South African Journal of Information Management
[DoE accredited]

Student Work Vol.5(2) June 2003

Challenges and risks for South Africa in the information economy

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1 Introduction

We often hear that we live in an information society. The research undertaken by the author investigated the challenges that South Africa faces while competing in the information economy.

In the information economy, the real market power has moved from governments and large companies to the individual. The user drives the information economy. Internet access is available in most public libraries and in community centres. Most public libraries supply community information free of charge. There are voluntary information providers like the Pretoria Citizens' Advice Bureau. Access to information has therefore become a personal choice, rather than a result of belonging to a privileged group of the community. Home computers and connecting to the Internet are now affordable and individuals can find information that was previously reserved for large organizations (Grulke 2000).

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2 Synergy between government and industry

The information infrastructure of a country forms part of its general infrastructure and is therefore the responsibility of the central government. Traditionally, governments have been both the main supplier and buyer of information and communication technologies. They

have large public monopolies for telecommunication, as well as information and communication technology (ICT) business activities. Governments therefore formulate the regulatory environment. In South Africa's dual economy, this role of government is still prevalent, but the industry is changing. The government is increasingly exerting a less direct role as a promoter of ICT supply and demand (Lanvin 2003). The SA government is taking control to shape and confront the challenges to operate within a global information infrastructure. The government is also developing an appropriate national information infrastructure that can operate within a global information infrastructure. Its responsibility is a difficult one, as it has to provide for a technologically sophisticated, first-world economy for the minority and an undeveloped, third-world economy for the majority.

In March 1998, the South African cabinet approved a proposal to develop a national information and communication technology strategy and this is proof that government accepts its responsibility. The key element of the strategy is to consolidate existing government networks and to offer the public access through the use of smart cards (African Information Society Initiative connects on-line database 2001).

To take advantage of the benefits of an information society, a country needs a national strategy (Cogburn 1996). Cogburn sees a national strategy covering four areas, namely infrastructure, application, human capacity and a legal and regulatory framework.

2.1 Infrastructure

The information infrastructure forms part of the general infrastructure of a country and is the responsibility of the central government. The national information infrastructure and global information infrastructure consist of networks of networks, including the Internet and World-Wide Web, which link consumers with producers, organizations, institutions and each other. These networks are based on the telecommunications infrastructure and are increasingly relying on fiber-optic communications technologies, along with satellite, radio, cellular and other forms of mobile computing, as well as the communications infrastructure.

Technologies in these areas are moving so fast that the investment required to keep up goes beyond the capacity of any government to meet the demands. This is one of the reasons why global networks should operate within a global information infrastructure (Cogburn 2001).

The information infrastructure in South Africa seems to be excellent. According to the AISI-connect national ICT profile (2001), South Africa is one of the top 20 Internet users worldwide. There are about 75 public dial-up Internet service providers (ISPs) in South Africa, serving approximately 650000 dial-up subscribers. The corporate, government and academic networks are also well developed, leasing 5000 digital lines to bring the total number of users to 1,8 million. Steps should be taken to facilitate the establishment of low-cost and widely accessible Internet services (Makgoba 1999).

2.2 Application

While the potential applications of the information society are numerous, many are yet to be developed. Some of the leading applications are telemedicine, electronic government services, electronic commerce and geographically distributed science (Cogburn 2001). South Africa has developed the mechanisms to both take advantage of these applications and to contribute to their development.

2.3 Human capacity

In most countries around the world, there are currently an insufficient number of skilled workers to keep up with the demand of developing a national information infrastructure. National states must develop strategies for increasing human capacity development, including the increased use of technology-enhanced learning and geographically distributed

research, teaching and learning (Cogburn 2001).

The above is the responsibility of the South African government. The government should invest in human capital and address the problem of brain drain. An information-driven economy requires educated and trained people with special skills. South Africa's weaknesses in human capacity must be addressed by:

- increasing the number of graduates in technical disciplines;
- enhancing the importance of ICT in education;
- ensuring computer literacy of students and teachers; and
- investing in research and development (Van der Merwe 2000).

The South African government is trying to play a role in this regard. The *Skills Development Levies Act, no. 9 of 1999* encourages South African companies to train their employees. Also, President Thabo Mbeki has said that 'the government must act to ensure that we reduce the number of people dependent on social welfare, increasing the numbers that rely for their livelihood on normal participation in the economy' (Pressly 2003).

The private sector is also taking up the challenge. According to *Business Day* (2003), a consortium of ICT companies have set up an academy to run technology courses to help alleviate the skills shortage. The ICT Academy will form part of the CIDA City Campus in Johannesburg.

2.4 Legal and regulatory framework

It can be stated that a legal and regulatory framework serves as a foundation for the information economy. Governments lag behind businesses regarding the legislation and regulation applicable to an information economy. The global flow of goods, ideas and money can become chaotic. The South African government tends to pass laws they cannot police. Issues such as intellectual property, privacy, security, data protection, electronic payments and currency have to be addressed by a national legal, regulatory and policy infrastructure that can be enforced. For example, the future of e-commerce depends on a legal and regulatory framework. Privacy must be protected and copyright laws and intellectual property rights must protect the software industry. There should be more legal frameworks such as the present framework for the telecommunications industry in South Africa that allows the current listing of Telkom on the stock exchange. It looks as if the South African government is adapting to confront present day challenges and that there is synergy between government and industry. This will help to drive the country forward.

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3 Creating relevant educational programmes

One of the biggest challenges that South Africa faces is the development of its human resources. The information economy exists side-by-side with an underdeveloped subsistence economy, which has had and always will have a negative effect on economic growth and prosperity in this country. The uplifting of the education of all the previously disadvantaged masses is one of the most important issues that the government faces.

The information economy not only requires better qualified people, but also people with special skills. An exceptionally large proportion of government expenditure is allocated to education and training. For the 2003 budget, R10 milliard was added to the educational

budget, bringing it to a total or R67 milliard (*Business Day* 27 February 2003). Education and training should focus on providing for the needs on an information economy. According to Molla (2000), Ngcaba (2000) and Van der Merwe (2000), this means that government should:

- ensure that all teachers and students are computer literate by introducing compulsory courses in information and communications technology as early as possible into the school curricula;
- provide Internet connections to schools, with emphasis an on the geographically remote and previously disadvantaged schools;
- encourage local hardware shops to collect, refurbish and make secondhand computers for high schools and elementary schools so that students will get exposure at an early age;
- increase the number of graduates in technical disciplines;
- expand tertiary level information and communications technology education;
- establish specialized institutions to prepare young people for the information economy in collaboration with the local private sectors and other international institutions;
- encourage, recognize, accredit and certify private institutions involved in high levels of ICT training
- set requirements and (social) obligations for organizations to provide ICT skills to their staff and provide incentive and motivation;
- institute distance, flexible and life-long learning mechanisms;
- encourage the wider use of e-commerce in the community; and
- retain highly skilled people in the country as well educated people are more likely to emigrate.

To create relevant educational programmes, South Africa faces a daunting research and development challenge. However, it must be faced, as research could be instrumental in redressing the imbalances in our society. The research and development challenge ranges from establishing and setting appropriate policies and institutional frameworks to identifying research areas, prioritizing them, ensuring their application and disseminating the findings (Molla 2000).

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4 Role of innovation

Innovation can be defined as the application in practice of new ideas. Innovation and technological change form the basis of economic activity and drive economic growth (Vaile 2000). Education and research stimulate innovation. Through research new ideas are generated and lead to new ideas being tried and tested. The capacity to innovate, and therefore to produce and adapt new technologies, is largely influenced by government action to attract financial and human resources (Lanvin 2003). A constant input of new ideas encourages innovation and leads to new economic activities.

Innovation is an interactive and interdependant process in the sense that different role players make different contributions. The development and sharing of knowledge result in innovation. Information and knowledge are innovating factors that can enhance the capacity of a company for renewal and change.

One of the recent most successful and innovative ideas was to confront the issue of the education backlog in South Africa by using information technology and to expand educational opportunities through technology enhanced distance learning.

Examples of innovation from the New Zealand economy are:

- individual rail or airfreight packages that can be tracked by customers via the Internet;
- telephone callers who can be identified prior to answering the phone; and
- electronic information that can be delivered automatically given a predetermined interest (Vaile 2000).

All of the above is possible in South Africa. The fact that South Africa has a National Advisory Council on Innovation (Abrahams 2003) confirms the importance of innovation.

Forsyth (1998) accurately summarizes innovation as 'adding ideas and turning new ideas into new products [that] will be central to wealth creation'. He further states that 'the information economy will grow with the enrichment of products and services through added ideas, information and knowledge … the future is all about innovation'.

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5 Technology transfer

Access to communication in an information economy is a necessity. A government must see that there is an infrastructure in place so that technology can be transferred to wherever necessary. Less-developed countries must also be *able to receive* technology transfer. In this way, technological know-how can be shared to the benefit of both.

According to Porter in Molla (2000), changes in technology and competition have diminished the traditional role of location. In a global information economy, there are no boundaries. For example, clusters of knowledge used effectively can play an important role in southern Africa to enhance global competitiveness and attract foreign investment to forgotten countries. It also implies new roles for governments, companies and other institutions. To illustrate the possibilities, Porter (Molla 2000) puts forward a theory of national, state and local competitiveness in the global economy, based on micro-economy. He defines clusters of knowledge as:

'Concentrations of highly specialized skills and knowledge, institutions, rivals, related business and sophisticated customers in a particular nation or region. Proximity in geographic, cultural and institutional terms allows special access, special relationships, better information, powerful incentives and other advantages in productivity growth that are difficult to tap from a distance.'

In line with the above argument and as a perfect example of technology transfer, the South African Development Community (SADC) is working on a coherent e-commerce strategy that would help the African region to leapfrog into the information economy. These

strategies for e-commerce include:

- a national information communication infrastructure plan (NICI);
- an African connection aimed at supporting the development of the necessary underlying infrastructure (the target is to lay 50 million lines in Africa over the next five years);
- trade centres by the World Trade Centres Association, which aim to promote trade;
- a Telkom South Africa-Far East (Safe) cable, in collaboration with Malaysia Telecom, which will lay fibre between South Africa and Malaysia;
- a south atlantic telephony/west African submarine cable (SAT-3/WASC), which has been combined with Safe;
- an optical-fibre necklace around Africa, provided by Africa-One;
- a satellite launched by Rascom;
- other related initiatives or plans by The Common Market for Eastern and Southern Africa (Comesa), Economic Community of West African States (Ecowas) and the East African Co-operation (EAC); and
- groundwork for an e-commerce policy provided by the SADC. A theme document that describes the role of the SADC in the new millennium, as well as the opportunities and challenges of information technology, has been produced (Green paper on electronic commerce for South Africa 2000).

Another initiative is the New Partnership for African Development (Nepad) initiative. This project consolidates a political will to address the critical challenges that Africa faces. One of Nepad's long-term objectives is to develop regional strategies to improve health and education (Ellis 2002).

There are a number of South African technology transfer initiatives in place:

5.1 Eskom

Eskom, South Africa's national electricity supplier, will provide fibre-optic capacity in the southern African region. The company already has commercial customers in 16 countries. Although its backbone is currently based on microwave links, Eskom plans to run fibre-optic cables down all new cables already laid down, as well as those planned for linking Botswana and Zimbabwe into the southern African grid. The grid is expected to expand into a continent-wide network in the long run, as projects that tap the electricity generation potential of the Congo come in line (AISI 2001).

Eskom's African telecommunication operation, which is known as Eskom Telecommunications Africa, is involved in Esi-cell Lesotho together with the Lesotho government and mobile operator Econet. Eskom also owns 72% of the Mountain Kingdom Communications consortium in which Econet has a 28% shareholding.

In Nigeria, Eskom owns 51% of a long-distance operator licence in partnership with a Nigerian company, the National Electric Power Authority.

Eskom is investigating other potential telecommunications opportunities in Africa (*Business*

Day 25 February 2003).

5.2 Cellular communication

South Africa is playing a role in introducing cellular technology to Africa. The two major mobile global system mobile operators (GSM operators) in the South African market are MTN and Vodacom. MTN was recently awarded a second network operator's licence in Uganda, a first operator's licence in Rwanda and an existing GSM licence in Cameroon. Nigeria is by far MTN's most profitable market with 1 million users, with about 2500 new users per day. MTN Nigeria earns $54 per month per customer. Uganda earns $33, Rwanda $27 and Cameroon and Swaziland $22. MTN is also setting its sights on the untapped Angolan market, but is reluctant to accept an offer for a GSM licence in Tanzania (Bidoli 2003).

5.3 Telkom

Telkom is the 27th largest telecommunications operator in the world and is selling its expertise and infrastructure to Africa. With its high capacity international links and sophisticated integrated digital network services, Telkom is in an attractive position to sell bandwidth to other parts of Africa, especially through satellite connections. In October 1994, Telkom demonstrated its space stream very small aperture terminal (VSAT) services in Lagos. These services can integrate voice, data and images on a single link. Telkom sold the service to an operator in Nigeria. They also sold an ISP (ZamNet) to Zambia (AISI 2001). Telkom is already the hub for much of the continent's international communications traffic. Telkom assists other African countries in establishing telecommunications solutions. It is coordinating an optical-fibre cabling system that links South Africa to Senegal and beyond in the west, and to Malaysia and beyond in the east. Telkom is also in the process of driving a SADC-wide VSAT joint venture initiative. In addition, Telkom participates in the Regional African Satellite Communications Organization satellite initiative (Makgoba 1999).

5.4 Regional cooperation and clusters

The SADC is viewed as an emerging regional market with the greatest potential to spearhead the African renaissance. Southern Africa can only compete globally if the region works together as a group to mobilize and coordinate resources. The SADC should develop structures and adopt policies to promote increased use of technology.

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6 Conclusion

The question was asked how the South African public could shape and adapt to deal with the challenges and risks associated with the information economy. The South African public, the government and industry are indeed adapting, but whether they are coping is open to debate. The government is faced with difficult choices between ICT-related objectives on the one hand, and urgent basic needs including food, health and basic education needs on the other. The crucial issues of a macro information economy are increasingly being addressed. Our macro-economic conditions have never been more positive. This fosters the spirit of enterprize and encourages new business ventures. This can move more people into the information economy. South Africa's rating on the World Competitiveness Scoreboard has indeed increased from 38,6% in 2001 to 43,98% in 2002 (World competitiveness yearbook 2002). The government does spend huge amounts of money on the development of education and training, including technology literacy and training. This is a concerted effort to move away from a subsistence economy. Small business development is encouraged because this is increasingly where wealth and jobs are created. However, a recent survey by the UCT Business School found that small businesses

are hampered by a lack of education and training, financial support and unfriendly government policies (RDP development monitor 2002).

The South African public in general is adapting and working towards creating opportunities to allow all citizens access to an information economy. However, the majority of people do not have the skills to survive in an information economy. This brings us back to the importance of a synergy between government and industry, the importance of creating a competitive environment and relevant educational programs and to encourage innovation. It must be remembered that nothing worth fighting for comes easy.

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ISSN 1560-683X

Published by InterWord Communications for the Centre for Research in Web-based Applications, Rand Afrikaans University