTs is a prerequisite to human development. Without connectivity, people, be it as consumers, workers or entrepreneurs, face barriers for participating in the economic and social networks that permeate modern societies (World Bank, 2016). Moreover, the recently approved Sustainable Development Goals (SDG) include ICT access and use into the purview of targets: 5.b. "enhance the use of enabling technologies, in particular ICT, to promote women's empowerment"; and 9.c. "significantly increase access to ICT and strive to provide universal and affordable access to Internet in LDCs by 2020".

Development discourse over the last decade has focused on access. While universal access still remains a challenge in many parts of the Global South, the supply side problems, and to some degree the solutions, are relatively well understood. Most countries in the global South are well into one or two decades of reforms in the telecom sectors. The available evidence shows that the ownership and use of mobile phones for voice/SMS communication is an overall success, even though significant disparities exist between Africa, Asia and Latin America. Yet, even with many owning internet-capable phones (albeit basic models), access to and the use of the Internet remains woefully low across all three regions. In Asia, the region that has historically had the lowest connectivity prices in the world with costs well under 5% of monthly income even for poor users, Internet adoption is below 20%. Although there are large data gaps in the available evidence, there is every reason to believe this is even lower in Africa. Clearly, something other than simple affordability is involved in getting people online. What are these barriers? Is it digital literacy? Lack of perceived usefulness of getting online? Cultural barriers and norms? Gender disparities? The answer may be different based on country, region, income, and a host of other factors. An in-depth understanding of the potential users is key to understanding the barriers, thereby helping formulate solutions to cross these barriers.

As important as understanding the barriers to use, is to understand how those who are online are using the Internet – what is being consumed, how, where and why? As far back as 2006, in the days of voice/SMS, household surveys documented that over 90% of the poorest in Asia had made or received a phone call (thanks to phone sharing), a factoid that surprised many who were only looking at national-level SIM-card penetration numbers as revealed by telecom operator statistics (which indicated much lower numbers). Similarly, before mobile voice/SMS prices dropped sharply in Asia, national level data showed the poor spending a significant part of their monthly income on calls/SMS. Yet, individual and household surveys as well as ethnographic research revealed the complex ways in which they use multiple SIM cards, sometimes switching SIMs as often as six times per day to make use of cheap promotional offers by the telecom operators, thereby making significant cost savings. Such real-world consumption patterns were only seen through direct observational research methodologies. Today, the need for such observations is even greater – why do users get online on the first place? What is the most attractive content? How do users on limited budgets manage their expenditure on data, where download quantities are much harder to gauge than clocking the minutes he/she spent on a voice call? RIA research sheds light on how the poor across Africa are creatively switching between multiple modes of access (mobile phone data packages, free Wi-Fi on the mobile accessed at public access points) to maximise the amount of data consumed. Are Asian and Latin American users adopting similar strategies, and if so, should policies regarding government funding of public Wi-Fi spots change? How do multiple modes of access (mobile phone data packages, paid or free Wi-Fi on the mobile accessed at community centres or Internet Cafes) impact users' consumption of the Internet? What role does the provision of promotional packages (such as free content inside walled gardens) impact user

behaviour? Many such questions need to be answered if policy makers in the global South are to increase access and use of the Internet and improve the lives of their citizens.

As we move increasingly to the global complex adaptive system which is the Internet, policy can no longer be based on supply-side data alone. Demand-side representation of Internet users for commercial, private and state-related interactions, producing content and devising new uses in policy formulation is imperative. There is far less evidence of what the challenges are "beyond access" and the solutions as a result are far less well understood. We know some of the factors that drive consumer demand for ICT services. Such factors are income, demographic and skills related. They are also politically and socially determined. Understanding the capabilities required by citizens to exercise their freedom in a digital world and the constraints on them doing so is vital for the creation of an evidence base for demand-side intervention.

Often these may not be quantifiable. Qualitative tools, such as focus groups, are thus used in conjunction with the conventional quantitative tools to help identify the constraints to individuals' capabilities. The deployment of a capability approach provides a novel way of understanding ICT use (and access), and has potential for identifying more accurate points for policy intervention. This unified, cross-continental approach will create a rich and robust data set from to form universal indicators that have historically been uneven in their availability and quality.

Through nationally representative household and enterprise surveys, the research will answer the questions around who has (or does not have) access to varying forms of ICTs, how much use of ICTs is taking place and what type of digital participation are citizens of the global South having once they get online? It will differentiate the answers between key differentiators already known – men vs. women, rich vs. poor, urban vs. rural dwellers, literate vs. illiterate, youth vs elder as well as other dimensions that are yet to be discovered. The ground realities that emerge from the field research will be supplemented with analysis of policies conducive to increased access, use and digital participation. The evidence will be used to influence policy in each country.

There is evidence that ICTs reduce transaction costs and increase efficiency and transparency in many sectors, be it commerce, agriculture, delivery of government services, and operations of transport and other infrastructures. The use of ICTs, especially mobile phones, is "mainstreamed" into development programs, and of late, aid is flowing to projects that aim to use ICTs to deliver services to citizens or to enhance their livelihoods – be it disseminating market prices to farmers, or delivering government services. There is much hype about the "app economy" and the dividends of increased open data reaching the poorest citizens. Yet, a recent systematic review of 15-years of evidence of impacts of mobile phones in low and middle income countries reveals that while the impacts rolling out mobile phone networks areare positive overall, the impact of providing specific mobile applications targeting specific services (e.g. providing market information to farmers) is largely inconclusive (see Stork, Kapugama, Samarajiva, 2013). Another systematic review of impact of networked ICT devices on small, medium and micro enterprises found positive impacts on business growth and internal efficiency, but found the effect sizes to be very small (Ilavarasan et al, 2015). These comprehensive reviews hint at the need for a nuanced understanding of ICT interventions, and point to the need for looking beyond simply connectivity, into factors such as capacity, networks and other "analogue factors" that can amplify or minimise the effects of digital interventions on the target groups.

The proposed research will yield insight into such nuances and the resulting policy interventions will help shape pro-poor policies, and help targeting development funds most appropriate through differentiated treatment. This can help reduce the digital gap that already exists across countries, income groups and gender.

While these surveys are extremely resource intensive the cost of not doing them needs to be considered. The forgone funds that may be spent on misplaced directives by governments and states is just one of the most obvious. Although only a few countries will be covered in this first regional coordinated round, this nationally representative inter-region comparable database will provide the basis for larger comparative studies in future. With a synchronised methodology designed to create accurate indicators and explanatory variables, such surveys make possible modelling that is not possible without national representativity. With the increasing number of lower-end OTT services and apps, zero-rated and bundled services almost universally available across all countries proposed in this study, the database will provide the only user-based perspective on understanding what ICTs are used for when they are used, and why they are not used in the cases where this still exists.

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INTRODUCTION

The Global South is undergoing rapid social and economic change as a result of the confluence of mobile and broadband technologies on the continent. There is mounting evidence that broadband directly contributes to job creation and stimulates economic growth. The improvements in the flows of information and the reduction in transaction costs not only improves the efficiency of business but enhances the well-being of those who are connected to the Internet. But, there is also evidence of an increasing divide not only between those with access to such services and those without access, but between those who are connected with the means and skills to utilise the Internet optimally and those who are not. From a policy perspective this requires extending interventions to address inequality from those focussed purely on supply-side investment and operator-based strategies to those focussing on demand side challenges, still of affordability, but also a range of others enabling or enhancing digital inclusion – education, income, e-skills of various kinds at various levels, content and language.

As we move from voice communication services to the global complex adaptive system which is the Internet, policy cannot only be understood as an infrastructural issue any longer. It can also not be siloed into a single policy sector. The cross-cutting nature of ICT in the economy and society with the public and private sectors together with the factors determining digital inequality lying outside of the traditional communications sector, imply that integrated and coordinated policy responses are required form the state. While access to affordable bandwidth will remain a key objective of any policy and a necessary condition for realising the benefits of broadband Internet, it is by no means a sufficient condition for these benefits.

Identifying the best points for policy intervention from this perspective will require far better understanding of demand, or the absence of it; of users, citizens, entrepreneurs, and consumers in all their diversity; what or what not they are using their mobile devices to do; what they are prepared to pay for and what not; their use of social networking and other services; their response to zero-rated or pared down services or platforms, or commercial or technological innovations and regulatory changes; whether these stimulate take up and are a gateway to open Internet use or whether they are Internet ghettos for the poor; the reasons for people being offline; and what they are using the Internet for when they are. Moving 'Beyond Access' to better understand these challenges and to build an evidence base for demand side intervention is the primary purpose of this new round of data collection, indicator development, and analysis.

Research ICT Africa ("RIA"), LIRNE*asia* and the Latin America Regional Dialogue on the Information Society ("DIRSI") seek to build a Global South base of evidence and knowledge toto support ICT policy and regulation, and to monitor, review and inform policy and regulatory developments on the African, Asian and South American continents. One part of this effort is the generation of relevant information for policy-makers and regulators of which the collection, generation and particularly the analysis of ICT statistics and indicators serves a critical purpose.

The three regional networks, working across Africa, Asia and Latin America; with the help of the IDRC, have already created strong repositories of supply- and demand-side data over the past decade but this is the first time research efforts will be more systematically coordinated and resources shared. Over the past few years the global recession, migrant crisis and shifts in donor focus have seen the demand-side surveys, in particular because of their resource intensity, wane. A consequence has been the lack of updated data in regions where it is most needed for development gains in a sector characterised by rapid change. As a result, relevant demand side policy proposals to

increase access, use and appropriation are outdated in the presence of major investments, mostly public funding, that address the supply side constraints.

The demand for insights into access to and use of ICTs has come onto the agenda of different multilateral aid and development agencies, industry associations, donor organisations and foundations. This uncoordinated approach has resulted in a significant amount of ad hoc research and funding, duplication of effort, producing rather inadequate, inconsistent and sometimes patently flawed results. Evidence being sought could be better elicited from a comprehensive set of ICT indicators that if collectively funded and if placed in the public domain, could become a public resource - and indeed like other national statistics - a public good.

This proposal has arisen from discussions with the IDRC, SIDA, EU, the African Union and USAID on the importance of creating a robust repository of data that will be used to inform evidence-based ICT policy across the Global South and the pooling of funds to achieve this. As alluded to above, there are several cross-continental organisations wanting demand-side indicators for different purposes. While all have expressed an interest in supporting this initiative in future, other than IIDRC, they not able to support proposed phase of the proposed project, for various reasons. They have been asked to be kept abreast of development this round and would like to be informed of future planned rounds. Mozilla has indicated some modest complementary funding to support pre-and post-survey focus groups that will enhance the quantitative findings.

Our discussions with these organisations in particular have been focused on the need to move beyond high level descriptive indictors primarily focussed on access (which this research will continue to provide) to understanding the social, economic and political factors determining digital inequality, even once people are connected.

RIA, LIRNEasia and DIRSI are proposing consolidating efforts to provide nationally representative studies that are compliant with the universal indicators of the ITU and UNCTAD measuring the Information Society Partnership, which are used throughout the UN system. The more countries surveyed, the more accurate data will be available for evidence-based policy at the national, regional and multilateral level. Individual countries may come on board as part of multilateral commissions such as by the ITU for Lesotho and at the sub-national level as provincial and local government level ICT access and use research emerges in countries.

Arguably even greater value is derived from the comparative aspects of the research, providing opportunities for countries to benchmark their policy practices and outcomes. However, these traditional indicators often lack explanatory value. It is therefore the purpose of this research to go beyond the resulting simple correlations to model and analyse the data collected in order to be able to explain the relationships between variables with a rigorous methodology, and in this way identify the precise points of policy intervention.

This proposal seeks to pool these resources into a transparent and accountable fund which ensures that the surveys are undertaken on a regular basis (initially two survey waves of six months each over 5 years).

Under current funding constraints it is proposed that in the short term new individual, household access and use surveys only (not informal sector surveys) are conducted in eight countries on ICT access and use across Africa, Asia and Latin America over a five-year period (2016-2020). The indicators collected for this effort will be grouped by region and are entitled: ICT indicators for Africa (“ICTi4Africa”), ICT indicators for Asia (“ICTi4Asia”) and ICT indicators for Latin America (“ICTi4LatAm”). The methodology for the first time will also be synchronised so that indicators for the Global South can be developed and the data used for comparative analysis across the three regions. It is hope that in

future we will be able to ramp up to our earlier levels with 20 countries in Africa, 16 countries in Asia and 10 countries in Latin America.

BRINGING EVIDENCE TO POLICY IN THE GLOBAL SOUTH

The cross region synergies in the field of demand side (and supply side) ICT research is evident from the work done by DIRSI, LIRNEasia and RIA on their respective continents. Below is a systematic discussion of the work done in each region by each network and a description of the cross regional synergies that have arisen from supply and demand side work.

AFRICA – RESEARCH ICT AFRICA (RIA)

Research ICT Africa (RIA) is a think tank that has operated for over a decade to fill a strategic gap in the development of a sustainable information society and network knowledge economy by building the ICT policy and regulatory research capacity needed to inform effective ICT governance in Africa. The network extends across the continent and seeks to extend its activities through national, regional and continental partnerships. The establishment of the RIA network emanates from the growing demand for data and analysis necessary for the appropriate and visionary policy required to catapult the continent into the information age. Through rigorous research and analysis RIA seeks to build an African knowledge base in support of effective ICT policy and regulation, and to monitor and review developments on the continent. The research arising from a public interest agenda is made available in the public domain, and individuals and entities from public and private sector and civil society are encouraged to use it for teaching, further research or to enable them to participate more effectively in national, regional and global ICT policy formulation and governance.

On the basis of this research and extensive practical policy and regulatory experience RIA offers technical assistance and advisory services to multilateral agencies, governments and regulatory agencies across the continent. It also offers regulatory executive training and post-graduate education through the University of Cape Town

RIA has been commissioned to undertake research, technical assistance and capacity building for multilateral agencies such as the International Telecommunications Union, the Commonwealth Telecommunications Organisation, United National Conference on Trade and Development, the African Development Bank, the World Bank and the European Bank for Reconstruction and Development. It has provided technical assistance to the Government of Mauritius, Namibia and South Africa, including the National Treasury, the Department of Communication, Department of Trade and Industry, the Competition Commission and the communications authority, ICASA.

On the supply-side, RIA has continued to collect pricing data for policy analysis across forty-plus African countries, that has been critical in raising awareness of the cost of communications in developing countries, market and regulatory bottlenecks in certain markets and the challenges of affordability in countries with high network extension costs (remote areas and the arising need to install roads and power to extend networks) and low income. RIA has also undertaken pricing studies to develop indices that better capture the dynamic, bundled pricing packages that drive mobile broadband uptake in the predominantly pre-paid markets of the Global South. These prepaid offerings have been analysed in relation to quality of service to determine the value consumers are getting for what they are paying for and RIA has found that in all cases users are getting far less than is being advertised. This and a range of other supply-side data (bandwidth and post-paid pricing indices) has enabled financial analysis of African markets and the regulation of them, that has been used by civil society, regulators, parliaments and Ministries to inform official decision-making and drive affordable access and right-to-know campaigns.

Invaluable as the supply-side data is there is certain information and indicators particularly in prepaid mobile environments that characterise ICT access and use in the Global South that can only be derived from nationally representative demand-side data. This has been acknowledged by the WSIS Partnership on Measuring the Information Society, led by the ITU and UNCTAD who in addition to defining universal supply-side indicators have developed a suite of nationally representative demand-side surveys to measure ICT progress amongst individuals, households, enterprise and government. the demand side, RIA has collected ICT access and use surveys periodically since the early 2000's across Africa. Starting with only 10 countries in 2004[1]

On the demand side the ICT access and use surveys increased to 14 countries in 2005[2], 17 countries in 2007/8 [3]and 12 in 2011/12[4]. These surveys have provided indicators at the household, individual and the informal business levels. The surveys covered fixed, mobile and Internet services were designed to obtain individual and household level information from the population that would otherwise not be possible to obtain (such as education levels, employment status and other demographic information of users). This data has been invaluable in looking at access and use by citizens, consumer satisfaction, affordability and patterns of use of ICTs nationally. Disaggregated by location, gender and income allows for much greater granularity than either supply-side indicators or even limited high-level census data, which in most countries do not attempt to measure use. The dynamics of ICT use and uptake have therefore been analysed as the evolution of ICT's at each survey interval evolves and changes. Each round of the survey has been accompanied by rich focus groups in several of the countries to supplement findings that quantitative methods fall short of resolving. This allows for a stronger and more robust analysis.

As the only comprehensive demand-side research of this kind in the public domain, and in many countries at all, the value such surveys have added in assisting the development of national ICT policy requirements and understanding the ICT regulatory environment has been immense.

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[1] See previous demand side surveys: http://www.researchictafrica.net/publications/Towards_an_African_e-Index/Towards_and_African_e-Index_Household_and_individual_ICT_Access_and_Usage_across_10_African_countries_2005.pdf

[2] http://www.researchictafrica.net/publications/Research_ICT_Africa_e-Index_Series/SME%20e-Access%20and%20Usage%20in%2014%20African%20Countries.pdf

[3] http://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation_-_Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%202%20-%20ICT%20Access%20and%20Usage%20in%20Africa%202008.pdf

[4] http://www.researchictafrica.net/ict_surveys.php?h=2

ASIA - LIRNEASIA

In Asia, LIRNE*asia* has carried out similar efforts. Defining methodologies and measuring performance of certain aspects of the ICT sector has been a big part of LIRNE*asia*'s research since its inception in 2004. On the supply side, over the last decade, it has examined both objective indicators of success[5] and subjective indicators[6]. LIRNE*asia* started off by looking at regulatory agency websites and ranking them according to who gives the best information to stakeholders. LIRNE*asia* then moved on to measuring regulatory success by developing a perception survey known as the Telecommunication Regulatory Environment (TRE,),[7]. These TRE surveys were subsequently implemented in Africa and Latin America by RIA and DIRSI respectively. RIA combined the TRE survey with other supply-side indicators to measure overall telecom/ICT sector performance, and LIRNEasia subsequently did the same.

Recognising the growing demand for Internet and data services fuelled by lower handset and connectivity prices and greater availability of applications and services relevant to low-income mobile users LIRNE*asia* pioneered the measurement of broadband quality of service experience (BB QoSE)[8]. This supply side testing methodology (subsequently improved and adopted by RIA) showed that the actual speeds fell well below what was advertised, and that under-provisioning of international backhaul capacity was a significant part of the problem. The findings led to evidence-based interventions into policy processes related to international cable capacity, with the highlight being UN-ESCAP prioritising the cross-border overland fibre capacity along Asian road network.

On the demand side, LIRNEasia has conducted ICT access and use surveys in a core set of countries[9]. The research has been conducted at various levels (individual, household, micro-enterprise and local administrator), collecting both quantitative and qualitative data.

LIRNEasia is a pro-poor, pro-market think tank. Its mission is: Catalyzing policy change through research to improve people's lives in the emerging Asia Pacific by facilitating their use of hard and soft infrastructures through the use of knowledge, information and technology.

LIRNEasia focuses on creating and disseminating independent, usable, actionable knowledge, through applied research, on documenting and disseminating regional best practices, on training and on providing short-term advisory assistance to governments/parties who request it.

Our primary audiences are governments (including bilateral and multilateral donor agencies), the private sector within and outside the Asia Pacific, media and civil society. We emphasise Asia Pacific expertise, but are not exclusive about it. We do case studies, but our policy is to abstract from the complexity to produce information that other countries can use.

[5] For instance data that shows if connectivity is increasing, if prices are dropping, if quality is increasing, etc.

[6] Such as stakeholders opinions of whether the regulators /policy makers are "doing a good job"

[7] Conducted in 8 Asians countries including India, Pakistan, Maldives, Sri Lanka, Indonesia, Thailand, Afghanistan and the Philippines

[8] Carried out in India, Pakistan, Maldives, Nepal, Sri Lanka, Indonesia, Thailand

[9] India, Sri Lanka. Pakistan, Bangladesh, Indonesia, Thailand, Philippines and most recently Myanmar

LIRNEasia also pioneered national level base of the pyramid (BOP) surveys, the focus of which has evolved with the market. Initially exploring patterns and means of shared use, the focus shifted to using mobiles to connect the (then) next 1 billion unconnected users. I. In 2010 the Teleuse@BOP surveys were based on the premise that those at the BOP will first experience the Internet via a mobile device. By 2013 the focus was on productive use of mobiles by those at the BOP, expanding on the information needs and use of mobile phones by micro enterprises.

In 2015 LIRNEasia has expanded this demand-side research to Myanmar by establishing an early baseline of ICT access and use, in order to measure the socioeconomic impacts of mobile phones in the country which experienced a comparatively late opening up of the mobile market in 2014. Nationally representative data was collected from households individuals between the ages of 15-65 and local administrators; over 12,000 individuals were surveyed using electronic data entry.

On the qualitative side, LIRNE*asia*, RIA and DIRSI place great value on the qualitative insights which arise from deeper interactions with respondents, through a variety of methods, such as focus group discussions (FGDs), in-depth interviews, home visits, mini-ethnographies and on-site observations. As such, most of the larger quantitative studies are preceded and/or followed by a series of qualitative data collection protocols using a carefully designed sample and research instruments. While FGDs can paint a broad-brush picture of the 'whys' and 'hows' of patterns observed in the quantitative data, or can help better shape a survey questionnaire, the richest insights come from one-on-one interactions and observations of the respondents in their own environments. LIRNE*asia* has conducted qualitative studies which focus on a broad range of issues (mobiles, migration and remittances; gender, mobiles and Internet; information needs and uses in low income urban micro enterprises, among others).

Latin America – Dialogo Regional Sobre sociedid De La Informacion (DIRSI)

Like RIA and LIRNE*asia*, DIRSI has conducted multi-component regional studies on ICT access strategies and use patterns by the poor, with a specific focus on mobile telephony and broadband. The dominant narrative about shared broadband access as the most cost-effective ICT access strategy for the poor ignores opportunities opened up by the explosive growth in mobile telephony coverage and take-up, better known as "Mobile Opportunities". In 2007, these "Mobile Opportunities" were measured by the results from a seven-country demand side survey in Latin America[10] as well as in-depth interviews in two countries[11] confirming the extent and depth of the diffusion that mobile telephony has achieved among poor households. It also outlined that significant access and use gaps are still present, in part resulting from tariff structures and commercial models that inhibit access and discourage broader use; and that few made use of mobile services beyond voice, partly as a result of lack of appropriate mobile applications for the poor.

The results of the study were extensively covered in the general as well as the specialised press, and DIRSI members have presented findings in regional and international meetings and conferences. The study succeeded in influencing the policy agenda mainly in Mexico and Peru[12] promoting serious discussion about mobile telephony affordability and the potential delivery of a broader range of mobile applications.

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[10] comprising Argentina, Brazil, Colombia, Jamaica, Mexico, Peru, and Trinidad & Tobago

[11] Jamaica and Peru

[12] The study revealed Mexico and Peru to be falling behind in mobile diffusion among the poor.

The connectivity landscape has dramatically changed since DIRSI first started examining the contribution of new ICTs to development. Whereas in the past the network research questions addressed basic inequalities in access to these tools, the questions that guided the second phase of research cycle ***went beyond*** access and relate to the potential benefits derived from adoption in specific social and economic domains that significantly affect the wellbeing of the poor and marginalised groups.

DIRSI is a network of Latin American researchers who over 10 years have worked on ICT use and regulation to create universal inclusion in the benefits of the information society. Through engagement with policy makers and regulators in the different countries, and with multilateral organizations, such as ECLAC and IADB, DIRSI has participated actively in the policy debate bringing forward data and analysis focussing on the bottom of the pyramid.

DIRSI's follow-on research cycle studies re-examine digital poverty under this new connectivity landscape. More specifically, assessing how the poor are utilising new ICTs to participate in a variety of new information networks across social domains, and how increased access to such networks is catalysing positive development changes. By establishing basic parameters about patterns of use in different livelihoods domains (e.g., the personal, the educational, the employment domain), this contributes to informing debate in a range of ICT4D subfields – very much like the demand-side work of RIA and LIRNEasia. The presentation of solid empirical evidence (both quantitative and qualitative) from a demand-side perspective also informs policymakers and practitioners in the design and implementation of development projects based on new ICT platforms.

DIRSI's work has also focussed on Affordability and Inclusion that seeks to provide continued support to the research base on ICT affordability and the patterns of ICT spending by the poor. This work has helped establish DIRSI as a major node of high-quality data and regional expertise on these issues, spanning collaborative projects with key international organisations such as ECLAC, ITU and the IADB, much of which is ongoing. More importantly, recent findings continue to point to low affordability as a major obstacle for full participation in new information networks by the region's majority.[13]

DIRSI's current work (2014-2016) is based on a research component titled Digital Poverty Survey 2.0[14], which focuses on digital poverty characterising adoption strategies and patterns of ICT use by the poor and other disadvantaged groups. Basic mobile services are approaching universal adoption in the region, while mobile Internet connectivity is increasingly available to the poor. The main objective of the digital poverty survey is to assess how the poor are utilising new ICTs to participate in a variety of new information networks, and whether increased access to such networks is catalysing positive development changes. The presentation of solid empirical evidence (both quantitative and qualitative) from a demand-side perspective will inform practitioners in the design and implementation of development projects based on new ICT platforms.

CONCEPTUAL FRAMEWORK

The research approach is based on understanding the role of ICT in social and economic inclusion to be able to guide policy formulation in the ICT and broadband field including

[13] Katz and Galperin (2013), The Demand Gap: Drivers and Public Policies. Santiago de Chile: CEPAL/DIRSI.

[14] This survey consisted of data from capital cities of three countries in Latin America: Argentina, Peru and Guatemala.

related policy areas such as e-government, e-democracy, emergency relief, e-participation, e-education, e-health and mobile money.

That importance of the role that ICTs play in economic and social development is now largely uncontested. At the macro-economic level, increased penetration of ICTs is associated with improved productivity (per capita GDP) and job generation (Katz et al. 2013; Kim et al. 2010)

On a micro level, wider access to affordable mobile communications has enabled social inclusion through employment generation and improvements in social services, and in livelihoods (de Silva et al. 2009, Jensen 2007). Interestingly, it has been shown that simply rolling out mobile phone networks is the most powerful development "intervention" in this regard, as compared to targeted mobile services and applications (e.g., agricultural price information apps, etc.) which too have an impact, though generalisable evidence is less consistent across studies (Stork et al. 2013).

More recently, the role of ICTs in enhancing political participation and resistance has been documented and analysed (Castells, 2012). The centrality of access to ICTs and the capability to exploit them to enhance wellbeing is now well accepted (Sen in Spence and Smith, 2011; Castells and Himanen, 2014, WDR 2016). Earlier work done within the networks demonstrates that ICTs are unlikely to transform the lives of the marginalised in unequal societies and economies on their own (Deen-Swarray et al. 2013; Chair, 2014). The arising "digital divide" literature tends mainly to be concerned with the differential exclusion and inclusion of different groups of people from the world of ICT. As Sorenson (2002) argues in relation to gender divides, exclusion has however been much more conceptualised than inclusion, which has often only been operationalised in terms of exclusion mechanisms. Our conceptual framework seeks to provide a way of exploring the dynamic interplay between those unable to enjoy the full benefits of enhanced communication services in the context of inclusion and exclusion. Those marginalised from services are not passive. RIA research over the last decade suggests that the marginalised do not sit around waiting for policy interventions. They devise multiple strategies to access communications as conduits to social and economic inclusion (Stork et al. 2013). To better understand the dynamics of these relationships, the complex context in which these interplays occur, need to be fully explored empirically and better theorised.

Digital inclusion is most commonly understood as a process of diffusion with Rogers' (1995) inimitable S-curve as its standard outcome. This however, overlooks a range of other factors that influence the differential uptake of ICT between those able to optimise ICTs for their well-being and those that are not. Factors such as income, level of education, age and ethnicity also affect the relationship between gender and ICT and therefore need to be taken into account to provide a better insight into exclusion and inclusion processes (Oost, 2002; Faulkner, 2002, MacKeogh, 2002; Fortunati & Manganelli, 2002).

Application of James Heintz's (2012) work on inclusive growth is instructive in trying to conceptualise inclusion rather than exclusion. Using his economic inclusivity argument one could argue that including marginalised groups actively in research and policy interventions is a significant aspect of the broader institutional setting within which public goods are provided and government revenues mobilised. Applying his contention about inclusive growth to ICT, one could argue that more research is needed on how the provision of public goods, or social goods, such as ICTs can improve equality through enhanced access and use and how investments in such social goods can be financed through the better mobilisation of resources. (2012:11).

This research aims to contribute to the ongoing debates on digital inclusion by this conceptual framework as a lens through which to explore our empirical and theoretical work and improve the rigour of policy recommendations. In quantitative studies, the

concept of exclusion is generally applied to the variables of education, income, age, location. The significant softer variables of culture and ethnicity can generally only be directly captured through qualitative research.

ICTs from pay-phones, to mobile phones and particularly the Internet, are variables for digital inclusivity. Their availability and affordability as they increasingly become general purpose technologies is determined by the policy and regulatory environment from which they emerge and operate in. The interplay between these factors of inclusion and exclusion will determine the levels of social and economic inclusion of various groups of people in society and the economy.

While this wider inclusion-exclusion approach will continue to inform the research and yield traditional social economic indicators in relation to ICT access and use, to really move 'beyond access' and to understand the demand-side challenges constraining Internet take up, the research will more actively incorporate into the conceptual framework a Capability Approach ("CA"). This extends the research focus from economic development primarily to social development and particularly imbues it with the political parameters. The CA emphasises people as the means and ends of development (Ibrahim, 2006).

The CA has developed largely from the seminal work of Amartya Sen, and specifically his notion of capability as freedom that has stimulated discussions on the relationship between ICTs and human development (Sen, 1999). This approach will enable the framing of the questions in a people-centred way and the measurement of outcomes not only in economic or material terms but in terms of wellbeing and agency[15].

In this way the CA assumes that well-being and agency should be discussed in terms of people's effective opportunities to successfully undertake the actions and activities that they want to engage in and be who they want to be. These doings and beings are conceptualised as functionings in the CA, which are states and activities constitutive of a person's being (Sen, 1985b, 1999). Examples of functionings can vary from basic to complex things. Being literate, healthy, and participating in a community for public affairs are functionings – things a person may value doing or being; whereas capabilities are things that a person has actually done, as well as things people can possibly do, with the goods they have access to (Sen, 1999). Different categories of functionings and capabilities can be defined based on the main dimensions of freedom: political freedom, economic facilities, social opportunities, transparency guarantees, and protective security (Sen, 1999, 2002). As a broad normative framework, the CA can be used to evaluate individual well-being and social arrangements or it can be used to design and evaluate policies (Sen, 1999).

In prioritising people's opportunities to realise their valued 'functionings', the CA stands in contrast to other measures of well-being, some of which focus exclusively on subjective categories while others focus solely on material means to well-being. The CA enables an examination of the intersection of factors that determine well-being. Using the CA in relation to ICT allows for the examination of conventional factors such as income, education, health, freedom of expression, and political rights. Over and above this, the study will use the CA to examine the use of ICTs for various purposes to capture how ICTs are connected to developmental outcomes. ICT use is context-sensitive, because what is

[15] Although the upsurge of interest in CA in relation to ICT4D in particularly largely takes the form of qualitative research, some quantitative analysis has been undertaken. Innovatively, Rong Wang used RIA household and individual ICT user data from 2012 across 12 African countries w to explain the 'beyond access' problems inhibiting user use. See Wang, R. (2015). Internet use and the building of social capital for development: A network perspective. Information Technologies & International Development, 11(2), 19–34. Volume 11, Number 2, Summer 2015, 19–34

effective in one context may not work well in another. This study draws on the CA to examine multiple dimensions of ICT use, which are defined in relation to policy goals.

Building on the extensive work in this area, most of which is qualitatively applied, (Kleine 2014, Heeks 2002, Gurstein 2013 and Gigler 2011) this research will adapt the multiple dimensions of capabilities, to inform the quantitative approach used amongst the networks historically to include non-material aspects of well-being and agency freedoms (Gigler, 2011). Thus developing datasets will tell us far more about how and how much, why and what for people are using the Internet.

As summarised by Wang (2015), the main dimensions of capability that have been applied to ICT include informational capability, which is about the freedom to know where to get, inspect, organise, and transmit information (Gigler, 2011). The second dimension is economic capability, which posits that wealth and employment not only enhance well-being but freedom (Heeks & Molla, 2009). The third dimension is political capability, which is about freedom of speech and the capability to participate in public affairs (Heeks, 2002). The fourth dimension is social capability, which is defined as the freedom to enhance literacy and learning and, thus, provide social opportunities (Heeks & Molla, 2009). The last dimension is cultural capability, which is about the capability for entertainment and leisure (Gurstein, 2003). With regard to these collective dimensions of capability, this research will identify individuals' capabilities to use ICTs in multiple contexts: information seeking, economic transactions, interacting with the government, online learning and education, and recreational activities (Wang, 2015; Gigler, 2011; Heeks, 2002).

This approach will enable the development of the questionnaire around these capabilities. The CA recognises ICTs as an enabler of positive social outcomes and will better enable the data gathering and subsequent analysis and potential theorising in relation to, for instance, the use of social networking, which our previous research tells us drives Internet take up in relation to other uses of the Internet for social goods; the limitations on freedom of expression or surveillance on use; user awareness of censorship, privacy and net security which better reflect Internet use as opposed to just telecommunications.

RESEARCH DESIGN

Based on the above conceptual framework, our research design provides a problem statement explaining the need for the research, outlines the objectives of the research, and delves into the methodology.

PROBLEM STATEMENT

Evidence-based policy formulation is a must among LDCs suffering from scarce public resources and major goals to achieve basic levels of wellbeing for its population. Most developing countries suffer from a severe shortage of basic ICT statistical data and analysis to inform policy and regulation. To achieve the SDGs regarding ICT appropriation and use, and realise the potential of ICT to enhance development outcomes for the people, solid and appropriate data are needed.

National statistics offices and regulators generally do not collect the demand-side data needed to measure ICT access and use to determine current policy and regulatory outcomes and thereby identify points of policy intervention to meet public interest objectives. They are therefore unable to report to international and multilateral agencies (ITU, WB, etc.) for them to accurately reflect on the position of many countries in Africa, Asia and Latin America in global indices. While the ITU collects supply-side (subscribers/pricing) statistics, which are also drawn on by the World Bank, OECD, WEF for comparative evidence-based telecommunications policy discussions, no organisation collects corresponding demand-side (use/spending) statistics across Sub-Saharan Africa and Asia or Latin America.

CETIC in Brazil collects comprehensive demand-side indicators for Brazil and some parts of LatAm, but these remain at the descriptive and indicator level and are not modelled to identify deeper relationships and dynamics. For this reason, one can talk about service prices but not actual affordability of services, except in broad terms (estimating affordability by fraction of income – where the fraction considered affordable is extrapolated from OECD survey numbers). Similarly, service uptake statistics (Internet use, mobile subscriptions and non-use rates, etc.) are very dated, unreliable, unsystematic and extremely inaccurate. Without complementary data the story provided by the supply side is incomplete and falls short for solving policy problems within countries. This proposed research aims to move beyond the access issues that have been the focus of official supply and the few demand-side surveys done beyond limited national censuses to understanding the factors that are constraining or driving uptake of Internet services.

Over the last few years at a global level this gap has been filled by donor and privately funded ad hoc research, most of which fails to adhere to international statistical standards or those set through academic peer review. Much of the ‘evidence’ arising from these studies, which tends to use development discourse and focus on issues of inequality (whether gender, the poor, or the unskilled) and makes global, national or even very local claims, is seldom statistically sound, generally not rigorous, and in some cases sufficiently flawed as to be misinformation. Yet in the absence of national statistics data, and therefore sound international data, or alternative evidence these studies, often sponsored by industry association or multinational companies with deeply vested interests in the sector, become the only reference points for policymakers – a situation of concern for public interest outcomes.

OBJECTIVE

The overall objective of this project is to catalyse evidence-based policy change that enables the people of Asia, Africa and Latin America to improve their lives through the use of information and knowledge that is shared and accessed via ICT. It hopes to dodo so by enhancing the decision-making process related to development – specially the development problems that can be solved/part solved by knowledge, information and technology.

In order to achieve this objective, it is necessary to:

- understand users: how is information/knowledge acquired and what role do ICTs play in that process? What are usage patterns of different demographics and what are the drivers of such patterns? What is the evolution of ICT use and the impact on consumer welfare? What is the effect of affordability in the context of real users, not national averages that mask inequalities?
- understand understand non-users: what are the barriers to the access, use of, and full digital participation by citizens (as differentiated by various demographic characteristics) and enterprises?

influence policy: by taking the systematic and rigorous evidence into policy processes, thereby catalyzing policy change that is evidence based and enables positive socio-economic improvements through use of ICTs.

RESEARCH METHODOLOGY

The modalities of achieving the above mentioned objectives are to:

- collect a range of household, individual and informal enterprise ICT indicators that not only meet the threshold compliant with the WSIS-initiated Partnership for Measuring ICT for Development by running nationally representative household and individual surveys but to gather a set of data in such a way that it will be possible, after modelling and analysis, to offer much greater insight into the demand-side barriers to digital equality and in this way provide far more comprehensive national and regional evidence bases to inform policy and regulation.[16]
- understand why the behaviours seen in household surveys are as they are, thereby shedding light on motivations through qualitative research protocols (focus groups, in-depth interviews, mini-ethnographical studies)

These surveys and qualitative research will be conducted across Africa, Asia and Latin America in a way that avoids duplication of costs, efforts and proprietary research. These surveys and their associated indicators are intended to serve the public interest and form part of a wider information and policy commons for these countries and continents.

[16] Both LIRNEasia and DIRSI expect to complete the SME surveys as add-on to the national household survey if and only if a sufficiently enough contractor is awarded the contract, as funds are currently very limited.

The "demand side" data thus collected will be analysed in the context of supply-side data and country context, to identify drivers, barriers and propose policy solutions.

HOUSEHOLD, INDIVIDUAL AND INFORMAL BUSINESS SURVEYS

The ICTi4Africa, ICTi4Asia and ICTi4Latam indicator surveys are to be conducted in two waves over a five-year period. The questionnaire design and structure has already been trailed and refined over several previous rounds in the last decade with core themes focussing on the real drivers of ICT take up beyond access. The survey methodology used to conduct this survey is outlined below. In the case of LIRNEasia, the survey will be limited to household and individual ICT use, with the informal sector sample being added only if sufficiently cheap bidders are found at the stage of competitive procurement. However, at the time of budgeting for this proposal, multiple firms have indicated that only the household survey is possible given the available budget and specified sampling framework. In the case of DIRSI, the same applies, except that we plan to collect quantitative data from a very small sample as a pilot study that will set the grounds for future large-scale data collection efforts.

To supplement the quantitative data obtained via the surveys, two sets of ten focus groups will be conducted for each country with each wave of the survey and other one-on-one protocols (either in depth interviews, mini-ethnographic studies or home visits). The objective of these qualitative techniques is to gather further information on unobservable dynamics affecting individuals who face different constraints, for instance those in different regions and between different demographic groups, particularly the elderly, who tend to be grossly overlooked in public policies in developing countries.

By the nature of developing economies any data that is nationally representative will shed light on inequalities inherent in society. Across Africa, Asia and Latin America the various gender, urban and rural, ethnic, and economic gaps that exist are a core theme around which the questionnaires for these ICT indicator projects are built.

An important component of this research and the research database that this project is striving to achieve is precisely uncovering the inequalities inherent in society that drive differences in ICT access, uptake, use and opportunity. Isolating these factors and supplementing the supply-side data with causal demand-side drivers allows for a consumer-centric understanding of affordability. Again, this is vitally important for evidence-based policy-making.

SAMPLING METHODOLOGY

The methodology proposed for the project delivers nationally representative ICT indicators for households, individuals[17] and informal businesses. The comprehensive picture emerging from this provides the data required for consumer-centred, evidence-based policy-making and regulation in Africa, Asia and Latin America. A technical discussion of the methodology is presented in Annex 1. Depending on individual country contexts (e.g. access to NSO sampling data, local costs, etc.), the methodology may be adapted as required; however national representation will be the key consideration in sample design.

There are two steps to the methodology: 1) establishing access to ICT devices (basic mobile phone, smartphone, computer, laptop, tablet) for individuals, households and informal businesses, and 2) the second step - based on those that do have access to

[17] Individuals between the ages of 15 and 65

devices - is to assess use. As in the first step, this will establish those that are able to use ICTs compared to those that are excluded due to the lack of affordability.

For the excluded, explanatory factors that will be explored include the lack of sufficient income, the cost of the device, insufficient ICT skills, language barriers, age and cultural factors. Particular focus will be placed on rural inhabitants, women, youth, the elderly and mentally disabled.

For those that are able to use ICTs, the impact of ICT use will be explored and include changes in income, skills, information needs, information capabilities, digital literacy, communication behaviour, general behaviour and wellbeing. For micro/informal businesses, the impact of ICTs on the sustainability of livelihood generation is the primary focus rather though the move towards a higher degree of formality (i.e. moving from informal to formal sectors), can also be gaged as well as increased access to formal financial services.

All surveys will be collected using tablets. The speed at which data can then be transferred to a central location for analysis means that initial results can be presented quickly and can inform qualitative methodologies.

Qualitative tools

Qualitative tools that will be used to supplement the study include focus group discussions (FGDs), in-depth interviews and mini-ethnographic studies. These techniques will be used to answer further questions arising from the quantitative findings that cannot be answered from quantitative analysis alone, this usually pertains to softer unquantifiable factors such as culture, social norms, etc.

Ethical Considerations

The questionnaires used in all three regions historically start with a mandatory action to the inform the respondent on the purpose and nature of the survey, the kind of information it will be soliciting, the confidentiality of all information provided and the guaranteed anonymity of the respondent. This is highlighted in the training of enumerators, and emphasised in the fieldwork protocol manual. In the practical sections of the training there is also sensitivity training to ensure that cultural practices and norms are respected and that the dignity of respondents providing personal information (of a financial nature for example) is safeguarded.

With the RIA data being increasingly used for postgraduate thesis internationally, but particularly at the University of Cape Town as part of the IDRC sponsored post graudate development programme, the student is required to demonstrate that the data even if collected by a third party conform to university ethical standards, and particularly the Commerce Faculty, in which the Graduate School of Development, Policy and Practice, under which students are registered is located. All thesis using RIA data because they make use of human subjects, are required to go before the university Ethics committee and have to have addressed the following questions.

Any person planning to undertake research in the Commerce Faculty should answer the following questions:

1. Is your research making use of human subjects as a source of data? (you are using questionnaires, surveys, interviews, secondary data about people)
2. Is there a possibility that your research could cause harm to a third party?
3. Does your research involve the participation of communities?
4. Is your research providing a service to a community?
5. If your research is sponsored, is there any potential conflict of interest?
6. Is your research in the field of Health? Please read the following document : Ethics in Health Research and read the additional note below.

As none of the three organisations have in the past have applied any additional ethical controls it is proposed that as part of the research design, implementation and peer review process, ethical checks will be applied.

The networks will use the broad, internationally accepted principle that inform the UCT Code of Practice for Research on Human Subjects (See Annex 2) that identified specific ethical consideration in the context of an institutional commitment to conducting research whichstrives to serve humanity and the society as a whole rather than any sectional interests, that research is released in a timely fashion and that access to the research findings is open. Specifically, it requires that:

- researchers should respect the right of individuals to refuse to participate in research and to withdraw their participation without prejudice to them at any stage;
- researchers must protect participants against foreseeable physical, psychological or social harm or suffering which might be experienced in the course of the research;
- researchers should be especially sensitive in their protection of the rights and interests of more vulnerable participants, such as children and the aged; and
- information obtained in the course of research which may reveal the identity of a participant is confidential unless the participant agrees to its release.

In this regard, as part of the completion of the research plan, each research project will need to receive ethical clearance from an external /independent assessor. This may be the person appointed as the overall peer reviewer of the project or a member of the advisory boards of the three networks.

In additional to general comments about research design and conduct, assessors will be asked to share any comments and/or recommendations that they may have for ensuring that the project has satisfactorily addressed the following ethical considerations (which are drawn form the European Commission's "Ethics in Research and International Cooperation" document): potential vulnerability of study participants; responsiveness of the research to the needs of the country where research is carried out, the scientific soundness of the project; the need for the project to abide by applicable global guidelines and local country legislation and guidance; the need for the project to provide benefits of participation for involved stakeholders; the need for the project to avoid diverting local resources; the need for the project to provide access to research outcomes for research participants and their communities; the need to always identify risks and benefits during the informed consent procedure; the need to have well-documented and followed

informed consent procedures; the need to clearly explain alternatives to participants in case they do not wish to enrol in research, and the need to maintain data protection and privacy (our project will of course strive to address all of these considerations at all times).

In addition to general comments about research design and conduct, committee members will be asked to share any comments and/or recommendations that they may have for ensuring that the project has satisfactorily addressed the following ethical considerations (based on the European Commission's "Ethics in Research and International Cooperation" document): potential vulnerability of study participants; responsiveness of the research to the needs of the country where research is carried out, the scientific soundness of the project; the need for the project to abide by all international good practice and local country legislation and guidance; the need for the project to provide benefits of participation for involved stakeholders; the need for the project to avoid diverting local resources; the need for the project to provide access to research outcomes for research participants and their communities; the need to always identify risks and benefits during the informed consent procedure; the need to have well-documented and followed informed consent procedures; the need to clearly explain alternatives to participants in case they do not wish to enrol in research, and the need to maintain data protection and privacy (our project will of course strive to address all of these considerations at all times).

ALTERNATIVE METHODOLOGIES

There is an increasing interest in using data analytics (or big data analytics) to answer develop research questions. Since 2013 LIRNEasia has been working with historical, anonymised datasets from multiple mobile telecom operators. Specifically, LIRNEasiaLIRNEasia analyses CDRs or call detail records (generated and stored in the systems of the telecom operators as users go about their lives while use their phones, resulting in trillions of records each week). LIRNEasia is one of the few institutions based in the global South working on big data analytics. Yet because of their experience, they are also aware of the limitations. For example, in theory, if they obtain CDRs from all telecom operators in each country, it can be analysed. They are doing this in Sri Lanka - thethe research is already able to identify the geographical spread of phone calls and phone owners across a country, thereby possibly eliminating the need for a survey to understand how phone penetration in urban vs. rural areas. But identifying the gender or age of the user is almost impossible – this is because in most countries the SIMs are pre-paid, and the ownership information attached to each SIM is highly unreliable (even in countries with strict SIM-registration rules, such as Pakistan). Instead of getting anonymized data, one could request for un-anonymized data. Apart from significant privacy implications (which may or may not be in line with the laws of certain countries), even un-anonymized data can be an unreliable predictor of gender/age. Moreover, getting all telecom operators to hand-over their data, which is incredibly commercially valuable, is an uphill battle as LIRNEasia's own experience shows.

As such, although there are complementarities in the research processes and the kind of data they can elicit, we are not taking a big-data/data analytics approach to address this research question. However, given we have the human and hardware capacity to do such analysis, in situations where relevant GIS data or other data sets related to ICTs can

be obtained with us, such data will be analysed, to triangulate the survey data and to complement it.

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ANNEX 1: SURVEY METHODOLOGY

The methodology for the RIA access and use surveys in 2012 that deliver nationally representative results for households and individuals has been developed using Enumerator Areas (EAs) of national census sample frames as primary sampling units. Households are to be sampled from listings created in the field, allowing the sampling of a nationally representative populations during a single survey at minimal cost. Two waves will be conducted in the form of pooled cross-sectional data to save costs.

The approach presented here delivers nationally representative ICT indicators for households and individuals. The same methodology will be used in the Asian and Latin American countries, though modifications to the methodology will be made if required in certain countries – for example, when national census sample frames are not made available to non-government entities (such as LIRNEasia) by the national statistical organization of country. In such situations, variations will be made to the methodlogy, without compromising representativeness or confidence intervals.

SAMPLING

The random sampling will be performed in four steps for households and individuals.

- Step 1: The national census sample frames will be split into urban and rural Enumerator Areas (EAs).
- Step 2: EAs will be sampled for each stratum using probability proportional to size (PPS).
- Step 3: One listing, for households, will be compiled for each EA. The listings serve as sample frames for the simple random sections of households. A pre-specified number of households will be sampled using simple random sampling for each selected EA.
- Step 4: From all household members 15 years or older, and visitors staying the night at the house, one will be randomly selected based on simple random sampling.

SAMPLE SIZE

The desired level of accuracy for the survey is 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. The minimum sample size was determined by the following equation (Rea & Parker, 1997):

$$n = \left(\frac{Z_{\cdot} \sqrt{p(1-p)}}{C_{\cdot}} \right)^{\cdot} = \left(\frac{1.96\sqrt{0.5(1-0.5)}}{0.05} \right)^{\cdot} = 384$$

$$n = \left(\frac{Z_{\cdot} \sqrt{p(1-p)}}{C_{\cdot}} \right)^{\cdot} = \left(\frac{1.96\sqrt{0.5(1-0.5)}}{0.05} \right)^{\cdot} = 384$$

Inserting the parameters for the survey yields the minimum sample size for simple random sampling. Depending the sampling method for the survey, the minimum sample size will have to be multiplied by the design effect variable.

In the absence of empirical data from previous surveys that would have suggested a differed value, the default value of 2 is chosen for the design effect. 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.

Weighting

Two weights will be constructed, one each for households, and one for individuals. The weights will be based on the inverse selection probabilities. The weights gross up the data to national level.

- Household weight: $$HH_w = DW \frac{1}{P_{HH} * P_{EA}}$$
- Individual weight: $$IND_w = DW \frac{1}{P_{HH} * P_{EA} * P_I}$$
- Household Selection Probability: $$P_{HH} = \frac{n}{HH_{EA}}$$
- EA Selection Probability: $$P_{EA} = m \frac{HH_{EA}}{HH_{STRATA}}$$
- Individual selection Probability: $$P_I = \frac{1}{HH_{m15+}}$$

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;

i=number of household members interviewed.

The target number of households in each EA will vary from country to country. In the last survey RIA conducted 24 households were selected from each EA.

ANNEX 2: UNIVERSITY OF CAPE TOWN ETHICS CODE FOR RESEARCH INVOLVING HUMAN SUBJECTS

Researchers should respect the right of individuals to refuse to participate in research and to withdraw their participation without prejudice to them at any stage. 5. Researchers must protect participants against foreseeable physical, psychological or social harm or suffering which might be experienced in the course of the research. Researchers should be especially sensitive in their protection of the rights and interests of more vulnerable participants, such as children and the aged. When there is risk of harm, discussion of this with participants or their guardians must precede the research and be included in the informed consent procedure. No research should be undertaken on such vulnerable subjects if the required information can be obtained by other means. 6. Information obtained in the course of research which may reveal the identity of a participant is confidential unless the participant agrees to its release. Researchers and society as a whole The University is committed to conducting research which will contribute to health and quality of life and which strives to serve humanity and South African society as a whole rather than any sectional interests. The University of Cape Town recognises society's right of timely access to research findings and to open debate on their implications. Researchers and the sponsors of research Research, which is undertaken on behalf of sponsors, is subject to the usual conventions of contract research. Remuneration arrangements for subjects and researchers should be outlined in the contract. Conflicts of interest should be avoided, and all researchers should be asked to declare any potential conflicts of interest. Interference on the part of sponsors, which may jeopardise the integrity of the research, is not acceptable. Information which reveals the identity of individual participants in the research will not be supplied to the sponsors other than with the permission of individual research subjects. In its dealings with the sponsors of research, UCT is committed to upholding the principle that findings should be made responsibly and freely available to the public within a specified and limited timeframe. UCT is committed to upholding this code, but recognises that as research is a human endeavour it is also dependent on discretionary decisions for which individual researchers must accept ethical and scholarly responsibility. The scholarly and ethical standards of researchers are central to the research endeavour and efforts to sustain and develop these are integral components of research at the University of Cape Town. This code and the more detailed versions available within Medicine* and other disciplines aim to be more educative than coercive; but minimal procedural standards must also be set. Ethical reasoning requires thought, insight and sensitivity. As with scholarly work, peer review is important. In the case of ethics, peer review includes the larger intellectual community, society at large, and research subjects. Seeking ethical approval should be seen as an opportunity for informed ethical reflection and discussion with ethical peers. In this spirit approval will be required in terms of the principles of this Code of Research, as supplemented by specific disciplinary codes, for; (i) all research projects undertaken by staff and students of the University involving the participation of human subjects; (ii) all research projects undertaken by staff and students of the University being likely to have significant social consequences; (iii) all research projects by researchers external to the university involving the members of the University as subjects. from the Faculty committees charged with responsibility for research ethics and reporting to the Code of Ethics for Researchers Committee. *See Medical Research Guidelines on Ethics for Medical Research (SA Medical Research Council)

HTTP://WWW.COMMERCE.UCT.AC.ZA/DOWNLOADS/UCT%20CODE%20FOR%20RESEARCH%20INVOLVING%20HUMAN%20SUBJECTS.PDF