

Towards Electronic Commerce in Africa: A Perspective from Three Country Studies

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Abstract

The challenges of globalisation and the information age are concentrating the minds of all African governments. Many of the issues that need to be addressed are similar but the situation in each country is different, both from an economic and a historical perspective, and the roads to the optimum realisation of the potential of ICT will be different.

Studies in three African countries (Rwanda, Namibia and South Africa) have highlighted both the similarities and the differences. The similarities relate to the fact that all three countries have large and relatively impoverished groups of people, mainly located in rural areas, where the benefits to be derived from ICT have not been felt. However there are major differences in the sizes of the overall economies, in the level of expertise available, general infrastructure, and socio-economic and historical circumstances that manifest in different policy and development issues within each country.

Recently, several assessment tools have been developed to assist countries and communities to determine where they are positioned in relation to the factors critical to the development of an information society and the consequent widespread use of e-Commerce. The intention is for policy-makers to make more informed policy decisions.

The authors have applied one such tool to all three countries, in particular differentiating between rural and urban communities. Clear differences emerge and in particular it appears that more refined analyses of different demographic groupings within each country could help the e-commerce policy formation process.

Introduction

Electronic commerce—e-commerce—is about the transacting of business using electronic communications processes and facilities. In Africa e-commerce needs to be seen within the wider context of the so-called "digital divide" that separates the developed and developing world and especially Africa, which has most of the least developed countries on the globe. Indeed the Economic Commission for Africa, through its African Information Society Initiative (AISI), has identified e-commerce as one of the four key areas in Africa to exploit ICTs to best advance social and economic development. [\(1\)](#)

With the help of international organisations and donors, many African countries have embarked upon national processes and projects to formulate and implement ICT policies and strategies, specifically with regard to e-commerce. Each country is different and particularly in Africa there are systemic factors related for instance to the banking and logistics systems that have a direct and fundamental bearing on the likelihood of success in e-commerce.

This article differentiates between key areas of e-commerce and the interactions between the major participants: business, government and the individual. It notes the minimal presence of e-commerce in Africa—apart from South Africa—explained in general by several major obstacles characterising the environment in developing countries. Assessments of e-commerce activity are then presented for three countries : Rwanda, Namibia and South Africa. In particular the practice of e-commerce is considered within the larger context of the so-called "networked society." A popular assessment guide is used to bring some objectivity to this analysis, revealing important differences between urban and rural contexts and the needed policy emphasis in different countries.

The Nature of Electronic Commerce

E-commerce comprises business transactions conducted using electronic communications processes and facilities (and especially the Internet). Within that broad definition, there are three categories of interest.

- **Trade in Physical Goods.** Following the universally known example of Amazon.com, in theory consumers in African countries can now purchase goods from anywhere on the globe by placing orders and paying over the Internet. Perhaps more important, African entrepreneurs have the world as their oyster, being able to advertise their products, receive orders, ship and receive payment electronically, "levelling the playing field" and enjoying vastly larger markets for their goods.
- **Trade in Offline Teleservices and Virtual Goods.** Many services such as capturing medical records data, digitising architectural drawings, translating, computer programming, etc. do not have to be done at a client's physical premises, and there are also so-called virtual goods like downloadable music files and digital images that can be created anywhere for electronic delivery to the client. All that is necessary for these types of trade is effective electronic communications. African countries can thus capitalise on a lower wage environment and offer such goods and services at significantly better rates than, say, equivalent workers in North America or Europe, or themselves acquire virtual goods with no concern about physical location.
- **Trade in Online Teleservices.** In similar fashion, African countries can offer real-time teleservices such as Call Centres. What is needed in addition to the criteria applicable to off-line services, are good and reliable bandwidth and reasonable telecommunication rates to make it possible for trained service agents, wherever they are, to respond to customer queries, whether for airline companies, computer suppliers, banks or whatever. Already deployment of such teleservices in lower income countries is becoming commonplace, with India being a popular location.

The nature of suppliers and recipients of such goods and services is also of importance, and there are three of consequence: individual consumers, businesses and governments. The existence of those three actors leads to the following well-known categories of e-commerce:

- **Business-to-consumer (B2C)** e-commerce involves direct business transactions between individual consumers and supplying companies, such as the purchase of books, or booking cinema tickets over the Internet, whether within an African country, or between countries, or internationally. This is the most well known type of e-commerce relationship, but nowhere near as economically important as
- **Business-to-business (B2B)** e-commerce, which links businesses in the value chain to each other, enables all manner of commercial and administrative transactions to be conducted over private telecommunications circuits, or over the public Internet, much more cheaply and timeously than

before. B2B e-commerce is the widespread realisation of Electronic Data Interchange (EDI), an effective application of ICT that has been in existence for many years, but still restricted to a few large companies because of its cost and proprietary nature.

- **Government-to-consumer (G2C) and government-to-business (G2B) e-commerce.** These categories reflect similar transactions to B2C and B2B e-commerce. The difference is of course that government agencies are involved, whether to enable individual citizens to pay traffic fines or submit income tax returns electronically, or whether it is to enable businesses to access tenders for goods and services, submit quotes, and, when successful, electronically complete all financial and administrative procedures related to the tender. This category of e-commerce is especially important in the African context because of the relatively large role that government plays in African economies.

The Reality of E-Commerce in Africa

Within the framework described above, what is the reality of e-commerce in Africa? It must be said that—with the exception of South Africa—*there is minimal evidence of e-commerce on the continent.* Nevertheless here we note some examples of e-commerce successes that may be harbingers of the new era of e-commerce in Africa [\(2\)](#).

- A Moroccan company with a staff of seventy does a solid business of digitising manuscripts for a European publisher.
- Another Moroccan company is successfully offering Internet-based translation services.
- A Senegalese company employs some thirty skilled CAD technicians to do architectural drawing detailing for European clients.
- A Dar-es-Salaam-based company is now offering digital mapping services to companies in California.
- C.A.F.E. Informatique of Lomé, Togo, has successfully set up what is believed to be the first VoIP (Voice Over Internet Protocol) Call Centre in Africa that is totally dedicated to serving North American clients on a full time basis.
- On May 23, 2001 an Amsterdam e-business bureau Explainer DC opened its doors in Accra, Ghana.
- EthioGift located in Addis Ababa sells goats to Ethiopians in the Diaspora. The goats are purchased over the Internet via an Internet domain registered in the US and paid by credit card, but the goats themselves are sourced in Ethiopia and delivered to the family in Addis.
- Also in Ethiopia, Genuine Leather Craft advertises its products on the Web, receives orders and dispatches leather garments throughout the world via regular courier services, promising delivery within ten days.

There are certainly more examples in Africa, since this is becoming an area where international consulting firms and donor agencies see opportunities to support African businesses and at the same time meet their own objectives. It should also be noted that the tourism industry in many African countries has clearly seen the opportunity at least to advertise its wares internationally, if not take bookings over the Internet. Most countries in Africa that have physical tourist locations will be found on

the Web. There is also a burgeoning market for cybercafés in African capitals, where public facilities are making up for relatively high costs, delays and technical deficiencies in domestic service provision.

South Africa shows a dramatically different e-commerce profile from any other country in Africa. International survey organisations predicted that in 1999 online shoppers in South Africa would spend USD 443 million in Internet-generated purchases, while business-to-business e-commerce would reach almost USD 620 million. There are thousands of South African websites and there is a growing incidence of on-line consumer purchasing over the Internet for products such as books, CDs, computer products, wines, flowers, etc.

With the exception of South Africa, however, and despite a few notable success stories, e-commerce in Africa is embryonic. There are good reasons for this, discussed in the next section.

Obstacles to E-Commerce in Africa

In the early days of e-commerce in the developed economies, there was much commentary about *supplier reliability* (the major e-malls and brand names prevailed), *privacy of information* (credit card fraud was the topic of the day), and the "*World Wide Wait*" as a result of slow telecomm links. Those concerns have greatly diminished and e-commerce has matured in the major developed nations. This is far from the case in the developing world and especially Africa. This section discusses common obstacles to e-commerce in Africa, some of which are specific to the socio-economic milieu of the continent. In subsequent sections there is a focus on factors specific to the particular countries in this study.

The obstacles to e-commerce are many and varied:

- **Policy Regimes:** Monopoly provision of telecommunication access and weak regulation results in high costs of service and limited business opportunities for value-added services.
- **Legal Frameworks:** Most countries are still to legalise digital signatures and contracts and tackle issues such as Intellectual Property Rights and Consumer Protection in the digital arena. Dispute settlement in the whole B2C arena and protection of intellectual property rights in the teleservices and "virtual goods" marketplace are significant inhibitors.
- **Financial Environment:** Credit cards are taken for granted in the developed world and are the *sine qua non* for B2C e-commerce. Also, e-entrepreneurs can often look to vibrant venture capital sector to fund new ventures. These are fundamental gaps in most developing countries. Many developing economies are almost entirely cash-based. Credit cards are virtually non-existent, and central bank clearing facilities are very limited. Concerted collaborative efforts between fiscal authorities, banks and private sector merchants will be needed to create an e-commerce-friendly financial environment. A sea change in banking attitudes will be needed to enable a venture capital market.
- **The Information Infrastructure:** Whether e-commerce relates to physical goods or teleservices, the costs of equipment and connectivity loom large in developing countries, especially in monopolistic regimes. Limited bandwidth adds to the problem of providing off-line teleservices and online teleservices demand high quality fast network access.
- **Transportation and Delivery Systems:** Perhaps nowhere is the contrast between developed and developing countries more vivid than here. The essence of B2C e-commerce is instant gratification! The placing of an instant order (and perhaps the equally quick debiting of the

consumer's account) has to be followed up with appropriately quick delivery of the goods. While this is eminently feasible for virtual goods such as music files, it is far from so when it comes to physical goods. Airfreight is risky, infrequent and expensive in Africa; customs clearance procedures are long and complex; local warehousing facilities hardly exist.

- **Human Capacity:** The people required to effect e-commerce have to be computer literate, oriented towards the digital economy, and comfortable with the major languages of the Web. Those that meet the requirements have to be willing to stay in their home countries and not join the brain drain.

It is clear from the above summary of obstacles that the African environment is positively hostile to B2C e-commerce in physical goods, but some of the B2C obstacles become less problematic for the provision of virtual goods and teleservices. B2B e-commerce also can avoid some of the more serious obstacles, but the legal environment assumes greater importance, especially in regard to commercial contracts. G2C and G2B e-commerce can be similarly analysed.

In plotting a course for e-commerce in a particular country, it is necessary therefore, to have a thorough understanding of the larger system of which e-commerce is a part. The policy, regulatory and legal regime must be studied, and the technical, financial and logistics systems, as well as the human resource capacity in government and the private sector must be understood to identify current and potential e-commerce opportunities. The next section elaborates on these notions within the context of three specific countries.

Country Studies

The authors have carried out e-commerce-related studies in several African countries, including the three addressed in this paper: South Africa, Namibia and Rwanda. These three countries are all in the process of implementing policies and practices aimed at enhancing their competitive position in the information age.

- **Rwanda:** A small landlocked country with 7.9 million people in an area of only 26 000 square km, Rwanda is the most densely populated country on the Africa continent. Rwanda has had a particularly turbulent history, culminating in the Tutsi genocide of 1994 perpetrated by radicals from the Hutu majority. Rwanda, with the help of the international community, has been endeavouring to reconstruct its economy. The President, the Hon Paul Kagame, has embraced the idea of turning Rwanda into a knowledge-based society within twenty years and has strongly supported a wide-ranging project initiated by the United Nations Economic Commission for Africa to help do this. Per capita income is less than \$300 a year, making Rwanda one of the poorest countries in the world.
- **Namibia:** With only 1.9 million people in a land area of 824 000 square km, Namibia is one of the most sparsely populated countries in the world. Most industrial activity is concentrated around Windhoek, although the unique mining town of Oranjemund, the seaside resort of Swakopmund and the port of Walvis Bay are development nodes. For many years a mandate of South Africa, Namibia implemented the same apartheid laws that that country did. Since its independence in 1990, Namibia has adopted a liberal constitution and is implementing policies to redress some of the inequalities of the past. Per capita income is approximately \$2000 per annum making it the sixth most affluent nation in Africa.
- **South Africa:** The most industrialised country in Africa with a population of 40 million people in a land area of 1 123 000 square km, South Africa shed its apartheid past and has, since 1994, had

a democratically elected Government with a mandate to uplift and empower the majority of the citizens in that country. With a history of extensive use of ICTs, South Africa is in a position to take greater advantage of the benefits of that technology than any other country in Africa and has a more diversified economy spread around a number of major centres. Per capita income is \$3300, fourth in the region after Seychelles, Gabon and Mauritius.

All three countries are striving to become knowledge-based societies from very different positions. In many cases their policy directions will likely be different, and the priorities that need to be established will relate to conditions particular to the countries themselves.

Country Readiness for the Networked World

Several recent studies examine the potential of ICT and in particular e-commerce to improve the living standards of African countries and have recommended actions (3). When faced with a wealth of information on ICT within a given country, however, and complex interplays between many economic and social factors, it is difficult to arrive at a useful summary of the overall situation and identify the useful ways forward. Recognising this, a number of organisations have developed assessment tools that provide a relatively quick and standardised way of looking at aspects of 'readiness' for the information age. The authors have applied one such tool developed by the Centre for International Development (CID) at Harvard University called 'Readiness for the Networked World – A Guide for Developing Countries (4).' It offers a framework that is easy to use, comprehensive and yet comprehensible and has been applied extensively both in Africa and elsewhere (5).

Within each country, there are large differences in the ICT situation in the urban and rural parts of the country, so separate assessments for those two categories are warranted. Unfortunately, there is no uniform definition of the difference between those two concepts. In general though, rural societies can be typified by their adherence to farming as a way of life. Such cultures are not goal- or achievement-oriented and their members seek subsistence, not surplus. For the purposes of the present assessments, rural Namibia and rural Rwanda are regarded as almost everywhere outside of the capital cities (Windhoek and Kigali respectively), whereas rural South Africa is seen within the context of the above general definition.

Results of the Assessments

The Table below shows the results of the assessments obtained by small expert groups within each country. In the case of Rwanda and Namibia, the assessments were performed at two workshops for key public and private sector stakeholders in the ICT sector. In the case of South Africa, the authors, both of whom have extensive experience in the South African ICT sector, did the assessment independently and then rationalised any differences (6). The next section rationalises the numbers contained in the table.

The Guide 'systematically organises the assessment of numerous factors that determine the Networked Readiness of a community in the developing world. It examines 19 different categories of indicators, ranking each level by advancement in Stages One through Four. The categories are linked, each driving the others, such that a community cannot concentrate solely in one area, but must pay attention to each, noting where it might be able to capitalize on synergies among the categories.' (7)

The categories fall within five groups:

Network Access: What are the availability, cost and quality of ICT networks, services and equipment?

Networked Learning: Does the education system integrate ICTs into its processes to improve learning? Are there technical training programs in the community that can train and prepare an ICT workforce?

Networked Society: To what extent are individuals using information and communication technologies at work and in their personal lives? Are there significant opportunities available for those with ICT skills?

Networked Economy: How are businesses and governments using information and communication technologies to interact with the public and each other?

Network Policy: To what extent does the policy environment promote or hinder the growth of ICT adoption and use?

The guide users then assess the current stage of their country or community within each Readiness category. A full description of each category is contained in the Guide itself; however, to illustrate the process using a specific example:

In the Group ‘**Network Access**’ and the category ‘**Network Speed and Quality**’ the guide provides the following descriptions of **Stage 1** (= not prepared for the networked world) and **Stage 4** (=fully prepared for the networked world).

Stage 1: Fewer than half of all domestic telephone calls are successful

For voice telephony, sound quality is often not acceptable for regular conversation

More than 100 faults are reported each year for each 10 telephone mainlines

No services beyond limited electronic mail capabilities are supported by the local telecommunications infrastructure

Large businesses which want access must link their networks directly to infrastructure backbone outside their community

Stage 4: Dropped connections are fairly infrequent and not a major disruption

Over 90% of domestic telephone calls placed are successful

Fewer than 10 faults are reported per year for each 10 mainlines

There is widespread access to dial-up modem transfer speeds up to 56 Kbps, with some access to high speed solutions such as DSL, cable modems and wireless media

High speed services of 1.5 Mbps are common, with higher speeds available in some areas

Adequate backbone capacity exists to support community needs without significant transmission delays except during infrequent periods of high demand

Packet Loss by the network is below 10%

Stages 2 and 3 are intermediate between these two stages and are defined using similar criteria (8).

Table: Empirical Assessment of Country Readiness for the Networked World

	Urban			Rural		
	Rwanda (9)	Namibia (10)	South Africa	Rwanda	Namibia	South Africa
Network Access						
Information Infrastructures	2+	2	4	1	2	2
Internet Availability	3	3	3+	1+	2	2+
Internet Affordability	3	2	3	1	1	2
Network Speed and Quality	3	3	4	2	2	3
Hardware and Software	2-	2	3+	1	1	3
Service and Support	3	3	4	1	1	3
Networked Learning						
Educational Access to ICT's	2	2	3+	1	1	2
Enhancing Education with ICT's	2+	3	3	1	1	2
Developing the ICT Workforce	2	2	4	1	1	2
Networked Society						
People and Organisations Online	2	3	3+	1	1	1+
Locally Relevant Content	2	3	3+	1	1	1
ICT's in everyday Life	2	3	3+	1	1	1
ICT's in the workplace	2	2	4	1	1	2
Networked						

Economy						
ICT Employment opportunities	1+	2	4	1	1	1
B2C Electronic Commerce	1	2	2+	1	1	1
B2B Electronic Commerce	1	2	3	1	1	1
E-Government	2	2	2+	1	1	1
Network Policy						
Telecommunications	2	2	2+	2	22+	2+ 4
ICT Trade	2	2	42	2	2	4

Interpretation of Results

The ratings in the table are based on an interpretation of the descriptors provided in the readiness guide and the reader is referred to the source document for the detailed content (11). The following sections amplify on the country situations and suggest implications for the realisation of e-commerce.

- **Network Access**

The minimum necessary condition for Readiness is access to adequate network infrastructure. Without access to global communications networks, no community can participate in the Networked World. Access is determined by a combination of the availability and affordability of use of the network itself, as well as of the hardware and software needed for network interface. The quality and speed of the network are also important in determining how the network is used. The customer service orientation of access providers is a major factor in network application adoption and usability.

The Table below illustrates the differences between Rwanda, Namibia and South Africa in terms of the penetration of networking facilities into the society. It does not, however, address the significant differences that exist *within* the same society (e.g. between rural and urban Namibia). For consistency, the figures are taken from reports produced by the International Telecommunications Union (ITU) (12) and apply to 1999, except where numbers are in italics, in which case they refer to the latest available statistics. The rankings apply to the country position out of 206 countries surveyed, and the overall rank to the average of the rankings of the other four indicators.

		<i>Telephone Main Line Density per 100 inhabitants</i>	<i>TV Sets density per 100 inhabitants</i>	<i>Internet Host density per 10 000 inhabitants</i>	<i>Cellular mobile subscriber density per 100</i>
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								<i>inhabitants</i>	
Overall Rank	Country	1999	Rank	1999	Rank	1999	Rank	1999	Rank
79	South Africa	13.8	97	13.4	120	74.96	48	13.21	55
115	Namibia	6.4	129	3.8	156	21.57	74	1.77	110
187	Rwanda	0.2	202	0.0	199	0.64	139	0.15	165

Certain of the reported figures have changed fairly dramatically over the past 2 years. In particular, cellphone penetration has grown considerably (off a low base) in both Rwanda and Namibia, with the mobile density in Namibia in March 2001 [\(13\)](#) at 5.26 per 100 inhabitants and that of Rwanda at 1.48 [\(14\)](#).

Comments on the categories defined in the Readiness Guide under Network Access follow.

Information Infrastructure: This component measures the penetration of fixed and mobile services into the community. As discussed above, Rwanda and Namibia are showing rapid growth in basic access although still operating on a low base. Rwanda is in the interesting situation that mobile connectivity already substantially outstrips fixed line telephony, despite the substantially higher costs of mobile access. South Africa has reached "maturity" in its urban coverage. As far as the rural population is concerned, the recent growth of mobile cellular and fixed wireless technologies has benefited all three countries. Rwanda is the least connected in rural areas.

Internet Availability: South Africa and Namibia show healthy levels of Internet usage and are rolling out a variety of public Internet access points. The use of the Internet is also growing strongly in Rwanda where about a dozen Internet cafes have been established in Kigali and are apparently very popular. The rural areas in South Africa and to a lesser extent Namibia are benefiting from a growing number of Internet Points of Presence (POP's) installed by the state telecomm providers in a number of towns, allowing local access to people living in the surrounding countryside. Rwanda still has a very low telephone penetration in rural areas.

Internet Affordability: In all three countries, subscribers pay per minute telephone charges to the monopoly telecommunications companies. Namibia and South Africa offer national numbers that allow country-wide Internet access at local call rates, but the motivation to reduce the basic call rate is lacking, especially given the local/international call balancing processes underway. Strong ISP competition in South Africa has led to declining prices for Internet services, with some ISP's providing free Internet access. Prices for leased line access are high, especially in Rwanda where it is an order of magnitude higher than in the other countries in the sample.

Network Speed and Quality: The use of the latest technology is narrowing the gap between developed and developing countries in this aspect. Microwave, fibre optic and sophisticated network management tools all contribute to a great improvement in quality of both the network and the maintenance thereof in all areas where these technologies are deployed. Namibia and Rwanda have installed fully digital backbone networks and Rwanda is making increasing use of Wireless Local Loop. In future one can expect network quality to be good wherever it does not rely on older technologies.

Hardware and Software: South Africa has a competitive and dynamic market for locally assembled PC's and specialised microprocessor manufacturing. A great deal of software has been developed for local needs over the years and South Africa has become a niche exporter of software solutions to the developed world. Rwanda and Namibia, on the other hand, have developed little indigenous expertise in hardware assembly or maintenance, or systems and applications software development and are almost entirely importers and distributors of product.

Service and Support: The move away from physical fixed line installations to either mobile or fixed wireless connections means that most aspects of telecommunications service have improved. The lack of a skilled base of technicians, programmers and developers in Namibia and especially in Rwanda means, however, that those countries are highly reliant on outside support. For instance the Rwandan government continues to call in the original Tunisian developers of its social services computer applications for systems maintenance.

Implications for e-commerce: While the technology is in place in all three countries, the relatively high costs of telephone access are a significant inhibitor to B2C e-commerce, although subscriber access via national numbers in South Africa and Namibia encourage the spread of e-commerce into rural areas. The minimal availability of local maintenance and support for hardware and software and high costs of leased lines in Namibia and Rwanda strongly discourage B2B and G2B e-commerce. In terms of telecomm infrastructure, South Africa is well placed to move ahead in all aspects of e-commerce, and both Namibia and Rwanda can exploit their modern telecomm infrastructure by targeting other aspects discussed below.

- **Networked Learning**

Without an educated, ICT-savvy populace, no community can fully participate in the Networked World. To foster this resource, information and communication technologies must be incorporated into the learning system. Lamentably, although the use of ICTs in education is one of the most powerful catalysts to Networked Readiness, it is an opportunity that is often squandered, misunderstood or underestimated.

Educational Access to Computers: In Rwanda computers are almost exclusively located in post-school institutions (the National University, the Kigali Institute of Science and Technology and the Kigali Institute for Education); there are virtually no computers in schools, either urban or rural (nor is there electricity in most rural schools). Namibia is well supplied with ICT facilities in tertiary institutions, and there is a growing countrywide rollout of computers in schools, set to accelerate rapidly thanks to the launch of SchoolNet Namibia and substantial Swedish donor funding. In South Africa, SchoolNet South Africa and some provincial government education departments are moving forward rapidly to place computers in schools and provide Internet connectivity. Over ten percent of South African schools are connected to the Internet, mainly in urban settings. The South African tertiary sector is well supported by computers and connectivity for distance-learning facilities is becoming widespread.

Enhancing Education with ICT's: At the tertiary level, Rwanda is moving forward rapidly to offer computer literacy and recently computer science and ICT technician training. The first steps towards teacher training for ICT have been taken. Namibia is more advanced with well-established computer studies curricula in tertiary institutions and extensive training programmes commencing for young adults who need to redo secondary school subjects. There is a policy in place to incorporate ICT in schools' curricula, but implementation has yet to start. In South Africa, while computers are far from being fully incorporated into the learning process, there is substantial use of computers in schools, and policy-making activity at national and provincial

level to enhance technology curricula. Many schools are taking to the Internet with enthusiasm and school children are gaining prizes in international web-design competitions.

Developing the ICT Workforce: South Africa is well advanced compared to the other countries in this study. Apart from ICT educational programmes at all tertiary institutions offering undergraduate and post graduate degrees in computer science and information technology, there is a proliferation of private training establishments offering the whole gamut of specialised and generalised training in ICT, including specific programmes in electronic commerce. Indeed anecdotal evidence suggests that there is now a surplus of graduates in areas such as the Microsoft MCSE programme. Essentially such training of the ICT workforce is, however, confined to the larger urban centres.

By contrast, training of the ICT workforce in both Rwanda and, to a lesser extent, Namibia, is quite primitive. In Rwanda there is some professional training in Kigali, and first steps towards technician training at the tertiary institutions, but Rwanda relies on external consultants to provide advanced ICT support. While numbers remain small, Namibia is better supplied with ICT experts, and training is available in the urban centres. Namibia also sends students to South African training establishments.

Implications for e-commerce: Creating a culture and developing skills conducive to careers in ICT and uptake of e-commerce starts at the school level. In this respect South Africa is far ahead of the other countries in this study. Indeed—along with Russia— it has been named as one of the top developing countries in the world from which to poach trained ICT people. Steps to enhance technology education at the primary and secondary school level will contribute greatly to producing a "networked society-ready" population. While most activity is still confined largely to the urban centres, the rollout of computers in rural schools and the emergence of public access facilities such as Internet cafes and multi-purpose telecentres will accelerate and broaden the knowledge-based community. This trend represents a priority area for action, if the various categories of e-commerce are to be encouraged.

Similar considerations apply to Namibia, although not to the same extent. That country probably needs to move ahead much more rapidly in implementing its ICT plans and curricula in schools, taking advantage of already committed donor funding for SchoolNet Namibia and coordinating the several community centre projects underway. Those moves will be important in growing the computer literate population attuned to e-commerce, and importantly increasing the pool of potential employees in the public and private sector who can drive business-to-business and government-to-business e-commerce activity.

Rwanda has fundamental steps to take before e-commerce can become a force in the country. A tiny proportion of the populace is computer literate and that number will grow only very slowly through the school system. Profound increases in electricity provision and telephone access will be needed first, as will emphasis on teacher training in ICT skills. In this regard, however, the steps being taken by the tertiary sector are impressive, albeit targeting only a small segment of the population. Considering the damage done to the private sector during the genocide of 1994 it is hardly surprising that there are few trained ICT technicians in the country and that the private sector has been slow to adopt ICT-enabled business processes. B2C e-commerce will therefore remain of minimal significance in that country for a long time.

Probably the most promising direction in Rwanda is a carefully targeted programme of ICT developments in government. If the government positions itself as a "model user" of ICT, seeking international support for staff training and systems implementation, streamlining government-to-

business transactions and starting to provide citizens with electronic access to basic information, it's G2B initiatives may succeed in drawing the private sector into the e-commerce arena as well.

- **Networked Society**

Readiness depends upon the community's incorporation of information and communication technologies into the fabric of its activities in order to maximize the gains of joining in the Networked World. In society-at-large, ICTs can have a profound effect upon people's professional and personal lives by providing easier access to information, more efficient ways to communicate and powerful organizational tools. To understand how a community is using ICTs, it is important to assess not only how many members of the community have access to the technologies, but also how they are using them.

People and Organisations Online: In Rwanda awareness of the Internet is restricted to the few urban centres and only a tiny proportion of the Rwandan population are dialup Internet subscribers (1100 out of 7 million people). There are very few registered Internet domains (362) and even fewer in active use. Namibia is much more active as a networked society, with about 12000 dialup users in a population of 1.7 million and perhaps 20000 employees in several major centres able to access the Internet via government and private sector leased lines. There are 3251 registered domains in the country. As a networked society, and despite major urban/rural differences, South Africa is far ahead of the other countries in this sample. Its number of registered domains (187649) places it in the top twenty worldwide, and large numbers of companies and government departments are connected and exploit their Internet presence.

Locally Relevant Content: South Africa has a few popular portals that provide much locally relevant content via the Web; some of the information (e.g. weather, restaurants, classified ads) covers the country; opportunities are readily available for Web-related training except in rural areas. Rwanda has no such portals and local information has to be obtained through traditional media. There are minimal opportunities for Web training although tertiary institutes in Kigali and Butare are starting to offer courses. Namibia is serviced by a number of South African ISP's but local content is scarce and most people use traditional media only.

ICT's in everyday life: In urban areas, Rwandan and Namibian citizens are fairly well serviced with public telephones, and, in Rwanda, mobile cellular technology has doubled the number of telephone users in a year. Internet access is limited, however, and no on-line shopping, banking or investing takes place. The growth of internet cafes in and around Kigali (12 in June 2001 [\(15\)](#)), however, demonstrates the potential of the technology if access can be made easy and affordable, particularly for the young.

This is in marked contrast to South Africa where, for instance, on-line banking is popular, on-line shopping for household groceries has started and many other interactions of both a social and business nature take place. In none of the three countries, however, do ICT's play any real role in the everyday life of rural communities.

ICT's in the workplace: The South African ICT industry generates revenue in excess of R60-billion, more than the total GDP of both Rwanda and Namibia combined. In the urban South African environment, the deployment of ICT's is widespread. Most medium-sized businesses have local area networks and most larger organisations connect to their branches through wide-area networks. Employees generally will have Internet access and their own e-mail accounts. Urban Rwanda and Namibia show similar profiles with some progressive businesses using the Internet and having networked computers. In the rural areas of all three countries little use is made

of any ICT's.

Implications for e-commerce. ICT's are irrelevant to the lives of the vast majority of the Rwandan and Namibian populations. Individual citizens of those countries will only start benefiting from e-commerce after profound changes take place in the educational system described previously, concerted attempts are made to raise awareness of the benefits of the networked society and wholesale changes take place in the banking and logistics systems that underpin e-commerce. The governments and larger businesses of those countries could well lead the way by moving ahead aggressively in their use of ICT's and the Internet in particular. So the emphasis should be on B2B and G2B e-commerce.

By contrast, it is probably true to say that urban South Africa is already a "networked society" and the emphasis in that country now needs to be on encouraging the broadening of the benefits into rural areas, which are currently underprovided.

- **The Networked Economy**

Businesses and governments that are able to effectively employ information and communication technologies find more sophisticated and efficient ways of managing their external relationships and communications. This growing ICT usage helps form the critical mass of electronic transactions which supports a networked economy, both in terms of the network size and the demand for associated goods, services, labour and policy reform. Clearly electronic commerce is an important component of the networked economy.

ICT Employment Opportunities: The South African ICT industry has shown strong growth over the past few years and has absorbed the majority of qualified personnel produced in the country, although there has been an oversupply of skills in a few areas. SA graduates are in strong demand overseas, and a sizable proportion of knowledge workers exists in the urban environment. ICT skills are becoming more sought after in smaller South African towns. While there is no definitive count of ICT professionals in South Africa, the number probably lies between eighty and a hundred thousand.

In contrast, both the supply of and demand for ICT workers is very low in Rwanda (probably fewer than a hundred) and low in Namibia (less than five hundred). Little new application development is taking place in those countries.

B2C Electronic Commerce: This is effectively non-existent in Rwanda and only in the initial stages in Namibia, where consumer-related e-commerce is largely at the product promotion and advertising stage. The Tourism Industry in Namibia and South Africa are prominent on-line advertisers, in particular targeting international clients, and Rwanda is beginning to follow suit. In South Africa some popular portals promote and sell a variety of products and South Africans also use overseas sites such as Amazon.com to purchase books, CD's etc. Most retail companies listed on the South African Stock Exchange support web sites that detail the products they sell, although many do not support on-line ordering. Even in South Africa the transport infrastructure and relatively low-density housing poses considerable challenges for the physical delivery of goods.

B2B e-commerce is non-existent in Rwanda, at an early stage in Namibia, and well entrenched in South Africa, where the early adoption of Value-Added Networks (VANS) and Electronic Data Interchange (EDI) has provided a foundation for B2B e-commerce. This, coupled with a well developed and sophisticated computer industry has meant that that country is already well on the way to achieving the productivity gains that can be derived from the technology.

G2B and G2C e-commerce: Most government departments in South Africa post key information on their websites; some sites are updated regularly. While there are projects underway to identify and convert all paper-based forms to electronic form, government forms and documents are, however, still almost entirely paper-based. Namibia has a comprehensive government website that is updated fairly regularly, depending on the ministry involved. In some cases information is old (latest GDP figures given are 1997) and in general the site is at least six months behind. Rwanda has a fledgling government website.

It is interesting that in the cases of all three countries, domain name resellers have acquired key domain names (southafrica.com, republicofnamibia.com and rwanda.com). Top-level country domain management is also an area for problems. An overseas Swiss businessman manages the Rwanda domain (.rw) and a local doctor in Swakopmund the Namibian domain (.na). The South African .za domain is the subject of ongoing, sometimes heated discussion between the South African government and the local chapter of the Internet Society.

- **Network Policy**

Public policy can be a help or a hindrance to the networked economy. The favorable climate that public policy can create for Internet use and e-commerce encourages communities, organizations and individuals to invest in and use information and communication technologies. Important aspects of Networked Readiness dealt with above (such as Internet availability and affordability, hardware and software availability and affordability, ICTs in schools and electronic commerce) are all influenced by public policy. For a community to become ready for the Networked World, the appropriate policy-makers must realize the implications of their decisions upon ICT adoption and use.

Telecommunications Regulation: There is no telecomm regulator in Rwanda. Namibia has a regulatory authority, essentially tied to the responsible government department. South Africa has a nominally independent regulator. All three countries have plans in place for the liberalisation of the telecomm environment and included in the plans are provisions for universal access. It is noteworthy that even in South Africa, implementation of liberalisation plans has been slow and fraught with difficulty, hence the relatively low rating of the relevant stage. In all countries the provision of mobile telephony is open to competition, although the fixed line operators all have a major stake in their mobile businesses. While received opinion is that fixed line monopolies should ensure reasonable roll out of telephony into less profitable rural areas, there is not much evidence that this policy is working in any of the countries. In fact, there is considerable evidence that the existence of monopolies in all three countries has had and continues to have a negative effect on consumer access to Telecommunications facilities. The use of Internet telephony is illegal in these countries, although there is evidence that usage is increasing nevertheless. It is quite easy (and inexpensive!) to use Internet telephony to call South Africa from other African countries, for example. There is more competition in the provision of value-added Internet and e-commerce services, especially in South Africa.

ICT Trade Policy: Trade barriers on ICT equipment are lowering in all three countries. South Africa is ahead on this measure, with very low import duties and restrictions on imported equipment and software. Namibia is in the process of removing all tariffs and Rwanda has nominally done so, although businesses have not seen the benefit yet. The South African ICT industry is growing rapidly and some local companies do the largest proportion of their business overseas. The government actively encourages foreign direct investment into the industry. By contrast, the Namibian and Rwandan ICT industries are at a very early stage of development. They do no business out of their countries and have had little support from government in

attracting foreign direct investment.

- **Implications for Policy Makers**

Rapid changes in technology are placing increasing pressure on regulators to liberalise the ICT regulatory environment. In particular, the development of Internet Protocol (IP) Telephony as a viable alternative to circuit-switched services is forcing a response from developing countries that they are not well equipped to make. The relative growth of data traffic compared to voice (16) is facilitating the convergence process, and the fact that IP Telephony is invariably cheaper than the circuit switched alternative (17) makes this technology particularly attractive for developing countries where much of the population will accept lower quality for a cheaper price.

In all three countries the Telecommunications regime is being liberalised, but at a slow pace and by governments that are attempting to retain as much value as possible in order to maximise the proceeds of privatisation. The regulatory authority thus has difficulty in placing the interests of the consumers above that of the monopoly telecomm operator. In addition, the increasing complexity of the regulatory environment and the need to understand the economic implications of either permitting IP Telephony or not is stretching the resources particularly of Rwanda and Namibia.

Discussion of the Assessment Tool used

The assessment tool used does not purport to be a comprehensive strategic planning tool but rather

"This *Guide* is a tool that provides the first step in creating a strategic approach to planning for developing world communities. Our collective understanding of Networked Readiness is still in its infancy, particularly with respect to the largely untapped markets and resources of the developing world.....To that end, the *Guide* is a general framework that each community should tailor to its own needs. It should not be used for comparison among communities, but for appraisal within them" (18)

In spite of the above caveat, the authors believe that there is merit in using the *Guide* as a comparative tool at least for illustrative purposes. It has been used in this fashion by others (19), and serves to position a country or community within a regional or global context. As mentioned previously, it is one of a number of e-readiness assessment tools that are available; a comparison between them has been carried out by **bridges.org** (20) who maintain that the *Guide* is useful 'If the goal (of the assessment) is for a quick but rough gauge of technology usage'. We would concur, and add the following observations:

In our experience the *Guide* has the following advantages:

- Because the different categories and stages are clearly described, assessment by individuals or small groups is rapid, and consensus is generally easy to reach.
- It is a useful catalyst to provoke discussion, both within and between different stakeholder groupings (business, academia, government and NGO's).
- The *Guide* is not limited to the more technical aspects of networked readiness but provides a framework to try to integrate the social, economic and regulatory aspects in an accessible manner.

Within the stated objectives of the *Guide*, the authors believe that the following aspects could be

improved upon:

- For developing countries, the stage definitions do not take into account the enormous differences that exist between selected urban centres and the rest of the country. In both Rwanda and Namibia, for example, the great preponderance of ICT activity takes place in only one city (Kigali and Windhoek, respectively). This geographical imbalance is in itself a negative characteristic which the authors and others (21) have tried to account for by considering the urban and rural communities separately.
- The increasing use of wireless technology and modern network management tools in developing countries makes some of the definitions describing the various stages under **Network Access** inappropriate. The advent of Wireless Local Loop (WLL) makes the definition of a 'mainline' complicated and the rapid growth of Internet Telephony, where the issues relate more to the quality of the connection, requires that this section be updated.
- Perhaps more importantly, however, the *Guide* does not examine the political or historical aspects of a country or community's use of technology but is essentially a snapshot in time. Thus the development of an effective national technology strategy needs to build significantly on the framework offered in the Guide.

Summary and Conclusions

This paper has presented a brief assessment of the state of e-commerce, and more generally "e-readiness" in three very different countries in Africa. While such assessments can only provide rough measures, they are useful to frame the problem and suggest practical steps for implementation. The ratings contained in the table suggest that Rwanda, Namibia and South Africa are at very different stages in preparedness for the networked world. As a result, e-commerce in Rwanda, for instance, is almost non-existent, and its emergence will rely on heroic steps to bring electricity to the rural areas and upgrade the banking and logistics systems in the country. In both Rwanda and Namibia, very small sections of the population are "ready" for ICT and this will only change when special emphasis is placed on ICT-related training and education. South Africa is well on the road to becoming a networked society and to build on its progress in e-commerce needs to emphasise the types of policy and "e-law" interventions more characteristic of developed economies.

Of particular interest is the contrast between urban and rural environments in all three countries. It is clear that the phenomenon of the networked society and especially the practice of e-commerce is largely (in some cases entirely) confined to the major urban centres. However, even within urban settlements, there are well-defined pockets of great poverty, such as the sprawling informal settlements and townships attracting the rural poor to the cities. This suggests that policy makers, NGO's, donor agencies, etc., could well make more effective interventions if they encouraged a more community-focused orientation to furthering ICT and e-commerce. For instance a disaggregation that takes into account settlements such as Khayalitsha outside Cape Town, or Katarura outside Windhoek would recognise that such groups:

- Can be supplied with a variety of telecommunications services as an adjunct to those provided to the nearby wealthier communities.
- The necessary human resources to effect training, maintain equipment and otherwise support any initiatives are close at hand.
- There is access to infrastructure and markets outside of the telecommunications Industry that

distant rural settlements do not have.

- Are more likely to be receptive to gaining ICT-related skills and participating in e-commerce – related activities, than typical rural populations who might be less likely to embrace apparently radical change and the associated risks to their existing life-styles.

It is also clear that there is great demand for Telecommunication services even in poor communities and that the most effective intervention on the part of governments is to allow competition to flourish as soon as possible. The huge increase in subscriber numbers of both internet and cellular technology wherever effective liberalisation has taken place sends an unmistakable signal to policy-makers.

Endnotes

1 The others are ICTs in health, ICTs in education, and national ICT policies and strategies. See <http://www.un.org/depts/eca/adf/pub.htm>

2 Most of these examples were presented by the entrepreneurs themselves at the recent UNCTAD Conference on the Least Developed Countries, 18 May 2001, Brussels, Belgium.

3 See for instance the DOT Force Report, The Digital Initiative Report and the ECA/IDRC Pan-African Initiative on E-Commerce, Mullin Consulting Ltd, 4th draft

4 <http://www.readinessguide.org>

5 It is not the purpose of this paper to discuss the merits and de-merits of the tools available; such an analysis has been performed, inter alia, by Bridges.org. Comparison of e-readiness assessment models, <http://www.bridges.org>.

6 Clearly the methodology adopted is subjective and does not purport to offer a definitive assessment.

7 <http://www.readinessguide.org> *ibid*.

8 Note that, in some cases, the categories of readiness could not be easily grouped into a particular stage but rather fell between stages. In these cases, a "+" was used to indicate significant deviation from the descriptions.

9 Urban Rwanda is considered to be Kigali only

10 Urban Namibia is considered to be Windhoek only

11 <http://www.readinessguide.org> *ibid*.

12 Extracted from ITU Internet Reports: IP Telephony, December 2000

13 Information and Communication Technology Policy for the Republic of Namibia, Unpublished Report, April 2001, Schoemans Office Systems, Miller Esselaar and Associates et al

14 ICT Survey of Rwanda, Unpublished report, June 2001, Miller Esselaar and Associates

15 An ICT survey of Rwanda, *ibid.*

16 ITU Internet Reports: IT Telephony , December 2000, p11

17 *Ibid*, p 21

18 <http://www.readinessguide.org> *ibid.*

19 See, for example, The ECA/IDRC Pan-African Initiative on E-Commerce, Third Draft, Mullins Consulting Ltd

20 Comparison of E-Readiness Assessment Models, <http://www.bridges.org>, 2001

21 The ECA/IDRC Pan-African Initiative on e-Commerce; Regional Report on Southern Africa, Third Draft, Mullins Consulting Ltd

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