

# Acacia Prospectus 2006-2011

Program and Partnership Branch  
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## List of Acronyms

APC	Association for Progressive Communications
CA	Connectivity Africa
CFA	Canadian Fund for Africa
ECA	Economic Commission for Africa
FDI	Foreign Direct Investment
FOSS	Free and Open Source Software
GEH	Governance, Equity, and Health
GEM	Gender Evaluation Methodology
GIS	Geographical Information System
GRACE	Gender Research in Africa on ICT Empowerment
ICT	Information and Communication Technologies
ICT4D	Information and Communication Technology for Development
IP	Intellectual Property
IPR	Intellectual Property Rights
NEPAD	New Partnership for Africa's Development
NREN	National Research and Education Networking
OA	Open Access
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OM	Outcome Mapping
OS	Open Source
PAREN	Promoting African Research and Education Networking
PDA	Personal Digital Assistant
PI	Program Initiative
PRSP	Poverty Reduction Strategy Paper
rPCR	rolling Program Completion Report
SAT-3/WASC	Southern Africa/Western Africa Submarine Cable
SMS	Short Messaging System
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
VOIP	Voice Over Internet Protocol
VSAT	Very Small Aperture Terminal

WiFi

Wireless Fidelity

WiMAX

Worldwide interoperability for Microwave Access

WIPO

World Intellectual Property Organizations

WSIS

World Summit on the Information society

## Executive Summary

The Acacia Prospectus (2006-2011) represents the third generation of Acacia programming, which began in 1996. Much has changed with respect to ICTs and African development in that time. While Africa still has the lowest teledensity of any region on earth, it is now the fastest growing mobile telephony market in the world. Parts of Africa now have access to the world's fastest fibre optic telecommunications infrastructure yet the majority of Africa still have yet to gain regular access to a phone. Even those with access often pay hundreds of times more for it than in developed countries. For a small percentage of Africans the Internet has become powerful tool for development but it remains outside the reach of most Africans. Meanwhile, the developed world has raced ahead to embrace new ICTs and ICT infrastructure, driving down costs and integrating ICTs as a basic infrastructure of modern economies. The failure of African countries to keep pace with this change has far-ranging implications and it is the mission of the Acacia PI to better understand these implications and to facilitate positive change through evidence-based policy reform.

The Acacia team drew on a wide range of resources to inform the development of this prospectus. Planning began with the ICT4D all-staff meeting in Oct 2004 that sowed the seed of ICT4D cross-regional collaboration. An external evaluation of Acacia in 2005 provided substantial guidance to the team on programmatic strengths and weaknesses. The prospectus was further informed by two team meetings that drew on the internal team resources as well as the expertise of the Connectivity Africa African Advisory Panel. as. It was also influenced by "Our Common Interest"; the UK Commission for Africa's report on African development published in 2005 in which Acacia was a participant. Other influences included research and evaluations from similar initiatives at SIDA and the Partnership for Higher Education in Africa.

Acacia's mission is very straightforward; it is to support research on ICTs that improve livelihood opportunities, enhance social service delivery, and empower citizens while building the capacity of African researchers and research networks. Towards that end, Acacia has identified three core research themes that will serve as a broad framework for the program. They are:

***People Empowerment:*** Understanding the individual and social changes that Africans are experiencing that are being brought about through the use of ICTs.

***Social Service Delivery:*** Research on how ICTs can help African governments with limited resources to more effectively deliver services to their citizens.

***Economic Development and Opportunity:*** ICTs in Africa are transforming both formal and informal economies. This theme explores the broader impact of ICTs on social and economic growth in Africa.

Within each of these thematic areas, three or four key research issues have been targeted for investment. Acacia will support research networks (some existing and some emerging) that will pursue these areas of inquiry.

Cutting across the Acacia research themes are the PI's objectives that will inform all Acacia programming. These describe the measurable outcomes that are expected from the program over the five-year period. They are:

- ***Sustained Policy Dialogue:*** While ICTs have the potential to enhance social and economic development, policy inevitably lags behind in this fast-changing field. Acacia is committed to fostering ongoing, robust dialogues among ICT4D researchers, policy-makers, and other key policy-related bodies.
- ***Thriving Research Networks:*** With 53 countries and comparatively few strong research institutions, finding the capacity to carry out larger research programs in Africa can be a challenge. Fostering regional research networks can strengthen weak institutions through mentoring relationships. They can also serve as fora for knowledge diffusion and can create an ideal vehicle for parallel funding activities. By the end of the next five years we expect to see ten or more thriving African ICT4D research networks that Acacia has catalyzed and supported.
- ***Enhanced Research Capacity in ICT4D:*** There are very few institutions anywhere in the world that specialize in ICTs for development. It is by its very nature a trans-disciplinary field. Our objective is to increase institutional strength in ICT4D research focusing on improved research methodologies and practices, increased numbers of ICT4D researchers, and research institutions with specific ICT4D focus.
- ***More Social and Technical Innovation in ICTs:*** ICTs are enablers of both social and technical innovation and Africa is home to a great deal of innovation especially around the adaptation of low-cost ICTs to African needs and conditions. In the next five years, we expect to stimulate innovation in the development and use of new ICTs including mobile telephony, wireless broadband, alternative policies and intellectual property regimes.

In addition to the core Research Themes, Acacia has also identified emerging areas of interest. These areas represent issues that warrant further exploration. They are topics that are “on our radar” and require further research to determine whether they are relevant to Acacia’s future programming. Among the emerging issues included in the prospectus are remittances, participatory-GIS and digital human rights.

Acacia will continue to build on its approach of iterative project development based on close, ongoing relationships with development partners. Acacia’s program officers, based in IDRC’s three African regional and one satellite offices, are critical to this strategy. The shift to network-based programming means less of a country focus for Acacia and more of a regional network development role for African-based staff. We will, however, continue to leverage the core country investments of the first two phases of Acacia.

Acacia is committed to partnering with other key donors in the area of ICTs for development in Africa. In particular, already strong relationships will be deepened with DFID, SIDA, OSI, and the Partnership for Higher Education in Africa.

Finally, Acacia remains committed to strengthening its partnerships with Canadian institutions. In particular, its relationship with Industry Canada and CIDA through its hosting of the Connectivity Africa initiative. We will also continue to build on partnerships with Canadian universities on education policy, access to legal information, health networks as well as in other emerging sectors.

# 1. Introduction

## 1.1 Development Problem

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In the post-industrialized world, change itself remains one of the few constants. The rapid evolution of Information and Communication Technologies (ICTs) and of ICT networks in the last 10 to 15 years is a significant driver of this accelerated environment. We now think nothing of searching for information on-line, corresponding with hundreds of people via e-mail, and maintaining corporate communications via a Web site. Yet, as little as 10 years ago, few of these things were being done by anyone outside an academic environment. New verbs such as “googling” and “texting” have entered the vernacular with unprecedented speed. More importantly, ICTs have enabled new economic realities. As a vehicle for ideas, ICTs are enabling new ways of doing business, allowing speedier innovation and new kinds of enterprises.

### *ICTs and African Development*

It is hard to reconcile the above with the harsh realities of Africa. In particular, rural Africa, where more than 60% of Africans live (UN, 2004), seems very remote from the world of high technology; it is a world often with no access to electricity, let alone access to communications. Nearly half the African population lives on less than a dollar a day (World Bank, 2000) and on average, life expectancy on the continent is falling; Africa is home to two-thirds of the estimated 38 million people suffering from HIV/AIDS.

In this context, one is driven to ask “What is the relevance of ICTs to development for those Africans whose priority is clean drinking water, basic health, shelter, safety, and adequate sources of food?” Are ICTs not a comparative luxury in this context? Shouldn't development funds be directed toward more basic needs? The answer is not *either/or* but rather *both/and*. Appropriately applied, ICTs have the power to accelerate individual, social, and economic development in Africa. A key message here is that ICTs are transformative at a variety of levels. ICTs are complex, not only because they are enablers of traditional services and businesses, but they are an economic sector in their own right, and perhaps most importantly, are enabling new economic models and types of social organization. As Figure 1 (taken in a Johannesburg suburb) illustrates, a simple mobile phone can transform an isolated artisan relying on word-of-mouth for trade, into an entrepreneur with a storefront, communications infrastructure, answering service, and targeted marketing strategy. This simple example is true for every aspect of development. ICTs can effectively increase the impact of development activities many fold. In fact, some critical development initiatives such as the wide-scale, roll-out of anti-retroviral (ARV) therapy cannot be achieved without integrated ICTs that can manage the distribution and monitor the impact of this therapy.



Figure 1. Mobile-enabled business in Africa

Much has been learned in the last 10 years and much has changed. Gone are the heady days of the Internet boom where Web sites were a solution for almost everything from libraries to teachers, where massive on-line information systems were expected to automate governments, health systems and agricultural extension, and where the digital world would result in the “death of geography.” While all of those things have earned a degree of relevance in the developing world,

the big changes that have taken place were largely unpredicted. The dramatic evolution and spread of wireless technologies, along with the seemingly unstoppable decline in the cost of technology and bandwidth are two examples. These changes have brought about new realities and new possibilities for African development.

### ***Half Full or Half Empty***

Understanding the role of ICTs in African development is more complex than it has ever been. There are compelling reasons for both optimism and pessimism. While the number of Internet users in Africa has grown 400% in the last five years to 22 million (Internet World Stats, 2005) and Africa is experiencing faster Internet growth than North America, most Africans have never used a computer or sent an e-mail. In contrast, other technologies have experienced explosive growth. Mobile telephony has spread rapidly across the continent. Mobile phone lines in Africa outnumber fixed lines by more than two to one. In sub-Saharan Africa the ratio is closer to three to one. In 2004, Africa became the fastest growing mobile telephony market in the world. Recent results from the Acacia-funded *African e-Index* (LINK Centre, 2005) study have shown that Africans are willing to pay a higher proportion of their income than in developed countries for access to telephony; this indicates, among other things, a significant, unfulfilled demand for telephony.

While the raw data still shows that 94% of Africans don't have a telephone (Sciadas, 2005), this does not provide an accurate picture of telephone use in Africa. Across the continent, there is widespread innovation in gaining and providing access to telephony services. A recent study of telephone use in rural areas in Botswana, Uganda, and Ghana (McKemey et al. quoted in Batchelor and Scott 2005), shows that 80% of residents had made at least one phone call in the last three months.

While there is emerging evidence of the economic impact of the spread of mobile telephony (Vodafone 2005), this is only the tip of the iceberg as the network effects of expanding numbers of users have yet to have a significant impact.

### ***Mobile then Fibre***

The growth of mobile telephony in Africa in the last few years has been so dramatic and its impact on the poor so evident, that some pundits have suggested that computers and the Internet are not the appropriate ICT development priority for Africa, and that mobile telephony is the only technology that is having a development impact. There is some truth to this. Mobile telephony, although still comparatively expensive, is the only interactive communications technology that is within the reach of the African poor. The challenge of mobile telephony in Africa is to adapt the technology to more effectively serve the aims of African development. These challenges include not only further reducing the cost of handsets and network access costs, but also adapting the infrastructure to deliver services and even handle transactions. New buzzwords such as “m-Government<sup>1</sup>” reflect the emerging potential of mobile phones to deliver government services.

To argue however, that mobile telephony is the future of African ICT for development, is like arguing that countries have no need for deep-water ports because only the small, low-cost fishing boats have a direct impact on fishermen's livelihoods. For Africa, mobile telephony has been a miraculous improvement, but is still held back by the lack of national and international telecommunication backbones. These are badly needed not only to make costs more affordable,

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1 m-Government refers to the range of e-government efforts to disseminate information, delivery services, handle complaints through the use of mobile and wireless technologies.

but also to deliver the more advanced broadband services that developed countries take for granted. This requires strategic investments today if African countries are to compete globally.

In the industrialized world, the cost of broadband (high-speed Internet access) has dropped dramatically over the last three years, and there is a general expectation that over time the cost of high-speed access will approach zero. This is attributable in part to the vast capacity of modern fibre optic infrastructure. This trend will consolidate a market shift from access to services; the result is that high-speed Internet infrastructure will simply become a minimum requirement for participation in the new economy. The cost of deploying fibre optic cable is surprisingly low. Most traditional infrastructure entities such as energy and transport companies are now deploying fibre optic cable alongside new infrastructure developments. There is already a surprising amount of fibre optic infrastructure in Africa.<sup>2</sup> Unfortunately, due to the tendency in most African countries to allow their state-owned incumbent telecom operators to dominate the telecommunications marketplace, most of this infrastructure or “dark fibre<sup>3</sup>” is unavailable to the market.

### ***Policy and Regulation in a Converging World***

The single biggest challenge for ICT-enabled African development is the telecommunications regulatory environment. A majority of African governments have unfortunately chosen to view the telecommunications sector as an opportunity to exploit a fast-growing industry. Recent efforts to privatize and deregulate the telecommunications sector in African countries have not had the hoped-for impact of lowering costs and extending the network. Foreign investors have often focused on maximizing profit extraction, and attempts to regulate the marketplace have been well intentioned; regulators seldom have been given the teeth to back up regulatory policy. The introduction of secondary and tertiary national operators has not necessarily led to significant drops in prices or the expansion of network infrastructure.

It is ironic that the least expensive phone calls in Africa can be made in Somalia where it costs 30 cents a minute to call anywhere in the world (*Economist* 2005). Somalia is distinctive in that it has had no government since 1991 and consequently no telecommunications regulation and control. Telecommunications services have flourished in that policy void.

Perhaps one of the best examples of regulatory failure with respect to access to ICTs in Africa is the Southern Africa/Western Africa Submarine Cable (SAT-3/WASC),<sup>4</sup> an undersea fibre optic cable that runs from Portugal down the west coast of Africa, with connections to eleven African countries. The cable is managed by an international cartel that maintains a fixed-pool price for access. In its current configuration the cartel is relatively immune to competition.

While the rapid growth of mobile telecommunications industry in Africa has provoked some change, the large mobile operators are now also beginning to exhibit the behaviour patterns of monopolistic telecom operators.

Fortunately, there are new forces in the telecommunications world that are shaking up the entire sector. In particular, Voice Over Internet Protocol (VOIP), which is a way of placing telephone calls over the Internet, is having a major impact. Because a flat rate is typically charged for Internet access, this has the effect of making VOIP telephony extremely low-cost, especially for long distance calls. This new technology is shaking up the telecommunications industry globally.

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2 A recent Connectivity Africa-funded study revealed that almost all universities in Africa are within 100 kms of fibre optic infrastructure.

3 In telecommunications, dark fibre or unlit fibre is the name given to fibre optic cables that have yet to be used. For more information see [http://en.wikipedia.org/wiki/Dark\\_fiber](http://en.wikipedia.org/wiki/Dark_fiber)

4 SAT3/WASC – Southern Africa / Western Africa Submarine Cable

Telecom operators around the world have begun to embrace VOIP as an emerging dominant technology. It is expected that VOIP will account for 75% of global telephony services by 2007 (Cohen and Southwood, 2004). Unfortunately, VOIP is currently illegal in most African countries. This new technology, along with advances in fibre optics and new wireless technologies are causing seismic shifts in the telecommunications industry globally as the market moves from one of scarcity to ubiquity.

### ***Why Good Policies Have Yet to Produce Results***

It is interesting to note that good policy and regulation is a necessary but not sufficient condition for improving access in Africa. Countries like Uganda — held up as a model of good policy and regulation — still have remarkably low penetration of ICT infrastructure and services. Income levels and ICT usage continue to show strong correlation. However, there is insufficient information about the behaviour and use the poor in Africa make of ICTs with regard to their livelihoods and social networking. In extremely poor countries such as Uganda (where 40% of the population lives below the poverty line), further decreases in infrastructure and access costs will be required by the network if the effects of expanded access are ever expected to be felt. Telecom infrastructure still requires significant investment. Consequently, more evidence demonstrating the longer-term benefits of access is needed to encourage both public and private investment.

### ***Knowledge Gaps***

Very little is known about the behaviour and consumer demands of African ICT users; individual consumers or public sector institutions; the poor or those trying to deliver services. They have generally been served by their monopoly telecommunications services, many of which suffer the burden of legacy technologies, overstuffed institutions, and a poor record in billing and service delivery. By contrast, the mobile phone companies have seen considerable growth in Africa. Mobile service providers have been able to reap rapid returns on their investments, working with newer, cheaper technologies that are easier to roll out. These services are eagerly absorbed by people whose pent-up demand for telephone services is so great that they are prepared to pay up to 4% of household expenditure (Ureta, 2005) to make voice calls.

Policy makers are caught in a vacuum. On the one hand, they receive insufficient intelligence about the telecommunications industry from their incumbents and on the other, new mobile telephony companies release no data because they consider their research to be proprietary. Yet African governments are expected to make large leaps of faith in shaping their nations ICT futures with scarce knowledge resources to navigate this constantly changing sector. Little is known of how country economies are faring with their existing telecommunications market structure. Even less is known about what benefits the poor have, what jobs are created directly or indirectly through the ICT sector, what the government sector contributes to the ICT sector, or how it benefits. Much more needs to be known about how the telecommunications industry has grown, how this growth has contributed to the national GDP, and how these efficiencies can be improved.. There is insufficient dialogue around how changing and shifting policies can assist these governments to meet their mandate to serve their people, to deliver services and improve the public services through leveraging the benefits of ICTs. Finally, the relevance to Africa of emerging, new market models that are enabled through ICTs needs to be understood in order to strategically integrate ICTs into national planning. Appropriate models need to be developed that arise from a bottom-up assessment of the demands, the needs and the realities of African ICT users.

### ***New Economic Models***

New VOIP companies such as Skype have an inverse economic model to traditional telephone companies (telcos). Instead of trying to maximise average revenue per use, Skype’s strategy is to cultivate as many users as possible and to charge them as little as possible (Economist, 2005). In three years since its inception, Skype now has an annual turnover of US \$60M and adds 150,000 users per day. Its recent acquisition by eBay for US \$4.3B is testament to the power of this model in a networked world.

This “long tail<sup>5</sup>” business model, also in use by companies such as Amazon, eBay, Wikipedia, and others is providing new mechanisms for generating revenue by making transactions, previously too small and unprofitable, viable through the aggregation of demand.

Alternative approaches to intellectual property rights such as those used by the Open Source software movement also show tremendous potential in aggregating the voluntary intellectual input of the many to produce high quality software applications. The network effects of this model have produced surprising results, including the following free software: Apache (the most popular Web server in the world), Firefox (a popular Web browser), and Ubuntu Linux (the most popular desktop alternative to Windows, developed in Africa).

The above models have two things in common: a) they are enabled through ICT infrastructure; and b) they are entirely appropriate for developing countries where individual wealth is often very small but populations are large and labour costs low.

### ***ICTs and the Idea Economy***

Knowledge and innovation are now widely regarded as key drivers of economic growth. But what enables knowledge flow and innovation? While the answer is obviously complex, it is clear that ICTs are deeply implicated. Prior to the growth of inexpensive telecommunications and the Internet, information was costly to acquire and disseminate. These costs act as a natural restraint on the spread of ideas and knowledge. The rapid spread of information and communication technologies enable anyone with access to publish information and access vast amounts of information and millions of other users and creators of ideas. The abundance of information creates a pressure to innovate (Verlaeten, 2002).

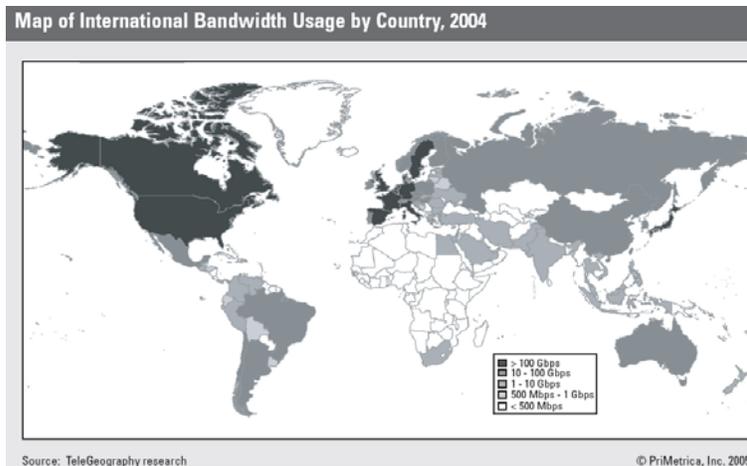


Figure 2. Source - <http://www.teleqeoqraphy.com>

5 The “long tail” is the colloquial name for a feature of statistical distributions in which a high-frequency or high-amplitude population is followed by a low-frequency or low-amplitude population which gradually “tails off.” In many cases, the infrequent or low-amplitude events can cumulatively outnumber or outweigh the initial portion of the graph, such that in aggregate they comprise the majority. See [http://en.wikipedia.org/wiki/Long\\_tail](http://en.wikipedia.org/wiki/Long_tail)

The more people that join this information and communication network, the more valuable the network and its resources become. The impact of this “network effect”<sup>6</sup> is to enable innovation and the spread of knowledge to develop at an unprecedented pace. Around the world, countries are recognising the importance of ICTs as a necessary condition for keeping pace in the global economy.

In Africa however, the Internet is used by only a small percentage of the population and, at a personal level, arguably does not exist for the vast majority of Africans. Figure 2 illustrates how Africa lags behind the rest of the world in bandwidth access. Dr. Francis Tsubira (LINK Centre, 2005) laments this fact in a recent Acacia-funded study on ICT access in Africa, “Uganda is de facto not using the Internet, and this poses the greatest challenge to strategy in the new sector policy: it is economic suicide to permit this situation to continue in the global knowledge society.” A key challenge for Acacia in the next five years will be to support African countries in understanding how best to affordably and sustainably leverage the Internet to enable effective African participation in the global economy.

### *Summary*

The world of information and communication technologies is racing ahead at an ever-increasing pace. The cost of technology continues to drop. This year will see the arrival of a \$ 30 cell phone and a \$ 100 laptop (MIT Media Lab 2005). While it is expected that the marginal cost of broadband infrastructure and of telephony will ultimately approach zero globally, in Africa the predatory pricing of international telecommunications cartels and the self-interests of incumbent telcos is likely to impede this trend. One way or another though, these changes are spawning new industries, new ways of doing business, and changing the dynamics of human communications at every level of society. It is in large part the drop in costs and the “commodification” of communications technologies that are triggering changes on the African continent. ICTs that work for the poor are a comparatively new reality and it will be incumbent on IDRC to support the research and applied research that will maximize the positive impacts of these technologies while mitigating the dangers that accompany any powerful technology.

## **1.2 Past IDRC Response to the Development Problem**

IDRC has been involved in researching the linkages between ICTs and development since its inception in 1971. However, significant investment in ICT research began with the widespread growth of the Internet in the mid-nineties.

The Acacia initiative began 10 years ago. At that time there was a general sense of the tremendous potential that the Internet was opening up for the rapid and low-cost dissemination of information and for enabling access to vast quantities of information around the world. What it could offer was unprecedented: the ability to make information available to a potentially unlimited number of people. All that was required was access to the Internet. The mission of the first phase of Acacia was to explore whether this potential might have an impact on poor, rural communities in Africa. Because there was no Internet infrastructure in Africa, the Acacia initiative supported the development of rural Internet access centres or telecentres and sought to measure the impact of these interventions. Acacia also supported the development of ICT policies in African countries that would support and enable the use of ICTs for development. While the

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6 A product displays positive network effects when more usage of that product by any user increases its value for other users. See [http://en.wikipedia.org/wiki/Network\\_effect](http://en.wikipedia.org/wiki/Network_effect)

Internet lived up to its potential and more, many hard lessons were learned in the first phase, especially the difficulty of creating sustainable, affordable access models for the rural poor in Africa and the need for content and applications relevant to Africans.

The second phase of Acacia (2001-2005) drew on the lessons of Acacia I and began to look at the kinds of innovations in ICTs and access models that would be most relevant and sustainable in the African development context. It represented a clear shift from demonstration and pilot activities to more research-oriented programs. It addressed the access challenge both from the perspective of exploring lower-cost technologies as well as seeking to bring down the cost of access through support for research on effective policy reform. Finally, it sought to increase the relevance of the Internet through supporting African content initiatives.

### **1.3 Existing Strengths and Opportunities for Learning**

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The recent external review of the second phase of Acacia (Batchelor, Hafkin, Chéneau-Loquay 2005) provided a timely perspective on Acacia's strength and key opportunities for learning:

*The shift towards regional thematic research networks:* The reviewers praised the move of Acacia II from one-off action research projects to support for regional thematic research networks that have more potential for policy influence, knowledge diffusion, and general sustainability.

*High quality outputs:* The reviewers noted the high quality of Acacia publications. Particular praise was directed at some of the more innovation dissemination approaches that Acacia has employed such as the "Out of Africa7" map which did much to spread awareness of Information and Communication Technology for Development (ICT4D) challenges on the continent.

*Policy influence:* The influence of Acacia in its original focus countries (Mozambique, Senegal, South Africa, and Uganda) continues to be felt and is recognized as a particular strength in spite of the shift from a focus-country approach to a more thematic network approach.

*The Acacia Team:* Particular praise was directed at the Acacia team for its expertise, on-the-ground experience, and commitment to sustainable innovation in ICT4D. Having staff in regional offices in Africa was recognized as a particular strength as was the iterative, dialogue-based approach that the Acacia team uses to develop projects with partners.

*Flexibility:* The flexibility of the Acacia initiative to adapt to changing realities in Africa without losing sight of prospectus goals was recognized as a strength. A good example of this is Acacia's support for the development of ICT policy in Kenya shortly after the elections in 2003. While Kenya was not a strategic focus for Acacia, the opportunity to support ICT policy research and development at a time when the Kenyan government was seeking input and support resulted in a much larger impact than might otherwise have been realized.

The external review (Batchelor and Scott 2005) highlighted the following as opportunities for learning and improvement:

*Wider choice of technologies:* Acacia II had perhaps focused too much on Internet technologies and applications. In particular, the reviewers felt a larger focus on the impact of mobile telephony was warranted.

*Gender:* While Acacia does have some interesting flagship projects on Gender and ICTs, it lacks

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7 For more on the Out of Africa map, see [http://www.idrc.ca/acacia/ev-6568-201-1-DO\\_TOPIC.html](http://www.idrc.ca/acacia/ev-6568-201-1-DO_TOPIC.html)

a systematic approach to the integration of ICTs in its research projects.

*Speed of publication of research:* Some Acacia outputs (from the first phase of Acacia) took years to be published. This is particularly problematic in a field that is characterized by change.

The issues raised in the external review are addressed throughout the Prospectus document.

## **1.4 Corporate Context**

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Acacia's vision, mission, and program objectives takes its roots in IDRC's mandate, mission and strategic objectives, re-affirming the Program Initiative's commitment to: strengthening and helping mobilize local research capacity; and contributing to changes in policies, practices, technologies for sustainable and equitable development, as well as poverty reduction.

The program themes and organizational practices reflect a conscious effort to continue, even accelerate our support for networks, as an efficient vehicle for policy influence and research capacity building, while keeping in mind that institutional capacity building will remain important particularly in the African context.

Although firmly rooted in the African dimension, Acacia will support researchers and regional networks to engage in global networks and processes particularly on issues such as Intellectual Property Rights, telecom policy, localization, and local governance.

The Acacia team will continue to closely monitor and engage with both regional and Canadian political initiatives related to ICTs for development. This includes the New Partnership for Africa's Development (NEPAD) e-Africa Commission, and the follow-up process to the Canada Fund for Africa (sustained Canadian Official development Assistance [ODA] focus on Africa).

## **1.5 North Africa**

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There is a temptation in designing a program on ICTs in African development to focus exclusively on sub-Saharan Africa where the most severe challenges exist. Indeed, this is the approach of most other donors working in this field. This phase of the Acacia program represents a departure from the previous two in that it now embraces the whole of Africa. With a program officer now based in Cairo, Acacia is in a position to deliver an integrated program for continental Africa. North Africa has much to offer the rest of Africa in terms of expertise, institutions, and experience. This has already been reflected in one of Acacia's newest research networks where a Moroccan university leads an Africa-wide network.

At the same time, it will be important to develop a uniquely North African perspective on Acacia's programming. In most of North Africa, there have been substantial investments in both ICTs and education, resulting in generally well-developed infrastructure (as compared with the rest of Africa) and widespread expertise in ICTs. Proximity to Europe has facilitated the growth of high-speed access in the region. In contrast with the rest of Africa, most ICT research and development is managed by state or state-sponsored institutions.

In general North African governments exert more control of public access and use of ICT infrastructure, restricting full access to the Internet. More needs to be learned through research how this regionally specific mix of public and private sectors affects both public use and access and the longer term implications it presents for the growth of the Information economy there.

Consistent with its networked approach to research Acacia will develop North African research nodes that will pursue a common general agenda to other African research teams but also develop a more nuanced approach and understanding of the impact of ICTs in the North African region.

## 2. Vision and Mission

After 10 years of programming in ICTs for development in Africa, Acacia's vision and mission for the next five years have crystallized into two simple statements:

<p style="text-align: center;"><b><i>Acacia Vision</i></b></p> <p style="text-align: center;"><i>African citizens build and benefit from a world of broader opportunities because they have the skills and resources to exploit ICTs as a catalyst for their own human, social, and economic development.</i></p> <p style="text-align: center;"><b><i>Acacia Mission</i></b></p> <p style="text-align: center;"><i>To support research on ICTs that improve livelihood opportunities, enhance social service delivery, and empower citizens while building the capacity of African researchers and research networks.</i></p>
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IDRC's Evaluation Unit reminds us that vision statements express the ambitious thinking that underlies the program. The vision extends beyond the reach of any program's capacities. A program's activities however, should contribute to facilitate the desired results articulated in the vision statement (IDRC 2004).

## 3. Acacia Themes, Research Networks, and Objectives

Acacia's programming is divided into three general themes representing the broad lenses through which Acacia is looking at ICTs for development in Africa. Each theme has a number of *target research networks* that represent areas of particular emphasis where we believe Acacia has a competitive advantage. This advantage exists either through present investments in research and research networks or through having identified areas in which more research is clearly in demand but little or none is being undertaken.

Acacia's four objectives cut across all three research themes, and represent the expected measurable results of the next five years.

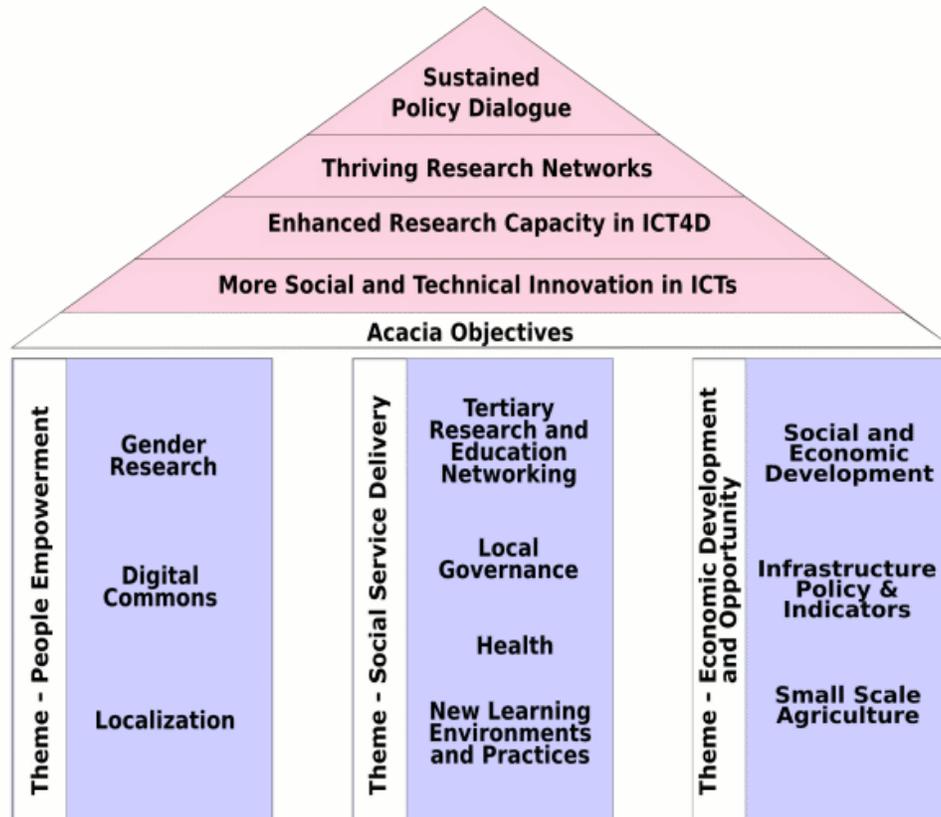


Figure 3 - Themes, Research Networks, and Objectives

### 3.1 Themes and Research Networks

The effects of ICTs are pervasive and multi-dimensional. The Acacia team has chosen three different thematic lenses through which to understand the impact of ICTs on African development. They range from the individual, to the social service delivery, to the economic environment.

#### **Theme: People Empowerment**

While it is important to understand the large-scale impact of ICTs economically, socially, and culturally, we felt it was equally important to understand the perspective of social change being brought about through ICTs from the perspective of the end users of these technologies. What does the 21<sup>st</sup> century ICT-empowered African look like? This perspective is important for understanding both the positive and potentially negative aspects of ICTs on society. This theme will cover areas of research that particularly focus on the individual and ICTs, covering topics ranging from income generation opportunities; gender to intellectual property to privacy issues; censorship; local language access; and more.

#### **Network: Gender Research**

There are many examples of the role of women changing in development through the use of ICTs. An often held up example is the Grameen Bank's *Phone Ladies* project in Bangladesh, which provides women with the opportunity to own a cell phone and resell airtime enabling them to raise their income significantly. Evidence of how ICTs are affecting women's day-to-day life

in Africa is also slowly emerging. In Lusaka, tele-health technology is making it easier to meet the basic needs of pregnant women and newborns (see <http://www.genderit.org>). Similar impact has been observed in Uganda, where an Acacia project using Personal Digital Assistants (PDAs), are providing midwives in remote locations with essential information for improved care. These various examples highlight the positive effects that ICTs can have on women's self-esteem, health, income, networking, social status, and political participation.

However, evidence suggests that there is an important gender gap in ICT access and usage in most, if not all, African countries. In some countries, the gap is dramatic — less than 10% of Internet users in Guinea are women (Orbicom Digital Divide Index, 2005). Acacia-funded research has demonstrated that in Benin, Burkina Faso, Cameroon, Mali, Mauritania, and Senegal, women have 36% fewer ICT-related opportunities and benefits than men (Mottin-Sylla et al. 2005). What is less known, however, is the exact order of magnitude of this gap, and its evolution with respect to access and patterns of use, ICT literacy, as well as education and skills.

Consequently, Acacia will continue to support research and research capacity building to gain a more sophisticated understanding of women's access and usage of ICTs in Africa, as well as the magnitude and evolution of the observed gender gap and changing gender relations in areas such as access and patterns of use; ICT literacy, education, and skills; and ICT employment. This research will build on projects like RegenTIC and Orbicom's digital Divide index. Furthermore, our program initiative will continue to fund research on the implications of ICT policies and innovations (applications) for gender equality and women's empowerment — how ICTs are changing African women's daily life, building on projects such as the GRACE network (Gender Research in Africa on ICT empowerment) and GEM (Gender Evaluation Methodology) developed by the Association for Progressive Communications (APC) through IDRC funding.

Research questions to be considered include:

- ❖ How severe are ICT-based gender disparities and why do they occur? What are women's experiences of this gap? How do these relate to women's experiences in Asia, Latin America?
- ❖ How do socio-cultural customs, infrastructural and access barriers restrict women from accessing and using ICTs?
- ❖ How and under what conditions are ICTs contributing to enhancing women's socio-economic and political empowerment?
- ❖ How are new ICTs changing relationships between men and women?
- ❖ To what extent and how are gender specificities taken into account in ICT regulatory frameworks and policies? What impact do these policies have on women accessing and using ICT?

### ***Box 1***

#### ***GRACE: Gender Research in Africa into ICTs for Empowerment***

*Launched in early 2005, GRACE is a network of researchers on gender and ICTs in Africa examining how ICTs are offering African women new opportunities. By providing intensive research training as well as ongoing mentoring and support to fifteen research teams in 12 countries, this project will encourage the establishment of an African community of gender and ICT researchers. This will build a more substantial body of research on how African women's lives and livelihoods are being changed by ICTs.*

The Acacia team will also endeavour to strengthen its own ability to assist all its project partners in raising the awareness of engendering all projects to ensure that these deliver disaggregated data and perspectives from women ranging from the e-usage index to the e-governance research projects. This process will begin with an external evaluation of gender programming within Acacia. The purpose of the evaluation will be to provide recommendations for capacity-building within the team on engendered analysis and project development and to assist in the development of a gender programming framework for Acacia that will cut across all projects. We expect this framework to be developed by year two of the prospectus but that it will continue to evolve over the remaining years of the prospectus.

### **Network: The Digital Commons**

Globally a battle is being fought for control of digital intellectual property. As broadband network infrastructure expands around the world, the ability to infinitely replicate and share digital media is being exploited to share material whose distribution was previously tightly controlled. Software, music, and now movies and television shows are being widely distributed through peer-to-peer networks. While most of these works are copyrighted, peer-to-peer file trading is now the single fastest-growing consumer of international network capacity. Peer-to-peer traffic now rivals the total amount of traffic generated by regular Web surfing.<sup>8</sup> Global media companies are struggling to cope with this and are attempting to introduce digital encoded restrictions to stop file-sharing. Most attempts to do this have turned out to be “finger-in-the-dike” efforts that have failed to stem the tide of sharing.

*“The crucial issue for developing countries is getting the right balance between protecting copyright and ensuring adequate access to knowledge and knowledge-based products. It is the cost of access, and the interpretation of “fair use” or “fair dealing” exemptions that are particularly critical for developing countries, made more so by the extension of copyright to software and to digital material. These issues need to be addressed to ensure developing countries have access to important knowledge-based products as they seek to bring education to all, facilitate research, improve competitiveness, protect their cultural expressions and reduce poverty.”*

***Commission on Intellectual Property Rights Final Report (Chapter 5, 2002)***

On the other hand, alternative copyright schemes such as Open Source software and related licences as well as the more recent Creative Commons licences, thrive in the networked world, encouraging rather than restricting duplications and creating alternative markets and approaches.

As Africans bridge the digital divide, the need to deal strategically with digital intellectual property (IP) will become increasingly urgent. Will African countries find themselves in a de facto dependent relationship with industrialized countries in terms of licensing intellectual property? Are there alternatives? As African indigenous knowledge is increasingly digitized what mechanisms can be developed to protect African IP from exploitation?

Copyright rules, one of the key means to govern the ownership of information and knowledge, have important implications for access to computer software and huge impact on access to digital content. The World Intellectual Property Organization’s (WIPO) two “Internet Treaties ” entered into force in 2002. These treaties have extended copyright protection to areas that were previously not covered in the 1886 Berne Convention, such as software and databases. They have also prohibited the circumvention of technological measures (also known as Digital Rights Management tools) used by copyright holders. These new standards pose particular difficulties to developing countries by dramatically increasing the costs of access to digital content and reducing the possibility of fair use and fair dealing.

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8. <http://www.wired.com/news/business/0,1367,67202,00.html>

Acacia will support research on innovative models for the creation and use of content, as well as the production of knowledge-based products such as software. It will also support the development of researchers in this transdisciplinary area and especially the interests of lawyers, authors, librarians, academics, and artists, as well as entrepreneurs in stimulating the growth of alternative approaches to digital copyright.

Research questions to be considered over the next five years include:

- ❖ What new models for publishing academic and scientific journals, alternative IP licensing schemes (i.e., creative commons) are most appropriate for African development?
- ❖ What is the potential of intellectual property conservancies such as digital libraries and Open Access archives?
- ❖ What is the potential of Free and Open Source Software (FOSS) as an appropriate, relevant alternative to commercial software in developing countries?
- ❖ What is the impact of more rigid copyright rules (shrinking public domain) on access to educational and scientific resources?
- ❖ What is the impact of IP on constraining innovation and access to affordable technologies?
- ❖ Are there exemptions to existing copyright rules that would help better achieve public policy goals (especially the fair use/fair dealing exemptions)?
- ❖ What is the impact of new Digital Rights Management technologies on access to digital content?

### **Network: Localization of ICTs**

Africa is home to thousands of indigenous languages, reflecting the diverse cultural make-up of the continent. Africans who are forced to study in a second (usually colonial) language often face an additional set of learning challenges. Adapting software to local African languages can offer more effective learning opportunities for Africa and help to protect fragile cultural heritages.

The term “localization” refers not only to the translation of software user interfaces and of content into a given language but also to the adaptation of content and applications to cultural and social contexts. Localization of ICTs and of content and services is a key issue in order to ensure the appropriation of ICTs by African users at the individuals and organizational level.

Localization of software and services is one of the 10 targets identified in the World Summit on the Information Society’s (WSIS) Plan of actions (Geneva, December 2003): to encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet. Section C8 of this Plan of action is dedicated to Cultural diversity and identity, linguistic diversity and local content, and contains several actions to take on localization of software, content and services, and to ensure the use of ICTs in all world languages.

Acacia has made some investments this year in localization research and will continue to support work in this areas to: a) make a difference by offering real solutions to specific problems in accessing ICTs and information; and b) develop evidence on what localization possibilities are feasible and on the benefits of ICT support of African languages. Research questions to be considered include:

- ❖ What are the critical African languages to focus on in order to achieve maximum impact and reach across the largest number of countries in Africa?

- ❖ What ICTs should be targeted as good localization candidates in order to showcase the importance and to highlight the benefits of the process: mobile phone, Internet software, office suites, software and languages processing tools (spellcheckers, dictionaries, glossaries, etc.)?
- ❖ What are the best localization strategies? Open Source software? Industry development? Translation? Role of volunteering? Role of the networks of localizers?
- ❖ How and under what conditions can a localization industry be developed in Africa?
- ❖ How can universities play a role in the development of skills and competencies in the localization of ICTs?
- ❖ What countries have policies or strategies to preserve local languages and promote their use in ICT tools and services? How effective are the policies that these governments have chosen?
- ❖ How can Acacia support the development of best practice policies and strategies in Africa? What policies and strategies are most effective?

### **Box 2**

#### ***Localizing ICTs to African languages and Arabic***

*Resources and expertise in localizing ICTs in Africa is relatively scarce. This project aims to make ICTs more accessible and relevant to rural Africans through localization—the adaptation to local languages, cultures and preferences— of computer software and Web content. In addition to measuring Africa’s localization status, the project will enable African localization experts to break their isolation, learn from each other and collaborate.*

#### **Theme: Social Service Delivery**

African governments are under huge pressure to deliver effective services to their citizens usually with inadequate resources. As ICTs become steadily less expensive and increase their reach in Africa, the potential advantages increase for using ICTs to help African governments deliver services more effectively and efficiently. This is not just for service delivery but also for citizen participation in government processes. This theme focuses on the question of whether ICTs have the potential in Africa to improve the way social services are delivered, reduce costs, increase transparency, and, facilitate devolution of government services.

#### **Network: Tertiary Research and Education Networking**

If innovation and knowledge represent the lifeblood of a university, the Internet could be called its veins and arteries. High-speed Internet access is a *sine qua non* of modern research institutions. Unfortunately in Africa, the average university has the same aggregate bandwidth as a single home user in North America or Europe. It is also true that the average African university pays hundreds of times more for this bandwidth than its counterparts in Europe or North America do for much more capacity.

Improving research and education Internet infrastructure for tertiary institutions in Africa is therefore a necessary condition for gaining an equal footing with their counterparts around the world. It would help to create an environment that keeps African scholars home and attracts those from the North. It would help African universities fulfil their role as nurturers of the intellectual

capital needed to address Africa's development challenges.

Access to decent bandwidth would make several things possible for African researchers and educators. It would provide the opportunity to use ICTs to exchange ideas and to work with their peers elsewhere in the world. Collaboration is at the heart of research, and much of this collaboration today is being mediated through information and communication technologies, whether it's on-line peer review processes or videoconferencing of critical medical procedures. Prevented from full participation in the global on-line research community, African scholars face huge obstacles in keeping up with the latest developments in their fields, let alone making original contributions.

*“The shortage of skilled professionals in Africa is a critical issue. It has its roots in a tertiary education system that is in a state of crisis. The emphasis in Africa in recent years has rightly been on the need for primary education. An unfortunate side-effect of this has been the neglect of secondary and tertiary education from which are produced the doctors, nurses, teachers, police officers, lawyers and government workers of tomorrow.”*

**Commission for Africa Report (2005)**  
<http://www.commissionforafrica.org>

More bandwidth would also give African academics access to a wealth of scholarly publications on-line. There are several excellent initiatives to make these publications available to African universities (Health Inter Network Access to research Initiative [HINARI] in the health sector, and Access to Global On-line Research in Agriculture [AGORA] in the agricultural sector, for example). However, the bandwidth issue hinders these initiatives. During Phase II, Acacia and Connectivity Africa initiated a program entitled Promoting African Research and Education Networking (PAREN), facilitating improved communication not only amongst the universities but also amongst the donor community in order to improve existing practices of bandwidth purchasing and management.

Few countries in Africa have the critical mass of universities required to form a national research and education network (NREN) to negotiate for better prices, as has happened in other parts of the world. The efforts of the PAREN project have resulted in at least one sub-regional network emerging in Eastern and Southern Africa to start such negotiations. In Ecuador, for example, national universities have banded together to secure a greater than 70% drop in the price of Internet access for universities.

Currently, no regulatory dispensation exists in most African countries for universities seeking bandwidth; universities purchase their bandwidth in the same environment that companies do. Negotiating a better deal for African universities — recognizing that they are the intellectual lifeblood of the continent — will be a critical role for any collective action that emerges.

And it's not hard to see the opportunities more bandwidth could make. To drive the growth of African universities, the focus has been on providing scholarships for Africans to study elsewhere, which further adds to Africa's "brain drain." A solid information and communication infrastructure — that includes bandwidth comparable to that of Northern universities — could enhance the capacity of African universities to draw and retain its scholars. Notwithstanding the importance of stable political and economic contexts in African countries, improved ICTs and increased bandwidth to African universities could become more attractive places for Northern researchers and educators as well, reversing the flow of intellectual capital out of African universities and deepening the exchange of knowledge between North and South.

Research questions to be explored in the area include:

- ❖ What are the most appropriate strategies for the effective development and expansion of research and education networking in Africa?

- ❖ What are the most effective policy interventions to support research and education networking in Africa?
- ❖ How can NRENs be more effective in expanding academic network infrastructure? What lessons can be learned from other regions?
- ❖ How do universities improve their university networks?
- ❖ Can regional aggregation of demand effectively lower costs and improve access for African universities? What are the economies of scale that can be achieved? How are the academic institutions able to gear the public and private investments in backbone infrastructure?
- ❖ Is there a correlation between Internet access and retention of academic staff in African research institutions? How do University lecturers use these networks?
- ❖ How does access to the Internet contribute to research capacity in African universities?
- ❖ What are the most appropriate technologies for African tertiary education infrastructure?

### **Network: Local Governance**

Good governance is high on Africa's development agenda, premised on the belief that this is a prerequisite for improved national socio-economic performance. As a result, the last decade has been characterized in many African states by transitions from authoritarian regimes to pluralistic, democratic systems. There is clearly movement toward reform in public administration and governance systems, and institutions in Africa.

The capacity and autonomy of local governments warrants specific consideration in Africa's governance agenda; they are nearest to the rural communities where over 80% of Africa's population lives and where community interests and needs can be far better addressed. Increased emphasis on local governance has generated greater demands from citizens for effective, participatory governance structures and services.

This demand for more effective local governance includes rising demands for access to public information. ICTs have a natural role to play here in their capacity to make information resources both searchable and widely accessible. Indeed, the role of ICTs in enhancing good governance in Africa is becoming an issue of critical importance as democratization gains ground on the continent (Committee on Development Information 2003).

Further, the 2003 WSIS Plan of action recommends that: "Governments should actively promote the use of ICTs as a fundamental working tool by citizens and local authorities. In this respect, the international community and other stakeholders should support capacity building for local authorities in the widespread use of ICTs as a means of improving local governance" (WSIS 2003).

While it appears likely that ICTs could have a positive impact on local governance, there is as yet little empirical evidence about the effects of ICTs in enhancing local governance, particularly within the African context. Decentralization of administrative systems in Africa demands greater attention to: a) improved efficiency and effectiveness in service delivery; b) transparent public financial management and accountability; and c) citizen participation in the decision-making process and monitoring the implementation of agreed decisions.

Even in the industrialized world, the conceptual and theoretical frameworks as well as methodological approaches for this type of research are in the process of development. Little work has been done to adapt these emerging models to Less Developed Countries and African

contexts. This focus area will thus aim to build African research capacity and strengthen the quality and significance of applied research on ICT-enabled local governance in Africa.

Research questions to be considered include:

- ❖ How can ICTs most effectively and sustainably enhance local governance processes in Africa?
- ❖ Does the role of civil society and the local citizen change through the adoption and use of these technologies?
- ❖ Are there any interesting examples and case studies available in Africa? What are some of the lessons learned? Are there lessons from other regions in the world?
- ❖ If access to public information through the use of ICTs is becoming a fundamental component of new government policies and strategies to combat corruption, what does this mean in practice?
- ❖ What kind of information do citizens want? Can they obtain it easily and, if so, how?
- ❖ Do new approaches for disseminating information through electronic local government initiatives work?
- ❖ What are the most appropriate partnerships/alliances (including public-private ones) to develop for the maintenance, operation, and financial viability of ICT-enabled local governance programs/systems in Africa?

### **Box 3**

#### ***Local Governance and ICTs Research Network for Africa (LOG-IN Africa)***

*LOG-IN Africa is an emergent pan-African network of researchers and research institutions from nine countries. LOG-IN researchers are conducting an assessment of the current state and outcomes of local e-governance initiatives in Africa, and in particular how ICTs are being used to realize good local governance at four levels: a) the internal organizational processes of local governments; b) the provision of information and service delivery; c) the promotion of the principles of good governance; and d) public participation and consultation. It is being coordinated through the African Training and Research Centre in Administration for Development (CAFRAD), ensuring effective implementation; a pan-African outlook; and high-level policy dissemination of research results.*

#### **Network: Health**

There is no doubt that ICTs are a tremendous enabler of healthcare, from health systems management to diagnostic tools, to medical education, and even simply as an enabler of communication. ICTs have had a transformative effect on the health sector globally. However, in Africa that impact has been constrained because access to ICTs at the front lines of health in rural areas has been non-existent in most African countries. However, as mentioned above, the rapid expansion of mobile telephony into urban and rural areas in Africa have brought about new opportunities for access and innovation in the use of ICTs to facilitate the delivery of healthcare.

While most mobile telephone infrastructures in Africa are too slow and too expensive for connecting computers to the Internet for long periods of time, low bandwidth communication applications are emerging that use mobile phones or Personal Digital Assistants (PDAs) such as Palm Pilots, to connect via mobile infrastructures to create power information networks. While

information designed and formatted for the World Wide Web is generally too bandwidth intensive to be transmitted over mobile networks, the information itself, properly formatted for small devices, takes up very little bandwidth.<sup>9</sup> Tools such as PDAs and smart phones also have the advantages of being more robust than computers (no moving parts), of generally being much cheaper, and of being easier to maintain in areas with little or no electricity infrastructure through the use of solar power rechargers<sup>10</sup>.

Pilot projects have been under way in the last two to three years across the continent to explore the potential of mobile telephony-based solutions in the health sector. Examples of mobile-enabled health applications include:

- ❖ the automation of demographic surveillance activities such as those at the core of pioneering health care initiatives such as the Tanzanian Essential Health Interventions Project<sup>11</sup> (TEHIP);
- ❖ the delivery of continuing medical education and professional development via PDA<sup>12</sup>;
- ❖ the delivery of patient and health-worker alerts;
- ❖ the maintenance of patient profiles for HIV positive patients' lifelong drug treatments; and,
- ❖ the management of specific health care initiatives such as the roll-out of ARV therapy<sup>13</sup> and TB treatment initiatives.

Acacia – together with funding from Connectivity Africa earmarked for the innovative use of ICTs — has funded projects in all of these areas but we are only scratching the surface of the potential of health applications and services in Africa. The team will continue to work with practitioners and developers in the health field to innovate relevant software, content, and communication with these small devices. As mobile networks continue to expand into Africa, these tools will steadily increase in impact.

Research questions to explore in this area include:

- ❖ What are the most relevant, affordable, and scalable technologies to facilitate m-Health delivery?
- ❖ Can mobile-enabled health services and applications actually reduce the costs of health service management and delivery? What is the return on investment in these technologies?
- ❖ What kinds of health services can best be enabled through mobile infrastructure?
- ❖ How are economies of scale being realized across the continent and how can innovations be rapidly shared across African countries?
- ❖ What are the social impacts of the introduction of these technologies in rural areas?
- ❖ What is the relationship between mobile health applications and services, and broadband solutions via Very Small Aperture Terminals (VSATs) and other broadband

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<sup>9</sup> To give some perspective to this, an entire copy of the Holy Koran available for download onto a PDA takes up little more than a quarter of a megabyte.

<sup>10</sup> Development of Personal Data Assistant (PDA) for Household Surveys in Demographic Surveillance Systems Tanzania ([http://www.idrc.ca/en/ev-26155-201\\_102240-1-IDRC\\_ADM\\_INFO.html](http://www.idrc.ca/en/ev-26155-201_102240-1-IDRC_ADM_INFO.html))

<sup>11</sup> For more about TEHIP, see [http://www.idrc.ca/en/ev-3170-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-3170-201-1-DO_TOPIC.html)

<sup>12</sup> Uganda Health Information Network - [http://www.idrc.ca/fr/ev-26155-201\\_102806-1-IDRC\\_ADM\\_INFO.html](http://www.idrc.ca/fr/ev-26155-201_102806-1-IDRC_ADM_INFO.html)

<sup>13</sup> Free State HIV Therapy Database (ART-HIV) [http://www.idrc.ca/en/ev-86361-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-86361-201-1-DO_TOPIC.html)

technologies?

### **Network: New Learning Environments and Practices**

Better access to quality education both for youth and adults remains one of the most important development challenges in Africa. In this new millennium, the continent continues to have one of the highest illiteracy rates in the world.

The current development of ICT infrastructures, including hardware and connectivity, has contributed to innovative ways of using these tools and technologies to overcome the existing educational challenges. The growth of on-line education delivery, or simply, the access to on-line pedagogical resources offer a greater diversity of learning goals, projects, and activities beyond the traditional classrooms and the geographical boundaries (anytime-anywhere learning, life-long learning, cooperative learning, etc.) (UNESCO, 2004).

Moreover the interactive, multimedia nature of these tools is bringing about a change of paradigm in the relations between learners and teachers by enabling a more learner-centred approach with the new and rewarding role of the teacher as a guide who accompanies the learning process.

In this new context, even if Africa is lagging behind compared to other regions in the world, the last five years have seen an increased penetration of ICTs in many educational settings, both formal and non-formal. This has been facilitated by public and private investments (e.g., school networking, school computer labs). To date, ICTs have been mainly used for computer literacy and for communication purposes rather than as tools for interactive education. The integration of ICTs into the curriculum and in teaching/learning is still very rare. The challenge now is to move beyond the adoption, deployment, and use of ICTs, towards a more integrated approach into the pedagogical strategies and practices (British Educational Communications and Technology Agency, 2005). Such an approach requires important educational reforms. Some countries have started to adopt strategies and policies to properly address the issues related to the integration of ICTs in education.

Therefore, there is the recognition of the need to develop, experiment, and validate strategies, methods, tools, guidelines, and regulations for an effective integration of ICTs in the educational systems. Equally, these can be used for monitoring and evaluating the effects/impacts of their use in pedagogical practices. The latter is necessary due to the lack of evidence on the consequences or impact of ICTs on education goals and targets.

Research on ICTs in education in Africa remains rare. We see a niche for Acacia in supporting research that contributes to better a understanding of the educational uses of ICTs in the socio-cultural context of Africa; that produces evidence that can inform the main stakeholders (policy-makers, practitioners, researchers, parents, students, etc.); and that promotes the formulation and implementation of policies and reforms supporting the introduction of ICTs in the educational systems.

Research will help to address, among others, the following questions:

- ❖ What are the factors enabling an effective integration of ICTs in education in the socio-cultural context of Africa?
- ❖ Which policies and strategies can mostly effectively support embedded and systemic ICT practices in education?
- ❖ What changes are needed to curricula and instruction to support the development of an ICT-inclusive pedagogy?
- ❖ What is the impact of ICTs on student and teacher knowledge, skills and attitudes, and

- what are the appropriate indicators for evaluating them?
- ❖ What are the most appropriate partnerships/alliances (including public-private ones) to develop for the maintenance, operation, and financial viability of ICT-based education programs?
  - ❖ How can ICTs enhance or detract from the teacher–pupil learning and communication process? At what levels of the education system do these tools play the most important role: pre-primary, primary, secondary or tertiary, or at teacher training?
  - ❖ Are there significant differences or similarities in education practices in Anglophone and Francophone countries in Africa?

**Box 4**

***Réseau Ouest et Centre Africain de Recherche en Éducation (ROCARÉ): Study on ICT and Education***

*The Acacia-funded ROCARÉ network, in partnership with the Université de Montréal (Faculty of Education) is implementing a research agenda that will facilitate a better understanding of those conditions likely to foster the successful integration of ICTs in education. The multi-case study is being conducted in eight schools for each of the five following West and Central African countries: Benin, Cameroon, Ghana, Mali, and Senegal (for a total of 40 schools).*

**Theme: Economic Development and Opportunity**

**Network: ICTs, and Social and Economic Development**

Of the 1.1 billion people living in extreme economic poverty, close to half of that number live in sub-Saharan Africa (World Development Indicators 2005). Evidence of ICTs' potential to combat poverty and promote socio-economic growth in developing countries is largely anecdotal. In spite of numerous cases studies documenting the potential of ICTs to alleviate poverty and promote socio-economic growth in developing countries, there is very little economic research to understand the relationship between ICTs and poverty alleviation in Africa.

In the narrower sector of telecommunications, a correlation has been clearly established between teledensity and economic growth and it is generally accepted that investment in telecommunications infrastructure leads to economic growth (LINK Centre, 2005). However, the same body of evidence does not exist for the more complex field of ICTs. ICTs and poverty are both complex, multi-dimensional concepts. It is hardly surprising that understanding the nature of the relationship between the two concepts continues to prove a challenge.

However, we don't have to look far to see that in practical terms, ICTs really are transforming livelihoods across the continent. Evidence of donor awareness can be seen in the proliferation of reports, initiatives, and pilot projects on ICTs and development, and more recently attempts to integrate ICTs into Poverty Reduction Papers (PRSPs) (for example, the Organisation for Economic Co-operation and Development/United Nations Economic Commission for Africa [OECD/UNECA] initiative and the United Nations Development Program [UNDP]).

There is a need to make the case for ICTs as tools of poverty reduction and socio-economic growth in a more rigorous and evidence-based fashion. Unfortunately, few economists on the continent have chosen to specialize in the field of the economics of ICTs. Most of the research to date has been carried out within other disciplines.

Acacia has supported some preliminary work in this area but now plans to move ahead in supporting a network of economists who will focus on understanding the linkages between ICTs and socio-economic growth.

Research questions to be considered include:

- ❖ Of the broader changes (economic, social, political, institutional, etc.) required within a developing country context to foster sustained growth and poverty reduction, what role do ICTs play in effecting these changes?
- ❖ Is it possible to develop a framework for understanding ICTs and poverty alleviation that will inform research in the field across the continent?
- ❖ Where and which ICTs are making the most difference? And why?
- ❖ If ICTs do enable socio-economic growth, is it pro-poor growth?
- ❖ Is the ICT sector itself an important factor in stimulating growth? If so, what types of ICT enterprises are best to develop in Africa?
- ❖ Are there ICT opportunities and or innovations that can improve growth potential in poor communities?
- ❖ Do ICTs have an impact on pro-poor growth barriers such as human capacity, corruption, etc.?
- ❖ Where are Africa's strengths in terms of ICT skills, infrastructure, competencies, etc., and what ICT industries can be developed?
- ❖ What role do ICTs play as enablers of the informal sector?

### **Network: Telecom and Network Infrastructure Policy and Indicators**

Development solutions that harness the benefits of information and communication technologies inevitably are profoundly influenced by government policy and decisions that relate to telecommunications market structure. Access to basic communication and information services is increasingly regarded as a fundamental human right. In many countries, “universal access” policies have been established to address this issue. They normally involve some form of “cross-subsidization” and obligation on the telecommunications operators to ensure the delivery of services to the poor, typically through facilities such as public telephones and the provision of services to remote rural areas.

Governments have used universal service funds for rural telephony with varying degrees of success. No efforts, however, have been as successful as the market-driven, roll-out of mobile telephony built on the principles of pre-paid airtime. Despite the much higher unit cost per call, this mobile technology has enabled a host of innovation by the poor to make affordable use of mobile infrastructure, from selling the right of use to neighbours to “beeping”<sup>14</sup> in order to get calls returned.

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14 Along with pre-paid phone cards, “caller pays” is regarded as one of the key strategies that has enable the growth of mobile infrastructure in Africa. Ringing and hanging up before the call is answer is known as “beeping” and allows phone owners to carry out rudimentary communication (often “call me” or “I’m on my way”) without incurring charges.

But the mobile telephony phenomenon is only part of the equation. The action research that IDRC has supported over the past 10 years has highlighted the rapidly-growing and gaping North–South divide in digital communications, especially the Internet. As the steady convergence trend towards digital, Internet Protocol-based communication continues globally, the absence in Africa of infrastructures capable of delivering high-speed digital services becomes ever more critical.

Unfortunately, many African governments have weak regulatory structures and continue to protect state-owned voice telephony. They fail to attract investment in fixed-line and wireless services that provide the Internet. At the same time, most state-owned telcos are becoming less and less profitable because of the falling costs of international calls due to increasing amounts of voice communication now being transported as VOIP. The infrastructure networks on which such communications take place are converging in terms of use and interoperability.

Experience to date has shown that ICTs can dramatically improve services that cut to the heart of poverty alleviation in education, health services, agriculture, food security, and job creation. However, the untapped potential of the efficiencies that can be gained from information and communication technologies need to be continually re-stated in the world of policy-makers.

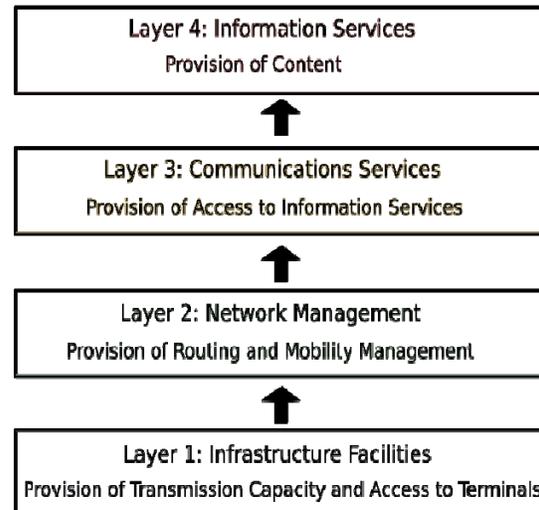


Figure 4. Network Layers – Source: Melody, William and Samaraiiva-Rohan. LIRNE.net presentation

Figure 4 illustrates the evolving stratification of the ICT infrastructure. In the past, development activities have focused on the third and fourth layers of information and communication services, assuming that the market would take care of the development of basic infrastructure. Manifestly, this has not happened and African content initiatives are failing to deliver on their promise because the basic access does not exist for Africa to take advantage of those services.

The demand for better and more efficient services are the main drivers for improved network expansion and upgraded operability from old analogue systems to digital quality lines and transmission equipment. But these demands are likely to remain unserved because complexity of strategic ICT infrastructure development remains outside the reach of the average citizen. They remain paternalistically managed by well-meaning governments with vested interests in earning high dividends from rapidly changing telecommunications markets. These issues need to be elaborated and debated within the context of public policy agenda setting.

Research questions to be considered in this area include:

- ❖ Assuming that supply-side statistics do not tell the full story of ICT use in Africa, what is the real usage and uptake of ICTs in urban, peri-urban, and rural Africa?
- ❖ What ICT policies are most effective in enabling African governments to deliver on their universal service commitments?
- ❖ How important are access and affordability to micro-economic changes for poor communities?
- ❖ What role does the ICT sector play in creating more job opportunities in national economies? To what extent and how is the ICT sector contributing to changes in the

structure of national employment?

- ❖ How effective are the policy-makers and regulators in Africa in establishing a level playing field for greater across-the-board participation in the ICT sector?
- ❖ What are the best mechanisms for positively influencing telecommunications policy and regulatory processes?
- ❖ What alternative infrastructures can enable universal access, what policy changes are required, and what regulatory capacities need to be developed in order to create the enabling environments that will attract public, private, and community investments into developing such alternative backbones and access networks in Africa?
- ❖ What are the institutional rigidities in the ICT sector (obsolete laws, policies, regulations, unrestrained monopoly power and political interference) inhibit investment in network development?
- ❖ How can the resistance to change and cultural lag of incumbent telecom operators be overcome?

These concern the policy, processes, demand for services, supply of services, and the measures required to remove the policy roadblocks to delivering services that will result in development and poverty alleviation for African countries.

**Box 5**  
**Research ICT Africa!**

*Acacia's flagship ICT policy research network, Research ICT Africa! (RIA!) is a network of policy and regulatory researcher in 14 African countries. RIA! has begun developing a set of indicators that give national, representative perspectives of the access, use, applications developed, and costs that households, small enterprises, and the public sector rely on in terms of ICTs. The baseline studies will be followed by successive studies that are being recognized by international bodies and national lobby groups interested in monitoring the development of ICTs in Africa and any related social and economic effects these have.*

**Network: Small-scale Agriculture**

Agriculture and the harvesting of natural resources provides livelihoods for over 70% of the African population; access to appropriate information is known to be amongst the single largest determinants of agricultural productivity. Much of what constitutes effective “rural development” has to do with aspects that affect this sector. While a few large-scale, commercial farmers on the continent have used some of the decision support tools that ICTs are providing, relatively little attention has been paid to the potential benefits of the broader use of ICTs in this (mainly informal) sector, one of the few in which women often predominate.

In a broader context natural resources are public goods. On paper, sustainable development policies aim to protect the public's long-term right to share in the benefits resulting from the use of these resources. When powerful parties with short-term interests make resource decision, the wider population, particularly rural agricultural communities, are often unable to negotiate their rights to an equitable share of the benefits. The national and international networks that can be fostered through the use of ICTs may help to address these issues. An important component or any agricultural system is the flow of information and the strength of the information systems that are managed by governments, farmers, and NGOs. It is in working with and improving these

information and communication systems that ICTs can be used to enhance the delivery of these services.

The challenge for Acacia in the next five years will be to fund research that seeks to understand:

- ❖ What are the key ICT applications that can benefit the small scale agricultural and natural resource sector?
- ❖ How important is the cost and access to ICTs of support in enabling small scale farmers to gain improved services? If of no significant consequence, what are the factors that influence the use of ICTs as an input into small-scale, agricultural development?
- ❖ What information resources are useful to this sector and which of these are available and could be made accessible with appropriate localization?
- ❖ What are the appropriate agricultural applications for mobile technologies and what is their potential to meet demand for information in the short term until broadband services and access devices become more widely available?
- ❖ How can small-scale farmers and related groups participate in efforts to bring about policy change in both the agricultural information and telecommunications sector?
- ❖ How can the capacity of networks of organizations engaged in supporting the small-scale agricultural sector be improved through use of ICTs? How can they learn from efforts in other regions?
- ❖ What is the potential role of community broadcasting when combined with ICTs in improving information delivery to the farming community?
- ❖ Is there a sustainable model for the deployment for broadband rural wireless access making use of the latest wireless technologies, combined with VSAT where necessary?
- ❖ What are the most successful models of the use of ICTs to support e-commerce and micro-finance applications in this largely informal sector?

#### **Box 6**

##### ***DrumNet: A Fair Deal For Kenyan Smallholder Farmers***

*Through the DrumNet pilot project, 500 smallholder farmers in the Kirinyaga District of central Kenya are getting market access as well as credit and price information that help them produce more crops and sell these at higher/real-market prices. DrumNet serves farmers through branch offices that are stand-alone information centres equipped with a computer with Internet connection, a mobile phone, and a whiteboard for displaying market prices. Farmers without access to a mobile phone can consult the whiteboard at the branch offices.*

### **3.2 Program Objectives**

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The Acacia program objectives describe the broad, measurable outcomes that are expected from the program over the course of the five-year Prospectus.

***Objective: Sustained Policy Dialogue***

The field of ICTs changes rapidly. While ICTs have the potential to catalyse social and economic development, policies inevitably lag behind these changes. In order to truly deliver benefits from the potential of ICTs, policy-makers need to be well informed on the issues, through engagement with both the research and civil society. Through investment in research, research networks, targeted publications, and events designed to bring policy-makers in regular contact with researchers, we expect to see:

- ❖ ongoing, robust dialogue among regulators, policy-makers, and researchers on telecommunications network infrastructure issues;
- ❖ growing awareness amongst government statistical agencies to collect data that aggregates the use of various ICTs in households;
- ❖ a deeper understanding of linkages between ICTs and wealth creation by policy-makers leading to ICTs having a strategic role in pro-poor policy making;
- ❖ more progressive, collaborative, forward-looking policies for basic network infrastructure in Africa;
- ❖ champions at the municipal level of ICT-enabled delivery of local-government services and citizen e-participation;
- ❖ targeted line ministries embracing appropriate ICT infrastructure for service delivery;
- ❖ an ongoing engagement between gender and ICT researchers and policy-makers resulting in more gender-aware ICT policies;
- ❖ a deeper understanding among partner institutions of the implications of digital intellectual property rights; and
- ❖ researchers participating in local and national policy fora.

***Objective: Thriving Research Networks***

Africa has unique challenges when it comes to research capacity. With 53 countries and comparatively few strong research institutions, finding the capacity to carry out larger research programs can be difficult. A focus on research networks addresses this challenge directly by networking strong and weak institutions together allowing strong researchers and institutions to take on a mentoring role with other less well-developed research institutions. It has the benefit of diffusing knowledge by default within the network and also of acting as an international locus for research in particular thematic areas. It is an ideal vehicle for parallel funding activities as well. Through our program in the next five years we expect to see:

- ❖ greater participation by representatives of African research networks in global fora;
- ❖ face-to-face intra-regional knowledge exchanges on thematic research areas;
- ❖ African researchers attracting more recognition and funding through association with their research networks;
- ❖ greater solidarity and interaction among thematic-based ICT4D research networks;
- ❖ more sophisticated use of ICTs to facilitate collaborative research, knowledge sharing, and research dissemination;
- ❖ increased intra-African consulting and research support through network-based research alliances;
- ❖ existing thematic research networks expanded to more African countries;

- ❖ inter-institutional partnerships emerging as a result of research network interactions; and
- ❖ broader participation by diverse disciplines researching the role of ICTs in development.

***Objective: Enhanced Research Capacity in ICT4D***

Information and Communication Technologies for Development (ICT4D) is not a traditional area of research. There are very few institutions anywhere in the world offering courses in ICTs for development, let alone granting a degree. It is by its very nature a trans-disciplinary field. Practitioners often enter the field from non-research backgrounds and while they have extensive experience in their respective fields, they may not have the skills to develop effective research projects. Our objective is to develop both individual and institutional research capacity in ICT4D in Africa. Through our five-year program we expect to see:

- ❖ greater capacity in research methodologies, in particular on ICTs and gender analysis;
- ❖ increased knowledge of best practices in research techniques appropriate for ICT4D;
- ❖ development and sharing of tools that support collaborative research;
- ❖ increased local and global awareness of ICT4D research capacities and expertise residing in Africa;
- ❖ increased numbers of new ICT4D researchers, in particular women;
- ❖ training in ICT4D research that targets women researchers; and
- ❖ increased access to and use of on-line scientific publications in Africa.

***Objective: Increased Social and Technical Innovations in ICTs***

ICTs are enablers of innovation both social and technical. Africa is home to a great deal of innovation in ICTs, in particular, adapting low-cost commodity technologies designed for the industrialized world to serve African needs and conditions. This is largely the area that the Connectivity Africa (CA) funding has been directed towards. In the event of the CA funding not being renewed, Acacia will again take on this mandate from an applied research perspective. Our objective is to create the conditions for maximum innovation in ICTs for development in Africa. Through our five-year Prospectus we expect to see:

- ❖ Africans producing and accessing content, services, and tools in their own languages;
- ❖ new, affordable, African-developed, low-cost technologies improving learning environments and educational practices by providing better access to educational content and resources;
- ❖ innovative technologies enhancing the delivery of social services by providing increased transparency, efficiency, and accountability;
- ❖ innovative uses of technologies offering broader and practical access to wealth and well-being;
- ❖ well-developed infrastructures and affordable technologies offering Africans the opportunity to compete in national, regional, and international markets;
- ❖ a robust body of research on alternative, innovative telecom and IT policy models for Africa; and,
- ❖ an African body of research on digital intellectual property that helps Africans participate

more effectively in the global knowledge economy.

## **4. Emerging Areas**

The emerging areas section represents the forward-looking aspect of the Prospectus. In it we profile areas of research that we would like to know more about. Similar to IDRC's "explorations," these areas may have the potential to become a core focus area within the Program Initiative (PI). At the time of writing, these emerging areas are research topics that are "on our radar." We will invest in sufficient research in this area in order to determine whether or not they are worth promoting to a core research area.

### ***Remittances***

Remittances account for the second largest capital flow to developing countries behind Foreign Direct Investments (FDI) and ahead of Official Development Assistance (ODA). It is estimated that Africa accounts for 15% of total remittances to developing countries, though these figures may be underestimated as it is not known what proportion of remittances are bypassing official financial mechanisms. For many countries in Africa, remittances have become an important source of foreign currency and a stable source of income to poor families contributing to improving their standard of living. ICTs have become a key enabler of the growth of remittances in the last few years.

To date, most studies looking at remittances have focused on Latin America and Asia, with only a few studies examining Africa. There is a clear need to better understand the financial flows and the financial systems in Africa, and to better understand how ICTs can expand financial services in rural areas. Is there potential for mobile technology to be used in this context? Which policies will integrate mobile operators into the reform of the financial system? Cross-border flows of currency are highly regulated in most African countries, greatly increasing the transaction costs of these flows. What role can ICTs play in facilitating easier and cheaper flows of remittances?

### ***Participatory GIS***

Geographic Information Systems (GIS) are becoming an increasingly well-recognized tool in decision-making. At the same time there is a rapidly growing amount of publicly-available geographic information now available on the Web. This has combined with the emergence of user-friendly software tools that can be used to access and process this information and make it useful for a wide variety of activities that support decision-making in a development context. These range from community empowered, land-use planning and environmental impact monitoring, to improving agricultural practices and community health strategies. While these tools have mainly been used in developed countries, their potential may be even greater in a developing country environment. We plan to carry out some initial projects to explore the potential of using these new technologies as tools for decision-making and for communication.

### ***Energy Powering ICTs***

ICTs require reliable power to operate and in most countries in Africa, the national electricity grids have limited coverage in rural areas. Novel approaches to this problem include solar powered schools and clinics in Namibia and South Africa, and even Cisco Academy in a remote part of Tanzania powered with biogas from 12 cows. As the cost of solar equipment continues to

drop and power consumption of ICT devices reduces, there may be increasing opportunities to make use of these alternative, renewable energy sources to reach remote and marginal communities. However much still needs to be learned on the most cost effective technologies and models for their deployment.

### ***Cyber-criminality***

The ICT revolution has fundamentally changed society. All sectors are affected by the dramatic diffusion of these technologies that bring with them both positive and negative effects. On the latter, there are new types of crimes as well as the commission of traditional crimes by means of ICTs, regardless of geographical limitations or national boundaries. Phenomena such as child pornography, cyber-space offences such as illegal money transactions, the offer of illegal services, dangerous computer viruses, etc., are spreading globally (Council of Europe, 2005). Although recent, cyber-criminality is quickly spreading in Africa. Evidence has shown that the countries lack the necessary mechanisms, legal instruments, and human resources to deal with this new situation. There is therefore, a need to better understand the evolution of cyber-criminality on the continent, and to support research contributing to create awareness among stakeholders and local capacities in this area.

### ***Digital Human Rights***

This Prospectus has focused mostly on the tremendously positive transformative potential of ICTs as a lever for human development. It is important to recognize that any powerful technology can also be misused. The same qualities that make ICTs great, also make them dangerous. Being on-line offers tremendous possibilities but it also brings risks such as invasion of privacy, and data and identity theft. It is important for Africans who embrace the digital world to be aware of the risks involved and of how to protect themselves on-line. Similarly, governments need to establish policies to deal with human rights abuses in the on-line world.

### ***ICTs and Crisis Situations***

As a means of citizen empowerment, ICT4D can play a major role in normal circumstances; during crisis situations however, they can also be of great help, whether the emergency is caused by armed conflict or natural disaster. ICTs can be used to monitor disease and pest outbreaks, such as the grasshopper invasion in West Africa in 2004 or the potential bird flu epidemic. In conflict situations, ICTs can assist in providing displaced people with access to information and communication tools. The focus in this area would be on technologies that are flexible, easy-to-use, robust, and rapidly deployable. This emerging area would look at alternative access and information technologies: Wireless Fidelity (WiFi); VOIP; wireless PDAs; mobile telephony; blogs; SMSs. The role of ICTs as facilitators of access to services, information to people (e.g., SMS as a tool for campaigning: elections or to help raise funds for victims), or training on-demand and in situ (e.g., WiFi in a box, VOIP in a box, etc.), would be researched. It would also examine the role of community-based NGOs in providing access to information and services in crisis situations and in post-conflict and post-catastrophe situations. Finally, it would explore the potential of GIS and Participatory-GIS technologies in crisis management, the prevention of natural catastrophes, and the dissemination of information to citizens and to authorities about risks of natural catastrophes.

## *Incubators*

Through embryonic work in the Connectivity Africa portfolio the team has developed some experience in supporting ICT-based incubators. These entities are best established in universities to support the extension of graduates into the experimenting with projects that could extend and improve government services in innovative ways and/or enable graduates in becoming entrepreneurs with innovative ideas that can be sponsored by local businesses. The support of these incubators requires not only a university initiative, but also supportive government policies that enable new business development. Where these projects require the innovation of venture capitalists, the IDRC would be able to invest in the social capital development, with venture capital expertise mobilized from the private and public funding sectors.

## **5. Approach/Organizational Practices**

Acacia shares much in common with other IDRC program initiatives in terms of its general programming approach, typically based on close, ongoing relationships with development partners. Rather than soliciting proposals or holding annual competitions, Acacia typically works with developing country partners in the field to better understand ICT and development issues and to develop project proposal. Successful project proposals are usually the result of an iterative dialogue with our partners. This approach builds capacity for both Acacia staff and the project partner.

The second phase of Acacia (now drawing to a close) initiated a shift from a country-focused programming approach to a more networked, regional orientation. We believe that thematic research networks are important influences in African ICT4D development. Successful research networks serve several purposes: they can aggregate what would otherwise be seen as a weak research capacity into a stronger community of thematic researchers in which the advanced researchers can serve as mentors and models for less experienced researchers; they facilitate a transdisciplinary approach integrating expertise from various disciplines; they serve as a mechanism for dialogue-based learning and for the dissemination of knowledge; they can act as a locus for new interest and investment in the thematic area. For all these reasons, we see thematic research networks as improving the quality and impact of Acacia-funded research.

While the majority of Acacia's investments over the next five years will go to into research networks, Acacia will also continue to invest in its original focus: countries in which significant impact has been noticed over time (Batchelor, Hafkin, and Cheneau-Loquay 2005). The Acacia team programs according to an informal 80/20 rule: 80% of program resources are invested in either thematic research networks or in projects that have strong linkages to existing projects; the remaining 20% is at the discretion of the program officer to pursue regional priorities and emerging issues. There is no active measuring of this "rule" as it is intended to be indicative rather than prescriptive.

Common to all Acacia programming, is an orientation toward policy influence and development. Supportive policies are critical enablers of this fast-moving field and it is a particular point of all Acacia-funded initiatives to involve policy-makers through the research process.

As mentioned elsewhere in the document, the field of ICTs for Development is not a field of research that has been established for many years. Many of the people in ICT4D come from non-research domains: technologists, activists, lawyers, programmers, designers, etc. As a result, much of the evidence of the impact of ICTs on development originates from anecdotal evidence. It will be a particular focus of Acacia to increase the body of credible evidence of the impact of ICTs on development in Africa.

Particular to ICT4D is the capacity to address both the medium and the message. Not only are research networks important, building on-line capacity for research and research networking is also important to Acacia's development approach.

An integrated learning approach is also important to Acacia and, along with other program initiatives, it will implement the Rolling Program Completion Report (rPCR) process that facilitates knowledge accumulation before, during, and following an IDRC-funded projects.

Finally, as the impact of ICTs is increasingly felt across the continent, understanding the way in which gender relations and social equity is changing is a key part of our program. Acacia will invest (particularly in the first year of this phase) in building capacity within the team and with project partners in engendered approaches to research project design and development.

## **6. Partnering Strategy**

### **6.1 Connectivity Africa and Acacia**

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Connectivity Africa (CA) is the alter ego of African ICT4D staff. At the June 2002 G8 Summit in Kananaskis, Alberta, Canada announced three initiatives as part of its response to the G8 Africa Action Plan and the recommendations of the Digital Opportunity Task Force. One of the three initiatives is Connectivity Africa: a CA \$12M program designed to improve access to information and communication technologies (ICTs) in Africa. IDRC was selected to manage the CA program.

Within a few months of the launch of CA, it became evident that Acacia and CA could be more effectively implemented by a single team. Accordingly, CA staff was hired to strategically complement existing Acacia staff. This allowed ICT4D, for the first time, to have program staff in all IDRC African regional offices. New program staff was hired for Connectivity Africa and along with Acacia program staff, were given "joint appointments" to carry out programing for both Acacia and CA. Currently, Connectivity Africa funds 3.5 full time equivalents (FTEs) within the Acacia/CA team, including the position of Acacia Team Leader.

CA has integrated well with Acacia programing. Of Acacia II's three research themes, Technology Research and Development fit especially well with CA's mission of innovation in ICTs for African development. This synergy has allowed Acacia projects to leverage research opportunities from Connectivity Africa's emphasis on innovation and connectivity.

At the time of writing, IDRC had applied for an extension to the CA initiative to March 2008. At the moment it is not clear whether additional funding will be available for CA when its funding cycle ends. In the event that no further funds are secured for CA, the positions currently funded by CA will need to be considered in the overall evolution of the Acacia program.

### **6.2 Canadian Partnerships**

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An important benefit of hosting Connectivity Africa at IDRC has been closer ties with both the Canadian government (Industry Canada and CIDA) as well as with Canadian Research Institutions and Non-Governmental Organizations. Staff at Industry Canada and CIDA's *Canada Fund for Africa* Division have had the opportunity to join us on various field missions in Uganda,

South Africa and Senegal, deepening their understanding of our mandate. Over the next 5 years, independently of what happens with Connectivity Africa, we will continue nurture these linkages. Collaboration with Industry Canada will focus on Telecom and ICT policy issues. As for CIDA, we will concentrate on priority issues, notably agriculture, health and private sector development, looking at possible collaboration for scaling up technology pilots and integrating key lessons learned.

We will also build on successful partnerships developed with Canadian institutions; for example in education with the Centre interdisciplinaire de recherche sur l'apprentissage et le développement en éducation (CIRADE) or in people's empowerment with Canadian Physicians for Aid and Relief (CPAR). Where appropriate, we will pursue new partnerships with Canadian institutions that are committed to building the capacity of African researchers and research networks.

### **6.3 Other Donors**

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Acacia is committed to working closely with other donors in the field of ICTs for development. It is not just a strategy for reducing duplication and redundancy in development activities but also a mechanism for improving the sustainability of projects. Funding projects jointly with other donors gives recipients more choices and increases the sustainability of both projects and recipient institutions. The following are some of our key partners in the field:

*UK Department for International Development (DFID):* DFID has a similar ICT4D initiative to Acacia entitled CATIA (Catalysing Access to ICTs in Africa). We work closely with CATIA on a number of initiatives including telecom policy reform and the impact of mobile telephony. Through the Connectivity Africa initiative, we share a common African Advisory Panel bringing us together for strategic discussions once a year;

*Soros Foundation (Open Society Institute):* Soros is a close partner on some specific issues, in particular: innovation in low-cost wireless technologies; digital intellectual property rights; and Open Access approaches to telecom infrastructure. It is our intention to co-invest with Soros in projects related to the above topics;

*Swedish International Development Agency (SIDA):* SIDA is a relatively new partner for Acacia. Evolving interest in African university network infrastructures and Open Access infrastructure have led us to collaborate with SIDA. We are currently jointly supporting a consortium of national African research and education networks to lobby for access to the new East African submarine fibre optic cable. We expect to partner more in this area and in the areas of Internet Exchange Points in Africa;

*Partnership for Higher Education in Africa:* The Partnership for Higher Education in Africa has been supporting ICTs in African universities for many years. We have been working with them to support university networking in Africa. We plan to jointly support the Association of African Universities to carry out some coordination in this area. We expect that more joint projects will emerge related to ICTs and higher education in Africa.

*Partnership for ICTs in Africa (PICTA):* Originally initiated by Bellanet and the Economic Commission for Africa (ECA), the Partnership for ICTs in Africa (PICTA) is intended to be a forum for ICT4D investors in Africa to share knowledge and develop joint initiatives. Through Connectivity Africa, we are funding a staff person at ECA to (among other things) facilitate this network. Acacia is committed to participation in PICTA.

## 6.4 Inside IDRC

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### *Asia and Latin America ICT4D Initiatives*

As the regional ICT4D program initiatives mature, common research threads are emerging across the regional realm: telecommunications regulatory policy, localization, open source, and digital intellectual property are all areas of emphasis for all three regional ICT4D initiatives. It is our intention to develop thematic cross-regional knowledge sharing practices and events that will foster South–South alliances and learning.

### *Other Program Initiatives*

Acacia is committed to extending its collaboration with other IDRC program initiatives, in particular, with:

- Governance, Equity, and Health (GEH) in our m-Health activities;
- Innovation, Policy, and Science program area on digital Intellectual Property issues; and
- Urban Poverty and the Environment on ICT-enabled local governance.

### *Bellanet*

Bellanet is a natural complement for many Acacia activities. In particular, we share a commitment with Bellanet to the Partnership for ICTs in Africa (PICTA). Bellanet’s commitment to fostering development collaboration through the effective use of ICTs fits well with Acacia-networked programming approaches. Bellanet is well poised to support research networks in Africa through capacity building efforts in on-line community facilitation and knowledge sharing, as well as appropriate ICTs that facilitate knowledge sharing and collaboration.

## 7. Communications Strategy

Acacia’s communications strategy will build on the strengths of the communications successes in the previous phase of Acacia and will also take steps to reinforce areas of weaknesses identified in the external review (Batchelor, Hafkin, Chéneau-Loquay, 2005).

### **Mid-term Conference**

A key dissemination and networking tool for Acacia II was a mid-term, project-networking event which brought together all Acacia-funded projects together for a three-day conference. The conference attracted many other development partners as well. The networking and cross-pollination of ideas and projects has led to many new collaborative projects and initiatives. It is our intention to organize another such event two to three years into the program.

### **Maps**

The previous phase of Acacia produced a number of extremely popular maps of ICT diffusion in Africa, culminating in a recently published Acacia Atlas of ICTs for Development in Africa. We have found that maps can help people become familiar with the deployment of infrastructures and policies relating to a variety of ICTs on the continent. Maps also help in identifying gaps, laggards, and pioneers. We intend to continue the production of maps relating to ICT4D in Africa, moving in this next phase toward on-line, interactive maps that can be customized to suit researcher needs. Mapping is also a natural fit with the emerging research on GIS and P-GIS applications.

### **Acacia Infobook**

This year saw the publication of the first Acacia *Infobook*; the book profiles, in plain language, the objectives and progress of Acacia projects. The *Infobook* was designed in such a way that

updates would not incur substantial, additional design or production costs. We intend to produce a new version of the *Infobook* every couple of years. The book will be intended for other donors in the field, for Canadian embassies and High Commissions in Africa, and for the general public.

### **New Technologies**

Consistent with the rapidly evolving field of ICTs, we will experiment with new, dynamic communications tools such as blogs for maintaining more dynamic communication with our partners, wikis for maintaining collaborative information resources, podcasts to transmit live events and interviews, and collaborative tools for sharing new knowledge such as social bookmarking and photo archives.

### **Focus on Francophone Publishing**

There is a particular dearth of publications on ICT4D in Francophone West Africa and North Africa. In this next phase, we will ensure that all significant Acacia publications are made available in French. We will also focus on the publication of Francophone African ICT4D research results.

### **Canadian and International Media**

In partnership with IDRC's communications division, we will seek to profile flagship initiatives and significant publications in the Canadian media and in appropriate international publications.

## **8. Anticipated Challenges/Risks**

### **Research Capacity**

Because ICT4D is a comparatively new field of research, few African research institutions have formal programs devoted to understanding the impact of ICTs on development. Rather, research in ICTs is evolving as a sub-speciality of various disciplines across the fields of economics, computer science, engineering, law, and the social sciences. As a result, it is often difficult to find adequate research capacity in the newest areas of ICTs such as in the area of intellectual property rights and in the economics of ICTs. Researchers also require institutional support for their work. Targeting specific institutions for capacity building and a continued focus on building networks of researchers will go some way to mitigating this challenge but experience has shown that producing high-calibre research results takes both time and strong leadership from experienced researchers. Steady focus on thematic areas and capacity are a part of the answer as is collaboration with other donors to diversify the support base of key partners.

### **Network Development**

Networks thrive when managed by strong coordinators and dynamic leaders. The networks that Acacia has built have relied on strong leaders and institutions, but leaders can leave and succession can fail, and institutions can fail to provide the flexibility required to ensure that multi-national networks can be maintained. These networks are dependent in most cases on the full-time commitment of academic mentorship and administration. Essentially, in supporting the development of networks, the IDRC is asking an intermediary institution to take on the leadership and administrative role of several other researchers and institutions. This can be an onerous task to both become acquainted with and maintain. On the other hand, networks can flourish, and members can come and go, some will be the stronger participants, while others who stay require more hand-holding and mentoring. The shifting responsibility of building research capacity in Africa on stronger institutions in Africa will be tested when the weaker institutions can themselves rise to the challenge of delegating networking responsibility.

### Incumbent Self-interest

All governments in Africa hold the majority shares in their incumbent telecommunications operators. Most are aware that the industry does, or potentially can, yield high returns for governments. This vested interest mostly interferes with policy changes to ensure broader participation in the delivery of voice and data services. These may be the most stubborn challenges to extending the services that can make economies more competitive, and services more available to the poor.

### Language

As research networks expand, inevitably they emerge with a language bias based on where the network hub is located. Developing African research networks that can span linguistic barriers is a particular challenge. No initiative can sustain the expense of translating all network communication, however, some research networks (such as ROCARE) have developed innovative mechanisms for maintaining a bilingual research network environment. In the next phase of Acacia, it will be a particular challenge to assist research networks in working bilingually and even trilingually.

## 9. Anticipated Budget Allocation and Team Composition

**Table 1. Anticipated Budget**

<i>Year</i>	<i>FY 06/07</i>	<i>FY 07/08</i>	<i>FY 08/09</i>	<i>FY 09/10</i>	<i>FY 10/11</i>	<i>Total</i>
Projected IDRC Funding	8M	8M	8.5M	8.5M	9M	42M
Resource Expansion	2M	2M	1.5M	1.5M	1.5M	8.5M
FTEs (POs Only)	6.5	6.5	6.5	6.5	6.5	
Tentative Funding Priorities	access and e-services	e-services, idea economy	idea economy, e-citizenship	TBA	TBA	

Resource expansion in fiscal years 06/07 and 07/08 refers to resources remaining in the Connectivity Africa initiative.

**Table 2. Team Composition**

<i>Name</i>	<i>Position and Location</i>	<i>PI Commitment (%)</i>	<i>Areas of focus</i>
Adera, Edith	PO, Nairobi, Kenya	100%	Local governance; poverty alleviation; agriculture, ICT policy and regulation
Camara, Alioune	PO, Dakar, Senegal	100%	ICT policy; education; human rights
El Zaim, Adel	PO, Cairo, Egypt	100% (CA funded)	Localization; wireless innovation
Emdon, Heloise	PO, Midrand, South Africa	100%	Telecom policy; gender; innovation
Jensen, Mike	Knowledge Officer, Johannesburg, South	50%	ICT innovation; network infrastructure; emerging trends

	Africa		
Roberge, Stéphane	PO, Ottawa, Canada	100% (CA funded)	Intellectual property; network policy
Song, Stephen	TL, Ottawa, Canada	100% (CA funded)	ICT innovation; intellectual property; tertiary networks
Thioune, Ramata	PO, Dakar, Senegal	50%	Gender; local governance, evaluation
Fourati, Khaled	RO, Ottawa, Canada	100% (50% CA funded)	Policy; global networks

## 10. Evaluation

In the previous phase of Acacia, significant capacity was built both within the team and with our partners in the use of Outcome Mapping (OM) as an evaluation tool. We have found it to be particularly effective for ICT projects as it helps technically-oriented researchers to shift their focus away from the technology and on the behavioural and relationship changes that we are seeking to bring about.

In this next phase of Acacia, we intend to expand our work with OM strategically, including it in all larger projects of a million dollars or more. At the same time we would like to begin working with other methodologies to expand our repertoire of evaluation tools so that we can help our partners choose the best possible evaluation approaches. Other tools include: the APC's Gender Evaluation Methodology (GEM); the Most Significant Change technique developed by Jessica Dart and Rick Davies (2005); and UNESCO's Ethnographic Action Research methodology (Hovland, 2005).

In terms of strategic areas to be evaluated in this next phase of Acacia, we plan to support the following evaluations:

1) *Evaluation of the integration of engendered analysis in Acacia programing*: The external review of Acacia highlighted gender as an area in which Acacia has lost some of its former emphasis and in which there does not appear to be a consistent approach to gender across our projects. The intention of this evaluation would be to take a closer look at gender in Acacia projects with the intention of building capacity within the Acacia team and of developing a framework for the integration of engendered programing into Acacia project development. This will be carried out in the first year of the next phase.

2) *Evaluation of our strategy to carry out programing through the support of research networks*: Consistent with the Centre's current focus on research network development, Acacia is planning to invest in research networks in all of its core focus areas. We have some networks that have been underway for a few years and some that are just getting off the ground. In the third or fourth year of the Prospectus, we wish to carry out an evaluation of how well research, network-driven projects are succeeding and whether they are delivering all of the additional value outlined in our objectives. We will collaborate directly with the Evaluation Unit to ensure that the results of the evaluation will feed into the emerging IDRC body of knowledge on development research networks.

3) *Evaluation of our approach to capacity building within our programing*: As the Centre's Evaluation Unit continues its research on capacity development, we will draw on existing studies to inform our approach to capacity building, and structure an evaluation so that it will complement the work of the evaluation unit in this area. This will be carried out in the third or

fourth year.

4) *Evaluation of Connectivity Africa*: As Connectivity Africa draws to a close, an evaluation of the program will be directed. The evaluation will draw on existing Outcome Mapping work being undertaken within the program and also evaluate targeted aspects of the program. This will be carried out in 2007.

5) *External Evaluation of Phase III of Acacia*: Finally, an external evaluation of the entire Acacia program will be done. This will be done in a similar manner to the recently completed external evaluation of Acacia's second phase. It will take place at the beginning the final year of the Prospectus.

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## Annex 1 - Acacia projects 2001- 2005

Project Number	Project Title	Amount CAD	Institution	Description
ICT Policy Research				
101584	Development of an African ICT Policy Research Network	1,269,130	The Link Centre	Most ICT policy research comes from the developed world. Africa's limited policy research mostly consists of one-off, disconnected projects, giving policy makers and regulators a weak information foundation for setting priorities and making decisions. By creating a focal point for African researchers and institutions focused on ICT policy, and by connecting Africans to international research institutions and networks, the Research ICT Africa (RIA) Network is supporting the development of policies to address African-specific circumstances and needs. This project has established an African ICT Policy Research Network in ten African countries coordinated from the LINK Centre, University of Witwatersrand, South Africa. The network will give African researchers, governments, regulators, telecommunications operators, multilateral institutions, development agencies, community organizations, and trade unions the information and analysis they need to develop and implement effective ICT for development policies.
102508	Gender Research in Africa into ICT's for Empowerment	1,458,480	Association for Progressive Communication	How do women in Africa use ICTs to improve their lives? What barriers prevent many African women from doing so, and how are they surmounting these barriers? GRACE is a two-year research project that is finding answers to questions like these while building a self-sustaining African gender and ICT research network. By providing intensive training and ongoing mentoring and support to the fifteen research teams, this project will encourage the establishment of an African network of gender and ICT researchers that, over time, will expand to include many other individuals and organizations throughout Africa. In turn, this will build a more substantial body of research on how African women access and use ICTs, which will guide policies and help to reduce the obstacles women currently encounter.
102103	Kenya National ICT Policy Development	495,190	Ministry of Planning and National Development, the Treasury, Kenya  E-Government Directorate, Office of the President, Cabinet Office, Kenya  Kenya Institute for Public Policy Research and Analysis (KIPRA)	The Government of Kenya's economic blueprint for 2003-2007 notes that the ICT sector "is important to the realization of the required improvement in productivity and empowerment of the citizenry". A national ICT policy will enable and guide the growth of the country's ICT sector and integrate the sector into Kenya's development, helping to create jobs, improve productivity, increase access to education, health care and government services, especially for disadvantaged individuals and communities, and allow communities to make informed decisions about local resource use. The policy process will also create a network of African researchers focused on identifying the most effective ways to apply ICTs to key development issues by linking research results based on experimentation at the community level to national and regional ICT policy-making.

Project Number	Project Title	Amount CAD	Institution	Description
101972	Increasing the Impact of Civil Society Organizations on ICT Policy Development	355,500	Association for Progressive Communications (APC) Southern African Non-Governmental Organization Network (SANGONet) Lisa Thornton Inc.	To achieve the full potential of ICTs as a means of improving the social, economic and cultural lives of individuals and communities, CSOs must work together to build an information society based on principles of transparency, participation and social and economic justice. But ICT policy issues are complex, and most CSOs have extremely limited resources. By providing access to information, training and other resources, this project will empower Southern African CSOs to collaborate to ensure that social justice concerns are enshrined in national, regional and international ICT policies.
101618	Open and Closed Skies: Satellite Access in Africa	420,100	Global VSAT Forum Catalyzing Access to ICTs in Africa	This research project thoroughly assessed barriers and opportunities in African economic and social development for Very Small Aperture Terminal (VSAT) technology. The research surveyed VSAT regulatory frameworks, applications, costs and technical issues across Africa, as well as assessing alternatives to VSAT and reviewing how VSAT technology has contributed to social and economic development in other developing regions.
101566	Measuring the Digital Gender Gap in Francophone Africa	226,694	Environmental Development Action in the Third World (ENDA) Gender and ICT Network	Without data to quantify the extent of the digital gender gap, identify underlying causes and pinpoint areas of particular concern, policy makers and governments are reluctant to make gender equity a development priority. Data on Africa's ICT sector is sparse, and what little exists tends to focus on economic and institutional development, with no breakdowns by gender. Drawing on the expertise and experiences of a network of researchers in gender and ICTs in francophone West and Central Africa, this project developed a composite indicator of the gender digital divide based on four key components: women's participation in decision-making and policy, the availability of gender-sensitive Internet content, women's ICT skills levels, and women's access to computers, the Internet and mobile phones.
102895	``Common-Sense``: Copyright, Education, and Innovation in Africa	354,400	Link Centre	Many people in developing countries and in the development community believe that existing copyright and intellectual property laws are a major barrier to using ICTs for social and economic development. They argue that these systems enforce unequal access to critical resources such as medicines, technology, education, and culture. This project will build on the work of other groups—including amongst others the Access to Learning Materials in Southern Africa (A2LM) Project, the Consumer Institute of South Africa, the Consumers International of Asia-Pacific and the South Centre—that are analyzing how current laws impact the way educational materials are created and accessed in Africa and identifying practical ways that developing countries can bring quality education to the poor and disadvantaged through alternative copyright approaches.
101570	Helping Kenya Extend Access to ICTs to Rural Areas	247,400	Communication Commission of Kenya (CCK) Intelecon Research and Consultancy Ltd Summit Strategies	As many African countries have learned from painful experience, attempting to improve rural access to ICTs without an appropriate policy and incentive framework is an uphill battle. This project—which replicates a successful IDRC-supported project in Uganda—addresses all aspects of extending ICTs to rural communities, including technical, economic, social, and political considerations. It will give Kenya and Kenyans a real opportunity to leverage ICTs to speed economic and social development in rural areas.

Project Number	Project Title	Amount CAD	Institution	Description
			Ltd Kenya Central Bureau of Statistics	
Technology Research and Development				
102411	Free State HIV Therapy Database (ART-HIV)	738,490	Free State Department of Health University of Cape Town Lung Institute Medical Research Council, South Africa University of Toronto and Institute for Clinical Evaluative Sciences	This project is developing an extensive and multi-purpose database system to collect and manage large volumes of time-based data in the wide-scale rollout of antiretroviral therapy (ART) for HIV-positive patients in the Free State province of South Africa. By combining complete, quality-controlled clinical and treatment records with a patient and facility information feedback system, the project will help ensure that ART therapy is administered as effectively as possible. HIV is proliferating in Africa, and the Free State province has South Africa's fourth highest HIV infection rate. To measure progress of the ART rollout, the project's computerized system integrates information collected via handheld and online computers at clinics into a data warehouse capable of multiple management functions. The system makes it possible to monitor the antiretroviral treatment program at a patient level as well as providing aggregated reports to the national government.
102806	Uganda Health Information Network	752,400	Satellite, Inc., USA Uganda Chartered HealthNet, Uganda Faculty of Medicine, Makerere University, Uganda	The Uganda Health Information Network (UHIN) is an innovative, low-bandwidth information network for health workers in Uganda. Using low-cost PDAs (Personal Digital Assistants) and a cellular telephony network, UHIN has cut costs and improved the quality and availability of health information. Its success demonstrates that PDAs can be used to establish an interactive infrastructure in regions serviced only by GSM (Global System for Mobile Communications) telephone networks. UHIN began as a pilot project involving a limited number of health care workers in Mbale and Rakai districts; this project will extend UHIN to a much larger number of health workers in the two districts. It will also test an inexpensive African alternative to the wireless server technology (Wideray Jack) used in the pilot project to connect PDA users into an interactive communications network.
102240	Assessing the Use of PDAs for Household Surveys in Tanzania	70,140	Tanzania Essential Health Intervention Programme (TEHIP)	How can developing countries ensure that scarce health care resources are used as effectively as possible? One answer is coming from the ground-breaking research of the Tanzanian Essential Health Intervention Programme (TEHIP), a pilot project in which ongoing demographic surveys have helped the government decentralize health planning to focus resources on the diseases that impose the highest burden on society, and for which cost-effective treatments are available. The World Health Organization has cited TEHIP as a powerful means for guiding effective health policy in Africa. However, TEHIP household surveys require time-consuming manual data processing procedures and entail high costs for printing survey forms. This project is exploring an alternative to manual surveys—using low cost handheld PDAs (Personal Digital Assistants) to capture household and other data directly with electronic data entry forms and then to transmit this data wirelessly to a central database. Conducted for the tropical disease research centre, Ifakara, in Rufiji District—about 200 kilometers south of Tanzania's capital, Dar es Salaam, over rough terrain—this project will compare PDA-based data collection with the manual process, assessing relative costs, data quality, technical viability, and

Project Number	Project Title	Amount CAD	Institution	Description
				acceptance by survey respondents and field data collectors.
102413	Using Cell Phones to Improve Treatment of Cape Town Tuberculosis Patients: An Evaluation	28,020	Bridges.org	A key target of the United Nation's Millennium Development Goals is to halve 1990 TB prevalence and deaths rates in developing countries by 2015. By producing guidelines for using the low-cost cell phone-based method to remind patients to adhere to treatment for TB and other diseases, this project could substantially reduce costs while improving the success rate of treatment.
101980	Sustainable E-Government for the City of Fez, Morocco	378,320	Al Akhawayn University	This project will allow Alakhawayn University in Ifrane, one of the top universities in Morocco, to pilot an e-government initiative in partnership with the local administration of the city of Fez in western Morocco. The initiative will allow local authorities to ICT-enable their offices, giving citizens fast, easy access to a wide range of government services through a fair and transparent process. If successful, the project will serve as a "road map" for rolling-out local e-government across Morocco. The project will also address important research questions about the social impact and political implications of e-government. These questions include: Is e-government viable and beneficial in a country with a high rate of illiteracy? Which segments of Moroccan society are most likely to use e-government services? Which are least likely to use them, and why? What political, social and economic strategies can give the greatest number of people access to e-government? How can ICTs have an impact on strategies for designing and delivering government services?
102896	Bandwidth Optimisation for African Universities		International Network for the Availability of Scientific Publications (INASP) Flemish Inter-university Council (VLIR)	Bandwidth Optimization for African Universities (BOAU) aims for widespread improvement in how African research and education institutions manage their Internet bandwidth. Because African universities spend up to 100 times more for access compared to their counterparts in industrialized countries, these institutions have very restricted access to ICTs and online research resources. To begin to close this "digital divide," the International Network for the Availability of Scientific Publications (INASP) is delivering a series of capacity-building workshops on bandwidth management, as well as developing and publishing freely available training resources on bandwidth management.
101569	DRUMNET: A Fair Deal for Kenyan Smallholder Farmers	255,980	Pride Africa	Using low-cost technology, DrumNet is helping shift power in agriculture away from urban "middlemen" who invest nothing in rural communities. Similar programs in neighbouring Uganda and Zambia have shown that if farmers receive fair prices for their produce, they will use the proceeds to improve their livelihoods and increase their incomes. This will eventually help make East African agriculture more efficient and productive, raising incomes and increasing opportunities for farmers and for their communities.
101172	Creating a Sustainable Agriculture	250,800	Songhai	Founded in Benin in 1985 by Father Godfrey Nzamujo, Songhai (named after the extensive 15th century Malian Empire in West Africa) is one of Africa's most successful and well-respected sustainable agriculture institutions. This project used the Songhai Website to extend and connect the Songhai

Project Number	Project Title	Amount CAD	Institution	Description
	Network in West Africa			community in two ways: by offering training via distance learning multi-media courses, and by beginning to develop new capabilities such as Web mail, discussion forums, teleconferencing and a electronic agricultural market. The project also allowed Songhai to install and experiment with connectivity solutions, including VSAT (Very Small Aperture Technology) satellites and VOIP (Voice Over Internet Protocol) technology, to overcome the communication constraints caused by Benin's weak infrastructure, especially in rural areas. The results of these experiments will offer useful lessons for others facing similar connectivity challenges.
101100	Using ICTs to Increase Incomes for Farmers and Fishermen in Senegal	120,000	Fédération Nationale des GIE de pêche au Sénégal Manobie	This pilot project has increased the incomes of Senegalese small-scale farmers and fishermen by giving them reliable, up-to-date information on market prices using cell phones and Internet technology. With the service, producers can check prices and demand in various markets to determine where they will get the best offer.
101697	Supporting Sustainable Agriculture in the East and central African Highlands	484,490	African Highlands Initiative Makerere Institute for Social research World Agroforestry Centre	This project is developing a system that gives rural farmers access to the information and resources they need to successfully introduce sustainable agricultural techniques into their communities.
Knowledge Generation				
102509	African Virtual Open Initiatives and Resources (AVOIR)	753,200	University of the Western Cape, South Africa University of Jos, Nigeria Université Cheikh Anta Diop de Dakar, Sénégal Jomo Kenyatta University of Agriculture and Technology, Kenya University of Nairobi, Kenya Makerere University,	AVOIR is an ambitious effort to bring together software developers, educational specialists and others in Africa to build a knowledge network capable of designing, developing, and supporting Free and Open Source Software (FOSS) that can help address African development issues and create African business opportunities. AVOIR is initially focusing on software for education, but over time will develop expertise and best practices in FOSS development and deployment that will be applicable in many sectors.

Project Number	Project Title	Amount CAD	Institution	Description
			Uganda University of Dar es Salaam, Tanzania Catholic University of Mozambique University of Eduardo Modlane, Mozambique Department of Science and Technology, South Africa Microsoft	
102933	Localizing ICTs to African Languages and Arabic	312,100	Bisharat Kabissa.org	Almost all software is developed in English and a few other Western languages. As a result, most Africans cannot access software in their mother tongue. Educated urban Africans have the option of using English, French, or Portuguese, the pan-African languages imposed by colonialism. In rural areas, where most Africans live, very few people speak European languages. This project aims ultimately to make ICTs more accessible and relevant to rural Africans through localization—the adaptation to local languages, cultures and preferences— of computer software and Web content. This will in turn make technology a much more powerful tool for social and economic development.
102209	Refurbished Computers in SchoolNet South Africa- A Comparative Study	121,764	SchoolNet South Africa SchoolNet Mozambique Department of Education, South Africa Department of Education, Mozambique	In secondary schools in developed countries, computers and Internet access are an integral part of how students learn. An Internet-enabled network in every school is a key goal of the South African government, which recognizes that ICTs are a powerful means of giving young people, especially in poor rural areas, access to information and opportunities. One of the ways that African countries have attempted to affordably bring computers and the Internet to secondary schools is to use refurbished computers, which are considerably less expensive than new ones. But some projects using refurbished computers have had serious difficulties, leading to a widespread perception that the used computers were the cause of the failure. This project compared two computers-for-schools programs in South Africa, one using only new computers and one using a mix of new and refurbished computers, in order to answer three key questions: Are refurbished computers suitable for schools? Were the project processes adequate? Is a more systematic approach required for such projects?
101550	Open Source Versus Proprietary Software in an African	186,736	Bridges.org SchoolNet Africa Open Society Institute SchoolNet South	By fully examining costs and benefits, this study will help managers in schools and telecentres make more informed software choices that take into account the strengths and weaknesses of using open source and proprietary software in an African context.

Project Number	Project Title	Amount CAD	Institution	Description
	Context		Africa Western Cape School Network SchoolNet Namibia Smart Cape Access Point Project	
101210	Offering Hope to Ugandan Youth and Women War Returnees	267,500	Canadian Physicians for Aid and Relief (CPAR)  Dr. Narathius Asingwire, Acting Dean, Dept of Social Work and Social Administration  Makerere University	This project has given 100 young people and 100 women who were displaced or abducted during Uganda's civil war a way to re-integrate into their communities through acquiring new skills and finding new ways of making a living. It focused on using ICTs to make existing economic activities more effective, to deliver skills training, to give participants access to trauma counseling, and to increase business and marketing opportunities. The project was based at the main community learning centre in Lira Town, with outreach to another community centre at Loro. Led by Canadian Physicians for Aid and Relief (CPAR), which has been working on integrated development and emergency relief in northern Uganda since 1992, the project was developed after field visits and extensive consultations with individuals and community groups in Lira and Apac districts.
101578	Senegal's Popular Information Systems: Assessing their Impact on Local Government and Development	233,130	Centre of Resources for the Emergence of Social Participation (CRESP)	Popular Information Systems (SIPs, from the French Systèmes d'Informations Populaires) help Senegalese communities make informed decisions about local issues, while also offering young Senegalese an opportunity to acquire skills in information management and database and Web site development. Since the establishment of the first SIP in 1997, the network has expanded to include twelve cities and eight rural areas in Senegal. It draws on Internet content and resources from a broad range of partner organizations, including government departments and NGOs within Senegal and in other African countries. This research project set out to assess the current contribution and potential of SIPs to improve local governance and foster sustainable development throughout Senegal.
101560	Innovative Public Access Strategies: Enhancing ICT Services in Mozambique's Telecentres	392,100	Informatics Centre of Eduardo Mondlane University (CIUEM)  Mozambique Information and Communication Technology Institute (MICTI)  Community Multimedia Telecentre (CMC)	Mozambique has eight public access telecentres in rural areas, but high costs and other barriers have prevented widespread adoption of non-basic telecentre services. This project is assessing how telecentres are used in Mozambique, identifying which current and new services best meet local needs, finding ways of delivering these services affordably, and measuring how their wider adoption reduces poverty. It is also helping to increase the economic viability of Mozambique's telecentres.

Project Number	Project Title	Amount CAD	Institution	Description
101696	Angonet: Increasing the Impact of Angola's Community-Based Humanitarian Network	265,500	Development Workshop Angonet United Nations Development Program (UNDP) Esso	After twenty-five years of war in Angola, communications infrastructure in the country barely exists. For the more than 340 non-governmental organizations (NGOs) and community-based organizations that are helping to rebuild a civil society in Angola, poor communications hampers efforts to efficiently distribute much-needed medical supplies, food, clothing and other essential supplies. And without access to ICTs, Angola's citizens—especially in rural areas—have no way to contribute to debates on critical topics such as land rights, the new constitution, poverty reduction and urban reform. By improving and expanding ICT services and content into regional capitals where there is limited or no service, this project will make it possible to assess if ICTs can help Angola overcome post-war deficits in other infrastructure, such as transportation, to hasten peace-building, community development and humanitarian assistance.
102516	The Impact of ICTs in HIV-AIDS Programs in Eastern and Southern Africa	300,840	African Network for Health Knowledge Management and Communication (AfriAfya) Community Capacity Building Initiative	With just 10% of the world's population, sub-Saharan Africa accounts for nearly 70% of all global HIV infections and 90% of deaths from AIDS. The HIV/AIDS pandemic in this region is both an unprecedented health crisis and a daunting long-term development challenge. ICTs hold the potential to help Africans combat HIV/AIDS by improving treatment and prevention programs, by helping to change attitudes and practices, and by making it possible to share success and best practices. Led by AfriAfya (African Network for Health Knowledge Management and Communication) in partnership with the Kenyan CCBI (Community Capacity Building Initiative), this research project will assess the impact of projects using ICTs to address the health and development challenges of HIV/AIDS in Botswana, Kenya, South Africa, Tanzania and Uganda. The first phase consisted of an overview of ICTs projects in the five countries; the second phase is a detailed assessment of innovative projects in the two countries that were identified in phase one as having the largest number and widest range of projects.
101581	Using ICTs to Improve Elementary Education in Senegal	503,115	Institut national d'étude et d'action pour le développement de l'éducation (Ineade) Centre interdisciplinaire de recherche sur l'apprentissage et le développement en éducation (Cirade), Université du Québec à Montréal	Senegal's 2000/2010 national education and training program aims to achieve universal education to ensure that the Senegalese people have the knowledge and skills required to build an economically strong, socially cohesive and culturally flourishing nation. In support of the national program, this project will integrate ICTs into basic mathematics and reading/writing instruction in elementary schools. The project team will work with a small number of Senegalese teachers, students and other partners in the education system to develop and validate ICT-based learning and teaching approaches that can then be extended across Senegal's education system.

## Acacia Addendum

### ***What are the most “binding constraints” facing ICTs in Africa in the context of Acacia’s objectives?***

In line with Acacia’s objectives, the following highlights the most binding constraints facing ICT-enabled development in Africa.

#### **❖ WEAK, OBSTRUCTIVE, OR NON-EXISTENT POLICIES THAT INHIBIT THE GROWTH, DIFFUSION, AND EFFECTIVE USE OF ICTS.**

The field of ICTs changes rapidly. While ICTs have the potential to catalyse social and economic development, policies inevitably lag behind these changes. In order to truly derive development benefits and outcomes from the potential of ICTs, policy-makers need to be well informed on the issues, through engagement with researchers, civil society and the private sector. Equally important is civic engagement and understanding of the use and policy implications of ICTs in social and economic life.

This is particularly true in the field of telecommunications where, unfortunately, a majority of African governments have chosen to view the sector as an opportunity for a short-term revenue grab. Recent efforts to privatize and deregulate the telecommunications sector in African countries have not had the hoped-for impact of lowering costs and extending the network. Foreign investors have often focused on servicing elite market niches. While attempts to regulate the marketplace have been well intentioned; regulators seldom have been given the teeth to back up regulatory policy. The introduction of secondary and tertiary national operators has not led to significant drops in prices or the expansion of network infrastructure other than in mobile telephony.

Very little is known about the behaviour and consumer demands of African ICT users, individual consumers or public sector institutions, the poor or those trying to deliver services. They have generally been served by their monopoly telecommunications services, many of which suffer the burden of legacy technologies, overstaffed institutions, and a poor record in billing and service delivery. By contrast, the mobile phone companies have seen considerable growth in Africa. Mobile service providers have been able to reap rapid returns on their investments, working with newer, cheaper technologies that are easier to roll out generally within premium markets are premium prices.

Policy makers are caught in a vacuum. On the one hand, they receive insufficient intelligence about the telecommunications industry from their incumbents and on the other, new mobile telephony companies release no data because they consider their research to be proprietary. Yet African governments are expected to make large leaps of faith in shaping their nations’ ICT futures with scarce knowledge resources to navigate this constantly changing sector. Little is known of how country economies are faring with their existing telecommunications market structure. Even less is known about what benefits the poor have, what jobs are created directly or indirectly through the ICT sector, what the government sector contributes to the ICT sector, or how it benefits. Much more needs to be known about how the telecommunications industry has grown, how this growth has contributed to the national GDP, and how these efficiencies can be improved.. There is insufficient dialogue around how changing and shifting policies can assist these governments to meet their mandate to serve their people, to deliver services and improve the public services through leveraging the benefits of ICTs. Finally, the relevance to Africa of emerging, new market models that are enabled through ICTs needs to be understood in order to strategically integrate ICTs into national planning. Appropriate models need to be developed that arise from a bottom-up assessment of the demands, the needs and the realities of African ICT users.

Accordingly, Acacia is committed to funding demand-side research to increase understanding of the unique complexities of the African ICT landscape. While telecommunication policy has been highlighted above, ICT-informed policies have a critical role to play in virtually every aspect of society and in every sector. It is well known that the role of women in Africa is changing both socially and economically as a result of the introduction of ICTs. Research in this area is critical to informing ICT policies that will increase social and

economic opportunities of women. Similarly, ICTs have an important role to play in preserving and developing local language and culture.

Acacia is committed to expanding and deepening its support for ongoing, robust dialogues among ICT4D researchers, policy-makers, and other key policy-related bodies to address this constraint. Our investments in RIA, LOGIN, GRACE et al reflect this.

❖ **A FAILURE TO EFFECTIVELY SHARE LIMITED ICT RESOURCES AND KNOWLEDGE FOR COLLECTIVE BENEFIT AND INCREASED IMPACT**

As a comparatively new development sector, investment in ICT4D research projects in Africa has been spread quite thinly over the African continent. Efforts, which began with pilot projects and moved on to sector or country specific initiatives, have been necessarily limited in scope and resources. This has diffused the impact of investment and often resulted in a failure (through lack of awareness) of projects and programs to learn from other similar initiatives.

Africa has unique challenges when it comes to research capacity. With 53 countries and comparatively few strong research institutions, finding the capacity to carry out larger research programs can be difficult. African researchers are also separated by poor intra-African connectivity and relationships, often having better connections to North American or European institutions.

A focus on research networks will address these challenges by deliberately fostering relationships among African research institutions uniting them through common research agendas and methodologies. Networks have a capacity-building function in linking strong and weak institutions together, allowing strong researchers and institutions to take on a mentoring role with other less well-developed research institutions. They also have the benefit of diffusing knowledge by default within the network and of acting as an international locus for research in particular thematic areas.

The potential of research networks has been amply demonstrated over the last three years by the Acacia-funded Research ICT Africa (RIA) network. In that short period, RIA has become the pre-eminent ICT policy research group on the continent, attracting the attention of policy-makers and of other donors in the ICT4D field. Similarly, our support for African Research & Education Networking has had a catalytic effect in the field, attracting investment commitments from large infrastructure funders such as the European Commission and in catalysing national action to support the development of National Research & Education Networks.

In the last year, Acacia has funded the launch of new research networks in Local Governance (LOGIN) and Gender (GRACE) and over the course of the next five years a total of 10 African ICT4D research networks are planned. We believe these research networks have a critical role to play both in raising the capacity and quality of ICT4D research in Africa but also in strengthening African voices in international fora.

❖ **WEAK HUMAN AND INSTITUTIONAL CAPACITY TO DESIGN AND MANAGE LARGE ICT4D RESEARCH PROJECTS**

There are very few institutions anywhere in the world that specialize in ICTs for development. It is by its very nature a trans-disciplinary field. African research institutions are thin on the ground in this comparatively new sector and are often resource-challenged. Some donors cope with this weakness by contracting northern expertise to carry out African ICT4D research.

IDRC research in policy influence processes tells us that trust relationships between decision-makers and holders of knowledge resources are a critical factor in policy influence. In this context, building African ICT4D research capacity is essential to the goal of influencing policy.

Capacity-building is particularly important in new ICT4D areas such as access to knowledge and intellectual property rights. Africans will be barred from active participation in the global knowledge economy if they continue to lack adequate access to knowledge and knowledge tools to enable African creation and innovation. Understanding and adopting a strategic position with respect to public and private goods online is a potentially key for ICT-enabled African development.

This is equally true in new approaches to ICT infrastructure development, which has historically been dominated by cartels of large telecommunications companies.

Our objective is to increase institutional strength in African ICT4D research focusing on improved research methodologies and practices, increased numbers of ICT4D researchers, and research institutions with specific ICT4D focus. Equally we need to invest in the ability of African researchers to communicate effectively and engage in the policy-making arena.

❖ **A GENERAL FAILURE TO DEVELOP AND DEPLOY LOW-COST, SUSTAINABLE ICT SOLUTIONS APPROPRIATE TO THE AFRICAN CONTEXT.**

A key mistake made by many early ICT4D projects was to assume that ICT solutions designed in the developed world would be financially or physically appropriate in developing countries. ICT projects languished because the necessary resources to maintain or upgrade the equipment were not within the means of the recipient institutions. They also faced difficulty because equipment overheated or became choked with dust or simply stopped functioning due to power outages. These failures illustrate just how different the ICT environment is in Africa.

Recently however, we have begun to see increased uptake of low-cost ICTs such as mobile phones, PDAs, and wireless networking. We have seen these ICTs adapted in innovative, useful ways in which were not foreseen by the manufacturer. From the explosion of SMS messaging to the creation of low-cost WiFi links innovation in ICTs is beginning to thrive on the African continent. This is thanks in part to the steady decline in the cost of ICTs and to the growing expertise in Africa to innovate with these technologies.

These technologies have tremendous potential to bring about changes in key sectors. In health, low-cost ICT can reduce the cost of data collection and information management, enabling the cost-effective roll-out and management of health services. In agriculture, ICTs have the potential to enable farmers to act collectively, to aggregate demand, and to negotiate more effectively with large seed supplier and with international buyers.

As mobile telephony continues its rapid spread across the continent, innovation in the adaptation of this affordable technology as a tool for development is an opportunity that should not be wasted. Over the next five years Acacia will invest in Africans to continue to innovate new tools and applied technologies that will increase the impact of development initiatives.

❖ **SUMMARY**

From a research investment perspective, we believe that the critical enablers of ICTs for African development are strong researchers and research institutions committed to social and technical innovation, engaged in policy processes, and networked together through thematic communities of interest. Those communities include:

- ***People Empowerment*** – gender, the digital commons, and, localisation;
- ***Social Service Delivery*** - health, local governance, education, universities;
- ***Economic Development & Opportunity*** – social and economic development, ICT policies and indicators, and, small-scale agriculture.

We are confident that committed investment in research in these thematic areas aimed at our four core objectives will bring about substantive change.