

ICT in Small Businesses: How can Academic Networks be more relevant?

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Academic networks have a major role to play in helping address the challenges faced by small businesses because of limited or no use of information and communication technology (ICT) particularly in sub-Saharan Africa. By leveraging the benefits and synergy that accrue from working together, academic networks can mitigate many of these challenges through nurturing an appropriate human resource base, researching in appropriate technologies as well as improving small businesses through creating a bigger market for local solutions.

Being a group of institutions, academic networks afford a stronger negotiating position that can be used to articulate and lobby for an environment that stimulates the use of ICT within small businesses. In order to achieve all of this and be more relevant to the ICT needs of small businesses, academic networks have to institute mechanisms to better understand the changing needs of their communities, behave less bureaucratic and attract more research funding.

Index Terms—SMEs, ICT usage, ICT adoption,

I. INTRODUCTION

INFORMATION, properly interpreted and applied as knowledge, is a principal source of power within our communities. The better informed will generally have enhanced prospects for emerging opportunities. To fully leverage information, one requires access to the principal sources of information on one hand and an ability to exploit the accessed information on the other.

Access to information in sub-Saharan Africa tends to be unequal. Disadvantaged groups are likely to include:

- Rural and low-income communities (includes the urban poor)
- Small and informal businesses
- Women

These groups are not mutually exclusive. Consequently, while we primarily focus on small businesses (SMEs) for this discussion, empowering them to better access and leverage information will influence the balance of power and impact a wider section of the community.

Although there is growing consensus that Information and

Communication Technology (ICT) can be harnessed to assist in developing the Least Developed Countries (LDCs), the translation of this euphoria into reality is still forthcoming. Universities and academic networks have a big role to play, given that their core missions revolve around research and education, which responds to the needs of their local communities [1].

In their education/training role, universities and academic networks can help create awareness about the potential of ICT to respond to local needs, helping generate local demand. Complimentary, they can develop human capacity to harness ICT in a manner that is appropriate for the community's local needs. In terms of their research role, universities and academic networks have the potential to address the challenges that inhibit the use of ICT to help fast track the development of LDCs. Some of these challenges include the lack of appropriate software and content in local languages, inappropriate hardware and user interfaces, poor connectivity in the rural areas, etc.

Universities and academic networks are stepping-up to respond to these needs particularly in response to the challenges faced by SMEs due to their non-existent or limited use of ICT.

II. POTENTIAL OF ICT IN SMES

Small businesses (SMEs) are recognized as potential engines for economic and social growth all over the world. Although figures may vary, SMEs account for the majority of firms and a corresponding share of employment within developing economies [2]. The sector largely exceeds the average economic growth of national economies in many developing countries and contributes significantly to employment creation. Accordingly, governments and development partners alike have recognized the important role that the SME sector plays in overall development. Government policies and programmes are therefore increasingly focused to supporting the growth of SMEs. These range from tax incentives to technical assistance, from regulatory provisions to training and other types of incentives [3, 4].

SMEs in general face a number of constraints in relation to survival and growth. These tend to vary with business or entrepreneur-specific factors, SME sector, location and other factors, many of which are cross-cutting [5, 6]. In many SME surveys that have been done, usually in developed countries,

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the most conclusive have focused on issues such as access to information and to capital and financial intermediation. Poor access to information (and access to poor information) by an SME may lead to incorrect strategic or tactical decisions, loss of potential income, and failure to learn from past mistakes. The scarcity of information is in big part due to SME owners' tendency to rely more on informal sources of information [7-9]. Access to finance is also hampered by lack of information about opportunities, procedures, and requirements. A key requirement, which many SMEs lack, is good financial and operational records: they tend to lack or, at best, keep poor records, making it impossible for financial institutions to gauge their performance as a basis for extending credit facilities. All these challenges provide an entry point for the use of Information and Communication Technology (ICT).

ICT can potentially transform the productivity of SMEs within developing countries in at least two ways. They may be used directly as inputs within the production process for example the village phones owned by rural women and used to provide payphone services to neighboring rural communities in Bangladesh [10]. They can also be used as tools to help streamline underlying business processes of an SME. Here, ICT may help computerise activities such as sales and invoicing, customer records management, accounting, after sales service, inventory/stock control, after sales service etc, helping improve productivity [11, 12].

Specifically, ICT has the potential to help SMEs supplement or replace their informal information resources by providing access to timely and quality information. In addition, ICT can help SMEs to improve their business processes through keeping better operational and financial records, reducing transaction costs (thereby increasing efficiency) and increasing access to markets.

In the recent past, most interventions and government policy initiatives within developing countries have been geared towards improving ICT infrastructure and penetration, a key priority given the bad shape of our infrastructure. Research emphasis has been on better understanding of ICT usage: How do people use existing infrastructure? What obstacles do they face? Consequently, the progress we have made in terms of infrastructure provision (reflected in the performance of the network providers in Table 1) is not commensurate with growth in terms of small business performance. Different reasons maybe used to explain this:

- The service costs remain high in relation to income levels, making it hard for the SMEs to fully exploit the available infrastructure for economic opportunities
- Most users exploit the technology for entertainment or other social aspects rather than economic ones. The ubiquitous mobile phone, for example, is used more for conversation than say access to business related information.
- Access to the information and data sources has not increased in proportion to increase in access to telecommunications, primarily due to a lack of appropriate applications and services to leverage

the existing infrastructure.

- There is limited awareness of potential benefits, compounded by lack of basic ICT (or computer) literacy among the majority of the population.

In many developing countries, especially in Africa, adoption of ICT is still equated to providing telecommunication infrastructure meant to simply provide communication and access to information. While access has certainly become easier, little or no attention is given to the creation of relevant applications or content appropriate to local needs [13, 14]. Table 1 highlights the predominant mobile network providers in sub-Saharan Africa and their financial performance in the last year, a reflection perhaps that most users do exploit the technology predominantly for entertainment and conversation as opposed to say access to business related information.

Table 1. Mobile operators in Sub-Saharan Africa

<i>Operator</i>	<i>Celtel</i>	<i>MTN</i>	<i>Vodacom</i>
Subscriber (millions)	8.8	23.2	15.7
Subscriber outside south Africa (millions)	8.8	14.2	2.9
Countries	13	16	5
Licensed Population	250	494	106
Fiscal year 2004 revenue (US\$ millions)	963	3,626	3,960

Source: Celtel, MTN and Vodacom websites, based on data as at December 2005.

The application of ICT in SMEs has started to receive more attention for a number of reasons. First, various developing countries in search of economic competitiveness in the global economy have linked the diffusion and adoption of ICT with competitive gains for both SME and their economies. As a result, the adoption of ICT within the SME sector is highlighted as a government policy priority in their development goals. Second, the private sector is also increasingly targeting SMEs and viewing their use of ICT as an emerging market opportunity [1, 15, 16].

Finally, in Uganda, like in many developing countries in sub-Saharan Africa, we have a nascent software industry with a number of challenges. The focus of our local ICT graduates has been towards filling ICT support and managerial positions that exist in public and private organizations because of the immediacy of employment and an assured income. There has been little focus on building local software development capacity, yet software production is nowadays an industry not only essential for the growth of the economies of the LDCs, but could be easily exploited because it is not capital intensive.

These challenges highlight the need to better facilitate SMEs to leverage the potential of ICT and illustrate the numerous opportunities for universities and academic networks to respond given that their core missions revolve around research and education meant to respond to the development needs of their local communities.

III. OPPORTUNITIES FOR ACADEMIC NETWORKS

There are multiple ways in which universities and academic networks can facilitate more productive use of ICTs in small businesses. We highlight some of these in the sections that follow

A. Human capacity development

In order to fully harness the latent potential of our nascent ICT industry, Universities and academic networks have a huge role to play in terms of human capacity development. This can happen at two of levels: First, they can help create more awareness of how small businesses can leverage ICT to become more efficient and productive, in the process creating more local demand for ICT services. Secondly, they can develop more appropriate human capacity to respond to this growing demand by equipping their graduates with skills that allow them to not only be job seekers but also have the capacity to discern these needs and create own businesses that respond to them.

B. Research in appropriate technologies

Given that our missions revolve around research, universities have a big role to play in helping to create relevant applications and content that is appropriate to local needs. We are in better position to advocate for research in more appropriate interfaces that address language and literacy challenges.

Research should be driven by a bottom-up approach to help cultivate and make ICT more relevant to SME needs. This will help create local ownership of ICT projects by giving small business owners an opportunity to participate in defining their needs and help build internal skills capacity to effectively utilize ICT within small businesses. The ability to effectively utilize ICT is often the major constraint and not equipment as is frequently assumed.

C. Incubators and two-way skills transfer

The slow development in our local ICT industry in Uganda is contrary to the expected impact of improvements in ICT training in the various institutions. Each year, these institutions produce scores of graduates whose skills are wasted because there are hardly any local software development companies that can employ their services. There are also complaints from ICT companies that these graduates do lack some relevant skills to help them thrive in the market. At Makerere University, the Directorate for ICT Support in collaboration with various partners both within and outside Uganda has setup up incubator. By creating incubators, universities can encourage students to engage in software production while they are still studying. The incubator can solicit and help subsidise the development of viable new ideas into finished products, creating a mutually beneficial environment: The students acquire skills and market savvy that will enable them to join the private sector, while the private sector taps into an innovative and comparatively low cost human resource

D. Demand for local solutions

Universities are big consumers of ICT goods and services from the private sector. Like many developing countries, Ugandan institutions spend millions of dollars on imported software, an amount increasing each year as they increasingly integrate information and communication technology into their operations. For example, over the last three years, Makerere University has spent about 4.3¹ million US\$ on ICT and related services, excluding proprietary end-user software and the fiber optic backbone. The annual recurrent cost of maintaining ICT services at the university is currently about 1.2² million US\$, the bulk of which is consumed by bandwidth. As an academic network, institutions form an even bigger market that can potentially be leveraged to spur development of the local ICT industry through demand for local solutions coupled with increased economies of scale. The Research and Education Network of Uganda (RENU) is exploring ways of reducing costs through articulating unique individual needs of each member and pooling resources to create generic barebones systems locally, which are then tailored to fit their individual needs in-house.

By seriously advocating for local ICT solutions, we can take advantage of the supply relationship that exists between an academic network and the private sector to spur its growth and influence them to operate more efficiently. Another good example is the falling cost of Internet bandwidth offered to Makerere University as highlighted in Table 2, which is eventually trickling down to the small businesses.

Table 2. Changing costs of Internet bandwidth to Makerere University

Year	2000	2001	2002/03	2004	2005
Bandwidth (Mbps)	0.192	0.768	2.3	3.84	21
Cost/unit (USD)	38,300	38,300	8,330	6,260	1,935
Monthly Recurrent cost (USD)	7,354	29,414	19,159	24,038	40,635
Use	Internet email dial up for few clients (univ. mgt)	Internet email for a few networked computers on the University	Access to online journals, 1,300 networked computers, research and general use, etc	Access to online journals, 2,000 networked computers, inter-university collaborations, research and general use, etc	Access to online journals, 3,000 networked computers, E-learning courses, inter-university collaborations, research and general use, etc
ISP	MTN	MTN	MTN & UTL	MTN & UTL	MTN & UTL

¹ Bandwidth accounted for 1.58, an integrated management system (finance, staff and student records) cost 1.0, a library management system cost 0.3, PCs accounted for 1 and local area networks for the remaining 0.5 (all prices in US\$ millions)

² Bandwidth accounts for 0.8, software licenses take 0.2 and equipment maintenance the remaining 0.2 (all prices in US\$ millions)

E. Lobbying

As academic networks, we have a stronger negotiating position and can better lobby on behalf of small businesses and ICT. We can effectively engage governments, regulators and other stakeholders on issues related to policy and regulation vis-à-vis ICTs and small businesses. We are in a better position to engage and guide development partners on how they may select and develop feasible interventions for our local conditions in order to have maximum impact.

IV. CONCLUSION

Academic networks have a role to play in helping small businesses to appreciate and leverage the potential benefits offered by ICT in sub-Saharan Africa. Their biggest challenge is how to effectively equip small businesses with the skills and knowledge that enable them to effectively participate in articulating their ICT needs one hand, while also generating the necessary human capacity and supporting it to create solutions that respond to these needs in an effective and sustainable manner.

Institutions in sub-Saharan Africa generally have a tendency to be bureaucratic. On the other hand, the private sector tends to be the opposite, it must usually respond to new and emerging opportunities rapidly in order to attain a competitive advantage. In order to better work together, universities and academic networks will need to evolve structures that provide the necessary flexibility with the required oversight.

The culture and ability to transition from research output to application to commercial exploitation is still severely limited in sub-Saharan Africa. While this may be due to many issues, a pertinent issue that needs to address relates to creating robust protection for intellectual property rights to help guarantee adequate compensation for researchers and stimulate more practical research. Academic networks need to create better awareness of the value of intellectual property on the other hand, while re-evaluating the way staff is financially rewarded to encourage research.

Although governments in sub-Saharan Africa emphasize the need to engage in research as a vital means to help elevate the continent out of persistent poverty, they do not yet back up their rhetoric with the necessary financial capacity. As a result research is impeded by the lack of necessary funds. Staff with research ability is still paid peanuts and consequently need to engage in odd jobs to make ends meet, leaving insignificant time for productive research. To realize our dreams, governments need to invest substantially in research that addresses the region's local problems.

While the demand for post-secondary education is increasing, ensuring that the universities have a constant supply of customers, there is a need to create mechanisms that allow institutions to keep better pulse of the changing environment so as to adequately develop the necessary human capacity in sync with the dynamic needs of their communities. Academic networks provide a natural avenue that can be used to collaboratively understand these changing environments.

Historically, academic networks were born out of the need to create connectivity amongst member institutions. In today's world, the need transcends literal connectivity. To help address the challenges faced by SMEs because of limited or no use of ICT, academic networks need to respond by helping to breed an appropriate human resource and providing a conducive research environment that proliferates the benefits and synergies that accrue when institutions work together in tandem with their community.

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