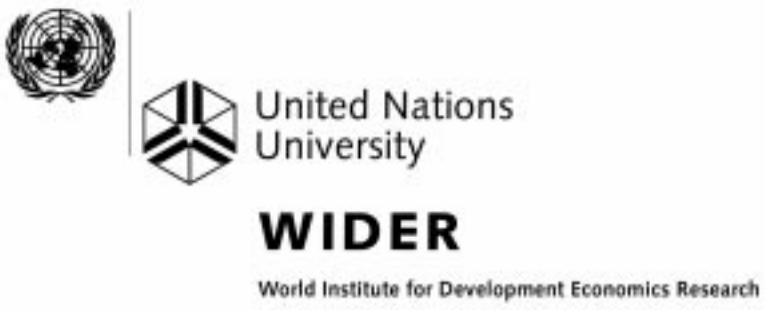

Discussion Paper No. 2001/77

Prospects for the Digital Economy in South Africa

Technology, Policy, People, and Strategies

Derrick L. Cogburn[1]
and Catherine Nyaki Adeya[2]

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Abstract

This study explores the on-going development of a global digital economy through a case-study analysis of its impact on and prospects in South Africa. It argues that four factors are key to understanding the impact of the digital economy on a developing country: (i) the level of technology, including its information and communications infrastructure and system of production and distribution; (ii) the policy and regulatory framework and initiatives; (iii) the human capacity and income distribution; and (iv) the strategic approach of the state in response to dramatic global and domestic processes. The paper explores these four factors in the Republic of South Africa, with a focus on the period 1995-2000. Data for the study are drawn from survey research, published reports from national and international bodies, scholarly journals, structured interviews, and participant observation. Key findings of the study are as follows: an insufficient information and communications infrastructure remains a barrier to

…/.

Keywords: e-commerce, South Africa, information policy, digital economy, information infrastructure

JEL classification: F01, O1, O19

[1] School of Information and Center for Afroamerican and African Studies (University of Michigan);
[2] Institute for New Technologies of the United Nations University (INTECH)

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growth of the information economy in South Africa, especially in peri-urban and rural areas; awareness of the importance of the information economy is growing, but current human resources and development strategies are insufficient to meet human capital requirements; significant efforts have been made in order to re-orient the South African policy environment into one supportive of growth in a global digital economy; and South Africa's role as a leading African and developing world economy places additional burdens on its need to engage in regional, and global policy formulation activities in support of the emergence of a new regime for global e-commerce that is supportive of the strategic goals of the developing world.

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1 Introduction

Economic realities have always conditioned, and been conditioned by, a wide range of social, political, technological, and cultural forces at both national and global levels. This historical period, characterized by globalization and the emergence of an information society, is certainly no exception. The other contributions to the UNU/WIDER research project have discussed some of the fundamental changes occurring in the structure and nature of the global economy, with its increased focus on knowledge and information as key factors of production, and an emphasis on the global production and distribution of intangible goods and services. These changes are leading to a fundamentally different global economy, which is being characterized variously as a knowledge economy, information economy, weightless economy, or a digital economy.

Source: *CIA World Factbook* (2000)

While a lot has been written, here and elsewhere, about the emergence of a digital economy and the theoretical opportunities for developing countries within this global transformation, insufficient attention has been paid to the empirical realities of the digital economy in these countries. Have developing countries been able to actually create environments that can produce and attract information-oriented companies that are able to exploit the market opportunities of a digital economy? If so, what conditions have supported the development of this environment? Is there a relationship between investment in information and communications technologies and growth of the digital economy in developing countries? Has policy played an important role in this process? If so, how has it contributed to economic performance (economic growth, productivity, and income distribution)? How is access to these technologies structured and promoted to confront the challenges of a global digital divide, both within countries and between countries? To what degree can successful strategies and approaches be diffused in other developing countries?

2 Purpose and rationale

The purpose of this study is to begin answering some of these questions by developing and employing an innovative analytical framework that can be used to evaluate empirical data in this area. Using a case-study design, this analysis focuses on the Republic of South Africa from 1995-2000. South Africa is an essential case study for five important reasons. First, in 1996 South Africa engaged in one of the most unique telecommunications policy restructuring processes in the developing world, which placed a high priority on achieving its universal access goals (Cogburn 1996, 1998; Jensen 1999; Horwitz 2000). Second, South Africa has made numerous movements towards creating a more liberalized telecommunications sector and promoting the development and use of information infrastructure, including international commitments at the World Trade Organization (WTO) in the Agreement on Basic Telecommunications. Third, there has been a marked increase in e-commerce in South Africa since 1996 in terms of both market and policy activity. Fourth, the racialized nature of the South African economy, the legacy of legalized racial segregation under

apartheid, and centuries of racially based oppression, have left South Africa with a dualist economy and society that has elements of both a developed and developing country. Finally, there is the empirical reality that South Africa has been investing heavily in information and communications technologies (ICT). The 1999 share of South African ICT expenditure per GDP was 7.2 per cent, higher than the world average of 6.6 per cent, higher than in the Netherlands, Japan, Denmark, Ireland, Finland, Brazil, Malaysia, China, Mexico, Egypt, and numerous other high-profile countries with innovative approaches to the information society (*Digital Planet* 2000).

These data suggest that South Africa is engaging in a systematic attempt to leapfrog into the information age through a concerted strategy of infrastructure development, applications support, awareness raising, private investment, and public policy approaches. Given the reality of globalization and the emergence of a digital economy, and given the importance of South Africa in the Africa region and amongst developing countries, this study analyses the prospects for and impact of the digital economy on South Africa.

3 Analytical framework, methodology and data

3.1 Analytical framework

In order to explore the impact of global and domestic pressures on national economies, particularly in periods of rapid change and crises, Gourevitch (1986) developed a useful analytical framework. This framework went beyond limited analyses of looking at either global or domestic variables to include both and beyond simply looking at narrow economic variables to include a range of socio-political and cultural components, providing a fairly comprehensive understanding of national responses to economic crises. The analytical framework developed in this study finds its roots in Gourevitch (1986) but considers a more contemporary understanding of the processes and nature of globalization and the emergence of a global knowledge-based economy. A similar analytical framework has been applied previously to an empirical analysis of high-technology policy formulation in South Africa, particularly in telecommunications (Cogburn 1996, 1998).

The framework, called the global innovation-mediated paradigm shift (GIMPS), draws heavily on the basic assumptions and approach found in the Gourevitch model, but combines it with other relevant literature on global political economy and international regime formation. It employs four major themes to enhance our understanding of the impact of globalization and the digital economy on South Africa. These themes are: (i) *Technology*—the structure and orientation of its system of production and distribution, including its information and communications infrastructure and the promotion of small, medium, and micro-sized enterprises (SMMEs); (ii) *Policy*—the policy approach of the state, including its promotion of an appropriate legal and regulatory environment for the digital economy; (iii) *People*—the human capacity operating within the sector, the existing income and employment distributions, and the degree to which civil society is organized in response to the new economy; and finally (iv) *Strategy*—the development and implementation of national, regional, and global strategies for confronting the challenges and exploiting the opportunities of globalization within the constraints of the world-system.

3.2 Methodology

Based on Cresswell (1994), this study uses a 'dominant/less dominant' case-study design. It is primarily qualitative in its approach but utilizes quantitative data and analytical techniques where possible and appropriate. Thus, the primary goal of this study is to understand a case, and not to generalize or predict. The four components of the GIMPS framework may be conceived of loosely as independent variables. Nominally, the dependent variable is the level of e-commerce activity within South Africa and its readiness to harness the digital economy. Also following Cresswell (1994), a 'grand tour' research question is posed for each component of the GIMPS framework, supported by several subsidiary research questions. Data were then collected through multiple techniques and analysed in order to answer these questions. These grand tour questions are presented at the beginning of each part of section 4.

3.3 Data and sources

One of the biggest challenges of doing empirical research in Africa and many parts of the developing world is the paucity of quality data. Thus, for this study we worked with a commercial data provider, BMI-TechKnowledge (a South African partner to the International Data Corporation) to secure a significant amount of primary data on South Africa. We were able to access primary data from a series of surveys conducted during 1999 and 2000. These surveys include the following: South African Company e-Commerce Survey (May 2000); South African Consumer Internet and e-Commerce Survey (2000); South African Outlook for Internet Access: Users and Devices (July 1999); South African Internet Services Market (May 2000); SoHo Internet Usage in South Africa (August 1999); and SME Technology Barometer 1999–2000. Further, structured interviews were held with key officials, academics, and community leaders in South Africa. In addition, numerous secondary sources were consulted (including government documents, international organization reports, business and trade publications, and Internet websites).

4 Findings: Prospects for the digital economy in South Africa

4.1 Technology and infrastructure

The first component of our analytical framework is technology. What is the status of information and communications technology (ICT) infrastructure within South Africa, and how is this influenced by its system of production and distribution? What impact could this infrastructure have on South Africa's ability to harness the digital economy?

Of the four factors having perhaps the greatest impact on a nation's ability to harness the global digital economy—information and communications infrastructure, policy, human capacity, and strategy—information infrastructure is perhaps the *sine qua non*. Without an information and communications infrastructure, the applications made possible in the information society are useless. In terms of the digital economy, information and communications infrastructure refers to *telecommunications infrastructure* (hardware and services, both fixed and wireless), *computing infrastructure* (hardware, software, and services—consulting, training, systems development and integration, etc.), and *internal ICT spending*. The status of these major

components will be reviewed. Then, we will explore the current e-commerce market in South Africa.

4.1.1 Telecommunications infrastructure

Historically telecommunications in South Africa was introduced and developed by the South African Posts and Telecommunications (SAPT), a classic state-owned monopoly PTT (posts, telephone and telegraphy). In 1991, the telecommunications and postal operations of the SAPT were separated, with the telecommunications functions being vested in Telkom, a new 'commercialized' enterprise maintaining a monopoly in the provision of fixed telecommunications services. While operating as a business under the authority of the South African Companies Act, the sole shareholder for Telkom was the South African government (Kaplan 1990; Cogburn 1996, 1998). In 1996, a major legislative initiative established a new legal and regulatory framework for telecommunications in South Africa (Cogburn 1998; Horwitz 2000).

Telkom dominates the telecommunications market in South Africa. While still relatively small in global terms, the telecommunications market in South Africa is perhaps the largest in Africa. It leads the continent in the number of fixed lines, number of cellular subscribers, data services users, financial revenues, investment, technological capability, local equipment design, and manufacturing capabilities. Table 1 presents selected measures of development in the South African telecommunications industry.

In a number of ways, the technology employed in the South African telecommunications network is quite sophisticated. Nearly all of the high-end communications services expected in the advanced economies are available in South Africa, including ISDN (integrated services digital network), GSM (global standard for mobile communications), videoconferencing, and WAP (wireless applications protocol). In fact, the South African GSM cellular network is the largest in the world outside of Europe and the percentage of digital switches is higher in South Africa than in many highly industrialized countries. Table 2 illustrates some of these key technological measures for the telecommunications infrastructure in South Africa.

Table 1
Selected measures of the South African telecommunications industry

Description	Measures
Connected telephone lines	4,768,000
Cellular subscribers	2,540,000
Telephone lines per 100 persons	11.2 (1997)
Rural telephone lines per 100 persons	2.2 (1997)
Largest consumers of telecom services	ABSA, Standard Bank, Nedcor, FirstRand

Source: Synthesized from BMI-Tech (1999)

Table 2
Selected measures of telecommunications infrastructure in South Africa

Installed plant	Description	Measures
Transmission	Transmission circuits ('000 km)	156,000
	Optical fibre ('000 km)	343
Switches	Total automatic exchange units	3,019
	Digital exchange units	2,662 (75%)
	Analogue exchange units	357

Source: BMI-Tech (1999)

4.1.2 Computing infrastructure

As a base for the digital economy, the computing infrastructure of a country can be explored in terms of hardware, software, services (e.g. consulting, training, systems development and integration), and Internet access charges. The number of installed personal computers in South Africa has risen dramatically from 1992 (541,582) to 1999 (3,091,949) a CAGR of 28.3 per cent. Additionally, so has the number of PCs installed in homes (50,977 in 1992; 260,950 in 1999) and the number of PCs installed in schools (40,248 in 1992; 273,914 in 1999) (WITSA 2000).

In addition to the installed base of computers, the digital economy requires these computers to be networked (e.g. to be connected to the Internet) and to have a solid base of users. Currently, South Africa is ranked 20th in the world in the percentage of its PCs that are networked (65.6 per cent) and is ranked 17th in the world in the overall number of Internet host computers (297,446) with 1,250,046 users.[1] The penetration of the Internet in South Africa is about 30 times that of Egypt, its nearest competitor in Africa.[2] The Internet penetration for all of Africa is only 311,072 hosts, so South Africa's dominance in terms of the region is readily apparent (leaving approximately 13,626 Internet hosts in the rest of the continent). Table 3 further illustrates the rapid growth in the computing infrastructure in South Africa.

The online population for all of Africa is estimated at 3.4 million. South Africa has over 650,000 dial-up subscribers. With the addition of corporate, government and academic users (who lease a combined total of about 5,000 digital lines), the total number of users in South Africa rises to about 1.8 million. Within Africa, South Africa is followed by Egypt with 60,000, Morocco with 20,000, and Kenya with 15,000.[3]

There are over 75 Internet service providers operating in South Africa, who pay an annual licensing fee of $400.00. Over 100 South African cities have local points-of-presence (POPs) (Jensen 2001). The average dial-up cost for 20 hours per month is $40.00. Two companies (M-Web and World Online) dominate the dial-up market, having about 90 per cent market share between them. The cost of a local telephone call is $1.3 per hour (with call charges being metered every three minutes). Rental charges

1 Available at http://www.netsizer.com

2 Available at http://www.bellanet.org/partners/aisi/nici/South per cent20Africa/southinter.htm.

3 Available at http://www.netsizer.com and www.usic.org

Table 3
Selected measures of computing infrastructure in South Africa

	1992	1993	1994	1995	1996	1997	1998	1999
PCs installed in:								
Education	40, 428	53,328	70,345	92,792	143,718	181,833	249,917	273,914
Homes	50,977	71,457	100,164	140,405	196,813	225,624	204,133	260,950
Business and government	450,177	593,827	783,314	1,033,266	1,341,659	1,697,476	2,333,066	2,557,085
Total PCs installed	541,582	718,611	953,823	1,266,463	1,682,190	2,104,933	2,787,116	3,091,949
% of PCs networked	26.5	30.0	32.5	34.7	30.0	38.9	43.2	45.9
Telephone lines/HH	48.0	48.0	49.0	29.0	29.0	30.0	30.7	31.5

Source: WITSA (2000)

for a home telephone line are $9.1 per month. The price for an international Internet link is $800.00 per month. Two companies, M-Web and World OnLine, lead the dial-up Internet access market; about 90 per cent of the South African market between them.[4] The other major market players are IBM, Intekom, and CiTEC.[5]

While these statistics and infrastructure are astounding in relation to the African continent and some other parts of the developing world, they are severely misleading inside and outside the country. For example, while the percentage of South African households with telephone lines of 31.5 per cent sounds great compared to 4.5 per cent in Vietnam or 19 per cent in China or India, it pales in comparison to countries like Turkey (83 per cent), the United States (92.2 per cent), Singapore (125.1 per cent), and Denmark (146.3 per cent) (WITSA 2000). Further, given the legacy of apartheid, access to these information and communications technologies within the country has been skewed significantly along racial lines. Table 3 illustrates this skewed distribution. Before 1994, when the first democratic elections in South Africa occurred, teledensity data was much higher. This is not because there were more telephone lines in the country at that time, but because the apartheid government only reported data primarily for white households, which make up only 13 per cent of the population in South Africa.

4.1.3 Spending on information and communications technologies

In 2000, the OECD argued that the two factors most likely to influence the future expansion of e-commerce are: (i) the extent to which IT companies invest in network capacity, and (ii) the speed of data transmissions (OECD 2000). South Africa, both the public and private sector, is investing heavily in its information and communications infrastructure to enhance its ability to harness the digital economy. Relative to many other countries, South Africa ranks very high on indicators of ICT spending. For example, in terms of total ICT spending, South Africa spent 10,898 (US$m) in 1999, ranking it twenty-third worldwide. This amount is more than in Finland (8,793 US$m),

4 Mike Jensen's http://www2.sn.apc.org/africa/countdet.CFM?countries__ISO_Code=ZA

5 Ibid

Singapore (8,025 US$m), Ireland (5,556 US$m), Malaysia (5,263 US$m), Chile (4,824 US$m), Egypt (2,047 US$m), and a host of other countries often considered Western and/or more developed than South Africa. On the other hand a number of interesting countries have much higher levels of ICT spending than South Africa, such as the People's Republic of China (47,871 US$m), Brazil (46,007 US$m), Mexico (16,198 US$m), and India (15,541 US$m).

Further, in terms of telecommunications spending, South Africa ranks thirty-first, spending $3,899 US$m in 1999. Again, China ($35,181 (US$m), Brazil ($30,339 US$m), India ($11,329 US$m), and Mexico ($8,930 US$m) are much higher, as well as the telecommunications spending in Singapore ($4,193 US$m) (*Digital Economy* 2000).

South Africa also spends a large amount on ICT relative to its GDP. In 1999 the percentage was 7.2 per cent, ranking it fourteenth, higher than the percentage in the Netherlands (7.1 per cent), Japan (7.1 per cent), Denmark (6.9 per cent), Ireland (6.5 per cent), Finland (5.9 per cent), Brazil (5.8 per cent), Malaysia (5.2 per cent), China (4.9 per cent), Mexico (4.2 per cent), Egypt (3.3 per cent) and a number of other countries. The only developing countries spending a higher percentage of GDP on ICTs than South Africa were Columbia, Singapore and Vietnam. However, in terms of ICT spending per capita, South Africa drops significantly. In 1999, it spent $240.6 for each of its citizens, ranking it thirty-fourth, behind Singapore ($2,488.5), Finland ($1,703.7), Ireland ($1,495.3), Israel ($1,372.4), Chile ($321.0), and Brazil ($267.0). The highest per capita spending on ICT in 1999 was in Switzerland ($3,355.0). However, this level of ICT spending does rank South Africa ahead of Malaysia ($231.8), Mexico ($168.4), Russia ($53.6), China ($38.0), Egypt ($29.8), India ($15.4) and several other countries.

Finally, in terms of the total installed base of personal computers, South Africa ranks seventeenth (3,091,949), trailing Brazil (7,712,548) and Mexico (4,311,989) but leading Switzerland (3,067,000), India (2,723,965), Belgium (2,155,00), Malaysia (2,032,224), Austria (1,935,000), Finland (1,870,000), Hong Kong (1,738, 681), Israel (1,280, 578), Singapore (1,226,969), Ireland (877,000), and Egypt (363,739).

Table 4 summarizes many of these important data as they relate to ICT spending in South Africa along with other economic measures. Obviously, one important feature of much of these data is the size of South Africa and its population relative to the other countries and their population. South Africa has a population of 43,421,021 with a 0.5 per cent growth rate.[6]

What explains such a high level of ICT spending by South Africa? Hodge and Miller (1996) provide one answer when they argue that 'the beginnings of trade liberalization under the GATT agreement caused the average tariff level in the South African economy to come down to around 25 per cent, and in the early 1990s tariffs on computer equipment came down even further to a flat rate of 6 per cent for both hardware and imported components. This relatively liberal trade stance for computer hardware was bound to have a positive impact on IT adoption in South Africa, as price is an important determinant of the level of IT adoption in firms. This should in part explain the relatively large and vibrant IT industry in South Africa' (Hodge and Miller 1996: 14-5). This argument would also suggest that if South Africa were to sign the IT

6 Available at http://www.cia.gov/cia/publications/factbook/geos/sf.html#People

Agreement within the WTO, lowering the tariffs on all ICT products to zero, it would lead to a further increase in the diffusion of ICT infrastructure within the country.

However, an additional explanation is that during this period, the new democratic government was attempting to harness the benefits of the emerging information and knowledge society. Key leadership in South Africa, from President Mandela, then Deputy President Thabo Mbeki, former Minister of Communications Palo Jordan, former Minister of Communications Jay Naidoo, and Director General of Communications Andile Ngcaba, are all convinced that ICTs and the digital economy can have a profound impact on raising the standard of living of the previously dispossessed communities in South Africa (Cogburn 1998). These political leaders have engaged in a range of initiatives to promote the development of a knowledge society in South Africa (see sections 4.3 and 4.4 for further elaboration). Given these perspectives, the level of infrastructure development, and the high levels of ICT expenditure, what is the current status of the e-commerce market in South Africa?

Table 4
ICT spending and economic data for South Africa

	1992	1993	1994	1995	1996	1997	1998	1999
Spending (US$m)								
IT hardware	1,227	1,321	1,558	1,525	1,631	1,717	2,210	2,329
Software	287	330	386	456	633	669	756	815
IT services	876	938	1,100	997	1,202	1,472	1,571	1,879
Internal	1212	1,295	1,328	1,446	1,485	1,528	1,792	1,766
Other office equipment	131	138	170	158	148	155	200	211
Total IT	3,734	4,021	4,541	4,581	5,098	5,541	6,529	6,999
Telecommunications	2,666	2,847	3,023	4,068	4,185	4,149	3,668	3,899
Total ICT	6,400	6,869	7,564	8,649	9,283	9,690	10,197	10,898
Economic ratios								
ICT/GDP	5.4%	5.8%	6.2%	6.5%	7.3%	6.9%	6.8%	7.2%
ICT/capita	$160.9	$173.3	$187.1	$209.7	$219.0	$223.6	$230.2	$240.6
Software/hardware	23.4%	25.0%	24.8%	29.9%	38.8%	39.0%	34.2	35.0%

Source: WITSA (2000)

4.1.4 Current e-commerce market in South Africa

While access to information and communications infrastructure is critical, the development of a digital economy is about more. It is also about the degree to which companies can emerge to produce and distribute e-commerce products and services, and the degree to which consumers, even 'connected ones', have the capacity to easily download and use digitized products and services. Some scholars have called this concept 'effective access' to information and communications infrastructure (Cogburn and Adeya 1999; Wilson 2001). In order to assess the e-commerce market in South Africa, this study uses the 'electronic commerce market model' (ECMM) developed by BMI-TechKnowledge in South Africa.[7] This model segments the market into two

7 BMI-Tech (2000a)

primary segments, non-financial sector and financial sector, and several secondary segmentation strategies. Table 5 provides some examples of traditional and EDI-style web commerce.

Another possible explanation for the high South African investment in ICT discussed above can be found in the financial sector. The four largest South African banks are placed among the 500 largest banks worldwide and the sophistication of IT support in the country for the financial services is comparable or better than many developed countries. All major financial institutions have electronic networks that traverse the country. These banks are engaged in significant levels of e-commerce in various forms. Table 6 presents an overview of some of the ways in which the financial sector is capitalizing on e-commerce in South Africa.

Additionally, in the financial services sector, on-line brokers and investment bankers are emerging in the South African market. Several of these on-line brokers are linked with larger 'brick-and-mortar' firms, thus illustrating the 'bricks-and-clicks' business model. However, others are exploring stand-alone approaches.

Table 5
Examples of traditional EDI-style and Web-style commerce

	Traditional EDI-style commerce	Web-style commerce
Non-financial sector	Healthcare EDI	Travel and accommodation
	Pharmaceutical distributors	Computer hardware
	Retail EDI hubs	Books, CDs, etc.
	Manufacturing EDI hubs	On-line auctions
	Transportation EDI hubs	Information services (subscription based)
	Ticketing (e.g., Galileo, Computicket)	Cars
		Property
		Gambling
		Entertainment
		On-line game playing
		Multimedia products
Financial sector	Videotext (Beltel) based online banking	Web-based electronic banking
	Business electronic banking systems	Online bill presentment and payment
		Asset financing
		Mortgage applications
		Online share dealing
		Unit trusts
		Insurance product sales
		Insurance claims processing

Source: BMI-Tech (2000b) and (2000a)

A further explanation for the huge South African investment in ICTs can be found in professional services mainly provided to the manufacturing sector, financial sector, government and retailing. Professional services are needed in the selection, installation, integration and maintenance of hardware, systems software and package application software, and developing custom applications (Hodge and Miller 1996). By way of illustration between 1991-95, the sector grew at an average annual real rate of 10.9 per

cent, higher that the overall real economic growth of 1.1 per cent during the period. The sector also exports services to other African countries. The popularity of professional services in the ICT industry, from South Africa, can also be explained by their lower costs compared to those from the developed countries but with comparable skills.

Table 6
Overview of financial sector electronic commerce in South Africa, 1999–2000

	1999	2000	2001	2002	2003	2004	2005	CAGR (%) 1999-2005
	Revenue (Rm) from electronic commerce transactions							
Service/product type								
Electronic banking fees	678	926	1166	1413	1678	1958	2256	22
Share trading volume	1,843	9,659	35,147	93,494	194,923	369,729	777,991	174
Insurance premiums for on-line insurance	1	31	102	227	445	842	1669	280
Unit trust bought	163	8085	43028	109282	163983	227155	317047	253
Mortgages	50	300	600	1080	1728	2592	3629	104
Vehicle finance obtained	7	30	189	409	883	1602	2430	167
	Growth (%)							
Service/product type								
Electronic banking fees	38	37	26	21	19	17	15	
Share trading volume	362	424	264	166	108	90	110	
Insurance premiums for online insurance	na	5538	227	121	96	89	98	
Unit trust bought	na	4868	432	154	50	39	40	
Mortgages obtained	na	500	100	80	60	50	40	
Vehicle finance obtained	na	347	529	116	116	81	52	
	Online bill presentation and payment							
Value of bills presented (Rm)	0	5,000	42,000	129,000	216,000	275,000	284,000	na
Facilitator revenues (Rm)	0	3	21	65	108	138	142	na

Source: BMI-Tech (2000a)

4.2 Policy

Clearly, information and communications infrastructure in South Africa is a key component of the foundation for a digital economy. However, the second component of our analytical framework examines another important building block for that foundation—policy. What is the policy approach of the South African government to the digital economy, and has this approach allowed for broad input into the policy formulation process? What strategic policy initiatives has the South African government engaged in to understand and promote the development of e-commerce and the information economy? To what degree have these initiatives been successful?

Globally, the gap between those countries and individuals that have access to information and communications technologies and those who do not has become known as the ‘digital divide’. South Africa’s digital divide extends across the country with skewed access to ICTs. Addressing this gap has been a major policy objective of the

new democratic government in South Africa. Through various means, the Republic of South Africa has attempted to use policy tools to achieve a range of objectives relating to the digital economy and the fostering of a knowledge society. This section explores these initiatives and examines them within the global policy context.

As discussed above in section 4.1, the South African telecommunications sector has undergone a significant transformation, especially leading up to its telecommunications policy of 1996. This milestone in telecommunications policy had the specific objectives of re-orienting the South African telecommunications infrastructure for the information age. One part of this restructuring was South Africa's commitment to liberalization at the WTO, enshrined in the Agreement on Basic Telecommunications (ABT) in 1997. As one of only five African countries to make an accepted offer to the ABT, South Africa committed itself to the liberalization of its basic telecommunications sector by 2002. South Africa has already started to liberalize its cellular market, with MTN competing with the state-owned cellular operator Vodacom. A third cellular operator, Cell-C, was recently licensed. There is some speculation that South Africa will begin its foray into competition in fixed line telephony through internal competition from parastatals (e.g. Transtel, Eskom, Denel), which may collaborate to form one competitor to Telkom. The thrust of the restructuring efforts in the sector included a clear recognition that the objectives of universal access and providing basic telephony to redress the socio-economic ills created by apartheid had to be a major part of the strategy.

In addition to private access points, such as personal computers in the home, school or office, South Africa, like many developing countries, has also focused on the potential of public computing (e.g. telecentres and multi-purpose community information centres) to meet these universal access goals. These telecentres have been emerging in various guises in South Africa, ranging from those that are fully owned and operated by the private sector to those initiated and maintained by the government, particularly through its Universal Service Agency (USA). It is estimated that nearly 500 such centres are in existence (in various states of development) in South Africa at the moment (*CommUnity SA* 2001). In addition to these community information centres, the South African Post Office has initiated a programme called public internet terminals (PITs) to contribute to its universal access goals.

The Department of Communications estimates that South Africa is close to meeting its universal access goals. Universal access is seen as an interim step on the path to more widespread, nearly ubiquitous access, known as universal service. The Department of Communications suggests that 'it is likely that today around 90 per cent of South African households are within 30 minutes walk of a telephone they can use'.[8] Statistics South Africa's 'Household Survey' for 1999 shows that the vast majority (70.7 per cent) of all South African households are within a 15-minute walk of a telephone.[9] This figure is up from 66 per cent in 1998. Under the terms of its 1997 license agreement, Telkom is expected to roll out an additional 2 million lines to rural areas, and to meet significant universal access/service targets. All of the cellular operators are expected to

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8 Mike Jensen's http://www2.sn.apc.org/africa/countdet.CFM?countries__ISO_Code=ZA

9 Statistics South Africa, 'Household Survey, 1999'

make contributions to universal access as well. Table 7 illustrates these universal access figures.

Table 7
Universal service indicators for South Africa

	Measure		Racial/ethnic breakdown				
Goal (definition)	1998	1999	All	African	Coloured	Indian	White
Universal service							
Households with fixed or cellular phone, %		34	34	20	51	83	89
Universal access							
60 Min walk	87.4	90.2	90	87	98	100	100
30 Min walk	79.7	83.1	83	78	96	100	100
15 Min walk	66.0	70.7	71	60	90	99	99

Source: Synthesized from Jensen (2001)

Table 8
Key principles driving the South African e-commerce policy process

Quality of life	To improve the quality of life of people through the optimal use and the exploitation of electronic commerce, thus ensuring socio-economic development and facilitating equitable development.
International benchmarking	To ensure international consistency, alignment and harmonization. South Africa needs to be in line with international treaties and develop an e-commerce policy that is based on international trends and benchmarks while taking cognizance of South Africa's special requirements.
Consultative process	To be consultative, transparent and to balance the interests of the broader spectrum of stakeholder through the solicitation of the public to participate in the deliberations.
Flexibility	To be flexible in establishing rules and regulations for governance. The introduction of new measures and elements into law will take place within the relevant branches of law.
Technology neutrality	To cause the proposed legal framework to be technology neutral.
Private-sector led	Where possible, the e-commerce policy should support private-sector led initiatives.
Promoting public-private sector partnerships	To establish public/private partnerships that will promote and encourage the development and use of electronic commerce. The private sector will remain a critical driving force in the effort to optimize the potential of e-commerce.
Supporting SMMEs in the information sector	To facilitate the promotion and development of SMMEs and the informal sector, and contribute to their speedy adaptation of e-commerce.

Source: Compiled from the Department of Communications (2000)

In 1998, the South African Ministry of Communications launched an extensive policy formulation process on electronic commerce. The starting point for these discussions was a discussion paper on e-commerce and included a wide range of public and stakeholder consultations. A major component of this policy initiative was a green/white paper process. The 'green paper' phase of the process is designed to raise important questions, posed both to experts, and to users of e-commerce. This process is expected to involve the perspectives of all in South Africa, including the 'previously

marginalized majority of our people'.[10] The 'white paper' phase will explain the draft government policy on e-commerce. As the lead agency in this policy process, the Department of Communications, sees this process as part of a strategy to make South Africa a knowledge-based society and help create an information economy.[11] The key principles driving the e-commerce policy process in South Africa are illustrated in Table 8.

4.3 People

Information and communications technologies and a policy framework are indeed critical to South Africa's ability to harness the digital economy. However, without human capacity—people—to build and use the applications those technologies and policies will be for naught. What is the existing and planned human capacity for the ICT sector in South Africa? What are current income and employment distributions in South Africa and what impact has the transition to the digital economy had on these distributions? To what degree are employees and civil society organized in response to the new economy and what has been their influence on the digital economy to date? This section will review the impact of the people of South Africa on its potential to harness the digital economy.

4.3.1 Human capacity and skills shortage

Perhaps one of the greatest challenges for South Africa's ability to harness the digital economy comes in the form of human capacity. There is a severe shortage of persons with the skills necessary for growth in the economy in general, and in the ICT industry in particular (*HSRC Telecommunications Study* 1998). This shortage is seen as a result of the apartheid policies as well as a continued lack of coordination 'between the education system and the labour market' (SAITIS Baseline Studies 2000). The SATIS study also argues that this problem is 'exacerbated by the shortage of blacks qualified in the field of study relevant to IT' (ibid).

The shortage of relevant skills is further aggravated by the widespread emigration of skilled South Africans to countries such as the United Kingdom, United States, Australia, Canada, and New Zealand, which accounts for 75 per cent of South African emigration (SAITIS Baseline Studies 2000). Table 9 highlights the level of 'brain drain' occurring in South Africa.

Interestingly, even these dismal figures are contested as not illustrating the full extent of the problem. Economists Hodge, Meyer, and Brown (1999) argue that these 'official' data are incorrect, and significantly undercount South African emigration. Using a methodology that examines official immigration data from the five most likely targets of South African emigration (listed above), they argue that the actual emigration out of South Africa is perhaps 3.2 times higher than the official statistics for the period 1989-97. For example, their study shows that a total of 41,396 professionals (compared to official data of 12,949) and 233,609 in total (compared with 82,811) persons

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10 Available at www.ecomm-debate.co.za.: 8

11 Available at http://docweb.pwv.gov.za/index.html

emigrated from South Africa during this period (Hodge, Meyer, and Brown 1999). Further, most of these emigrants are amongst the most highly educated in South Africa, with 77 per cent having a tertiary education (SAITIS Baseline Studies 2000). A 1999 *ITWeb Survey* indicated that, 'the brain drain is likely to worsen with 48 per cent of the respondents indicating that they are likely or very likely to leave the country within the next two years; 40 per cent indicating that they have no intention of leaving; and 12 per cent undecided' (SAITIS Baseline Studies 2000).

Table 9
Official migration statistics for South African professionals, 1997

Occupation	Emigration	Immigration	Net migration
Engineers	428	99	-329
Medical practitioners	73	45	-28
Medical specialists	26	4	-22
Dental professions	58	2	-56
Education, and related	353	125	-228
Accountants, and related	277	27	-250
Managerial	885	357	-528
Artisans	371	111	-260
Other	962	305	-657
Total	3,433	1,975	-2,358

Source: Adapted from SAITIS Baseline Studies (2000); Statistics SA (1997)

4.3.2 Income inequality and poverty

South Africa has an estimated population of over 43 million, and an annual growth rate of 0.5 per cent. This figure explicitly takes into account the 'effects of excess mortality due to AIDS,' which can result in lower life expectancy, higher infant mortality and death rates, lower population and growth rates, and changes in the distribution of population by age and sex than would otherwise be expected.[12] The country's population is relatively young, with over 32 per cent of its citizens being less than 14 years old. Ethnic distribution for the country is as follows: (i) black, 75.2 per cent; (ii) white, 13.6 per cent; (iii) coloured, 8.6 per cent; and (iv) Indian, 2.6 per cent. The country has an unemployment rate of 30 per cent (which is even higher for its young people, closer to 40 per cent). Table 10 illustrates some of these key demographic data.

One of the most tenacious aspects of the racialized history in South Africa discussed above, is the continued disparity in economic power between blacks and whites. 'A wealthy country by continental standards, South Africa is also one of the most unequal societies on earth. By the World Bank's calculations, the poorest 40 per cent of its citizens earn less than 4 per cent of the income circulating in the economy. The wealthiest 10 per cent pocket more than 51 per cent' (Marais 2000: 106). As another measure of inequality in the economy, South Africa has a Gini coefficient of 0.68 worse than that of the Bahamas, Brazil or Jamaica (and 33 other developing countries), according to a study on income patterns by the HSRC and University of Natal

12 Available at http://www.cia.gov/cia/publications/factbook/geos/sf.html#People

economists. This intense concentration of capital has had tremendous distortionary effects on the growth and development of nearly all aspects of the South Africa economy, including its information and communications technology infrastructure. These disparities have forced the new democratic government in South Africa to expend a tremendous amount of energy and resources developing approaches that will attempt to redress these disparities.

This situation is likely to affect not only the country's social and political stability, but also the development path it follows: countries with less equal distributions of income and wealth tend not to grow as rapidly as those with more equitable distributions. 'Further, there is evidence that countries starting off with significant inequality experience lower growth rates than others because lack of access to physical, financial and human assets constrains poor people from participating effectively and efficiently in the economy' (May 1998).

In an influential study, Whiteford and Van Seventer (1999) explored in detail the income disparities within South Africa. The researchers found that 'the rich continue to become richer while the poorest members of the community, found mainly in the black community, become even poorer. The income of the poorest 40 per cent of black households was 20 per cent lower in 1996 than in 1991'. One of the most important groups to benefit from this growth is the black elite. Whiteford and Van Seventer (1999) show that the only blacks to benefit from the transition to democracy in South Africa, is the elite top ten per cent. The economic condition of most of the remaining black community worsened during this same period.

Employment creation is a very high priority for the South African government. However, the challenge is not just to create any jobs, but to create better employment for people, and jobs that are sustainable within the context of globalization and the development of a digital economy. In South Africa, 'the growth of the IT industry will depend on its ability to stimulate the growth of a vibrant black economic empowerment (BEE) sector' (*SATIS Baseline Studies* 2000). In 1998, 'there were about 70 black majority-owned IT companies, and 65 black investment consortia investing in the IT sector' (Forge Ahead BMI-T 1998).

Table 10
Demographic data on South Africa

Characteristic	Measure		Distribution/comments	
			Males	Females
Age structure	0-14 years	(32.46%)	7,094,756	6,999,009
	15-64 years	(62.76%)	13,111,457	14,139,372
	65 years and over	(4.78%)	782,397	1,294,030
Life expectancy at birth	Total population	(51.1 years)	50.41 years	51.81 years

Source: *CIA World Factbook* (2000)

4.4 Strategy

This section addresses the final component of our analytical framework—strategy. In section 4.2 above, we described the policy objectives and initiatives of the South African government relevant to the underlying information and communications infrastructure and their attempts to harness the digital economy and to create an 'information community' in South Africa. What is the dominant strategy in South Africa, at national, regional, and global levels, for confronting the challenges and harnessing the opportunities of globalization and the digital economy? To what degree have developments in the global political economy and world-system had an impact on South Africa's ability to harness the digital economy? This section will evaluate the strategic nature of these initiatives within a global context (taking into consideration global trends, institutions, and South Africa's international commitments).

4.4.1 The importance of strategy: Local, national, regional, and global

The transition to a global information-oriented economy has created new challenges for global governance and regulation of these processes. The international regime that is currently being replaced, the international telecommunications regime, was based primarily on one intergovernmental organization, the ITU. However, the norms, principles, and values of the emergent information regime are being promoted, debated, contested, and will ultimately be enforced by a range of global organizations, both intergovernmental and non-governmental (Cogburn, forthcoming).

At the centre of this new regime's enforcement structure is the WTO, supported by the ITU and various specialized international and regional organizations, such as the World Intellectual Property Organization (WIPO), the Organization for Economic Cooperation and Development (OECD), International Labour Organization (ILO), International Organization for Standards (ISO), the Internet Corporation for Assigned Names and Numbers (ICANN), United Nations Education, Scientific and Cultural Organization (UNESCO), United Nations Conference on Trade and Development (UNCTAD) and the World Bank. In addition, several national governments and regional governmental groupings have taken important steps towards influencing the emerging regime, such as the Group of Eight Industrialized Nations (G8), European Commission (EC), Government of the United States of America (USG), and the Asia Pacific Economic Cooperation (APEC). Each of these organizations will play a specific and important role in providing governance to the international regime for global electronic commerce and the information society. South Africa has been involved in each of these organizations and has formulated its strategies under their influence. The borderless nature of this global economy raises fundamental questions about how we might be able to achieve higher levels of harmony and reduced transaction costs as electronic commerce continues to develop.

The South African strategy has been to try and address the concerns raised by the digital divide and the emergence of the information society at local, national, regional and global levels. At local levels, it has attempted to stimulate the development of SMMEs and to promote skills development and investment. At a national level, it has engaged in a series of high-level consultative policy processes ranging from telecommunications to e-commerce.

At regional levels, South Africa has attempted to share its lessons learned with its neighbours, both near and far. At the SADC level (Southern African Development Community), South Africa has helped to create a regional body of telecommunications regulators called TRASA (Telecommunications Regulatory Association of Southern Africa). Within TRASA, South Africa has helped to promote the concept of using its telecommunications policy as a sort of 'model law' for the sub-region. A number of countries have looked to South Africa for guidance in establishing independent regulatory bodies, and for other aspects of its information and communications strategy. Further abroad, South Africa has played an important role in the major African regional initiatives, such as the *African Information Society Initiative* (AISI) developed and led by the United Nations Economic Commission for Africa (ECA) and the *African Connection* led by the African Ministers of Communication and supported by the World Bank. Further, since 1997, South Africa has attempted to use the quadrennial Africa Telecom conferences as another organizing point for the Africa regional leadership in the digital economy.

Within the global context, South Africa took a leadership role, hosting the G7/Developing World *Information Society and Development* (ISAD) Conference in 1996. This historic conference brought together the G7 countries with a cross-section of the developing world to jointly discuss strategies and collaboration in the movement to build a global information society (Cogburn 1997). Further, South Africa has been represented in nearly all of the major international conferences and forums addressing these issues, including the Global Information Infrastructure Commission (GIIC), Global Knowledge for Development (GKD), ITU World Telecommunications Development Conference (WTDC), and the Internet Corporate for Assigned Names and Numbers (ICANN).

While there have been problems with this strategy, on occasion, South Africa's presence has always been noted. Often, South Africa has been thrust into a leadership role at international conference and sometimes asked to 'represent' the interests and perspective of the developing world.

5 Conclusions

The Republic of South Africa has made significant strides towards embracing the digital economy and the prospects for its development in the country are good (the recent downturn in the global technology markets and the so-called 'dot.bomb' implosion in the global e-commerce sectors notwithstanding). A key element in this generally positive outlook is the country's high level of investment in information and communications technologies and infrastructure. These efforts illustrate the government's desire to see South Africa play a more leading role in the global information economy. In each of our four primary areas of analysis—technology, policy, people and strategies—South Africa has had a significant level of activity, and has tried to influence developments at local, national, regional, and global levels (with varying degrees of success).

However, while there has been a high level of investment, there is still an insufficient level of information and communications infrastructure in rural and peri-urban areas, and within most black communities. This disparity of access to information

infrastructure remains a barrier to growth of the digital economy in South Africa. These access issues are being addressed to a large degree through the use of multi-purpose community information centres, public internet terminals, and other approaches to public computing. However, the existing monopoly in telecommunications is still seen as a factor hindering the growth and development of the sector. Further, the lack of competition keeps prices artificially high, and combined with the metered tariff structure makes it exceedingly costly for SMMEs and consumers to fully utilize the existing information and communications infrastructure.

Awareness of the importance of the digital economy is growing, but current human resources and development strategies are insufficient to meet human capital requirements. The South African government has done an admirable job of raising awareness about the importance of the e-commerce and the digital economy, and to encourage public participation in the policy formulation processes. By hosting numerous high-level conferences about these issues, the South African government has been able to enhance the perception that the knowledge and information society are real, and that South Africa is going to be a participant. Tremendous credit should go to the Department of Communications, and its sometimes controversial, Director General Andile Ncgaba. The DoC has developed a mission that takes aim squarely at the development of an information society in South Africa. It has led in many of these international conferences, and has engaged in the tremendous effort to formulate a policy environment for South Africa that is of growth for all its citizens in a global digital economy.

South Africa's role as a leading African and developing world economy places additional burdens on its need to engage in regional, and global policy formulation activities in support of the emergence of a new regime for global e-commerce that is not overly hostile to the strategic goals of the developing world.

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UNU World Institute for Development Economics Research (UNU/WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

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