

**THE DIGITAL REVOLUTION IN KENYA: A STRATEGY FOR ACCESS
TO MARKETS IN THE TOURIST AND AIRTRAVEL SECTOR**

RESEARCH PAPER

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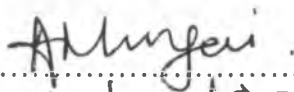


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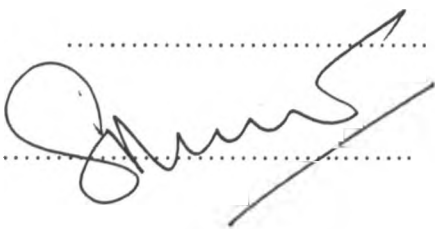
DECLARATION

This is my original work and has been submitted to the Department of Economics in partial fulfillment for the award of MA in Economic Policy Management.

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This project has been submitted with my approval as the project supervisor, Department of Economics, Nairobi University

- 1. Dr Ommeh
- 2. Dr Nyandemo 

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ABSTRACT

This research paper presents an analysis of the role of information communication technologies (ICTs) on market access to the Tourism and Air travel sub- sector in Kenya. It also provides an inter-country comparison in ICT penetration, between Kenya and its trade competitors in the Tourism Industry, South Africa and Tunisia.

Time series data covering ten years was collected from local and international sources, namely the Kenya Bureau of Statistics data, United Nations Internet Database , World Tourist Organization Database and the International Telecommunication (ITU) Union Database.

It is shown that digitally advanced tourist destinations, such as South Africa and Tunisia, have better access to the global tourism market than Kenya which is less advanced in digital technology.

It is also shown that ICT development in Kenya has a significant statistical effect on Air passenger arrivals in Kenya. Since air travel is closely related to tourism, this implies that ICTs can open up the international travel market, thereby providing a strong potential for tourist market access.

Finally, air passenger arrivals, which make the country more open to foreign technology transfer and stock of human capital are significant indicators in ICT development.

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Abbreviations

AVU	African Virtual University
AGOA	African Growth and Opportunities Act
B2B	Business to Business
CCK	Communication Commission of Kenya
B2C	Business to Consumer
G-8	Group of Eight
GDP	Gross Domestic Product
GSM	Global System for Mobile Communications
IBRD	International Bank of Reconstruction and Development
ICT	Information and Communication Technologies
IT	Information Technology
II	Information Infrastructure
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunication Union
MIS	Management Information System
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organization
NPV	Net Present Value
OECD	Organization for Economic Co-Operation and Development
OECS	Organization of Eastern Caribbean States
PRSP	Poverty Reduction Strategy Policy
PSD	Private Sector Development
SME	Small and Medium Enterprise
UNDP	United Nations Development Program
VSAT	Very Small Aperture Terminal
WB	World Bank
WTO	World Trade Organization

Chapter 1 Introduction

1.1.0 Introduction

The world is in the midst of an all-purpose technological revolution based on information communication technology, defined here as computers, computer software and telecommunications equipment. Information infrastructure refers to the physical facilities, services and management that support all computing resources in a nation. This includes computer hardware, networks and communication facilities.

It is argued that the history of mankind could be written around the introduction of new technology. Any society not ready to integrate new technology risks to be even more excluded and widen the gap even further. (Pyramid Research 2000).

Access to information networks is one of the features of being competitive and has direct impact not only on market access but the quality of service delivery. ICT can make the delivery of these services easier. More generally, they can create new opportunities to expand the reach, availability and impact of information and knowledge for the development of local communities.

The market efficiency gap refers to the difference between the level of service penetration that can be reached under current plans and conditions, and the level that one would expect under optimal market conditions.

The access gap denotes a situation where the gap between urban and rural areas continue to exist since the rural proportion of the population (which is large in Kenya), cannot afford the market prices at which the services are offered.

Kenya's communication sector is currently underdeveloped with the area of coverage by technological infrastructure being small, with low efficiency levels and high service costs. The current scenario does not guarantee universal access, both in terms of policy and available infrastructure.

1.1.2 Overview of Telecommunication Development in Kenya

Telecommunication is one of the strategic services in the country, due to its role in servicing all other sectors of the economy. By the mid 1990's the country possessed about 60 automatic telephone exchanges and 256 manual exchanges spread in various parts of the country.¹

The Communication Commission of Kenya (CCK) is the regulator of telecommunication services in the country. Licensing of foreign suppliers is restricted through a requirement to partner with local firms, with foreign firms holding a maximum shareholding of 40%. Provision of basic telecommunication services is also restricted, with suppliers required to supply services through a public switched network. Thus Internet services are only supplied through the Telecom (K) Ltd. Network, which enjoys five-year exclusive rights in the provision of this service.

Internet services

Both Internet and mobile telephone service are relatively new in Kenya, but have grown at highly impressive rates. By the end of 2000, there were 50 Internet service providers. CCK is responsible for issuing licenses to Internet service providers, with a limited foreign equity ownership of 40%.

Internet service providers face a number of regulatory constraints with regard to the expansion of their infrastructure. They are neither allowed to build their networks or to own or lease their own international data gateways.

Mobile Telephone Services

Currently there are two mobile phone service providers, Kencell and Safaricom. Both operate as joint ventures with a 40% foreign equity ownership. Full private ownership is allowed, but only for local firms. Safaricom was the first firm to be allowed to operate as a mobile phone service provider in Kenya in 1996. It was initially 100% owned by Telecom Kenya. In 1999, it was joined by Vodafone (UK) with a 40% shareholding, and introduced the GSM technology.

¹ G.K. Ikiara and S.M Nyandemo Kenya's Service sector: Emerging National, Regional and Global issues, University of Nairobi, November 2002

Kencell Ltd was licensed in 2000 to become the second mobile telephone service provider. This is a joint venture between the Kenya Sameer Group (60%) and Vivendi of France (40%). Kencell's entry has significantly changed the market in terms of the number of people connected and a drastic fall in the connection fee. By October 2002, there were about 1.2 million subscribers in various parts of the country, with each of the two subscribers supplying about 600,000 subscribers.

The entry of Kencell as a second operator introduced sufficient competition that led to a major decline in the cost of mobile phone services from over Ksh 250,000 to Ksh 5000 for the purchase of a handset and connection fees. The current number of operators is currently restricted to two for at least five years, however there is increased pressure for more reforms in the provision of mobile phone services.

1.1.3 Overview of Kenya's tourism sector.

Tourism plays a leading role in Kenya's economy in general and in external trade for the last four decades.² It is the country's single most important export and currently the top foreign exchange earning export, having surpassed tea and coffee. By 2000 the sector was earning about Ksh 2 billion in foreign exchange.

Kenya's share of world tourism rose from 0.17% in 1985 to 0.19% in 1990, while her share in African Tourism rose from 4.7 % to 5% over the same period, making Kenya the 5th most important tourist destination in Africa behind South Africa, Morocco, Tunisia and Mauritius by the end of 1999.(Ikiara and Nyandemo 2002)

Tourist services provided in this country include car hire services, tour firm operations, hotels and lodges, game viewing and cultural activities. Kenya's tourism is heavily dependant on Europe with an about 60% of tourists coming from this region.. In 1980, 62.6% of tourist flow came from Europe, rising to and 64% in 2000.

Transport and tourism have remained Kenya's leading sub-sectors. The country's top three service exports were travel (tourism), transport and telecommunication services. Foreign travel

² Ikiara G. and Nyandemo S. (2002) Kenya's Service Sector: Emerging National, Regional and Global Issues, University of Nairobi

or tourism enjoys the largest net trade surplus, followed by telecommunication services (WTO 1999)

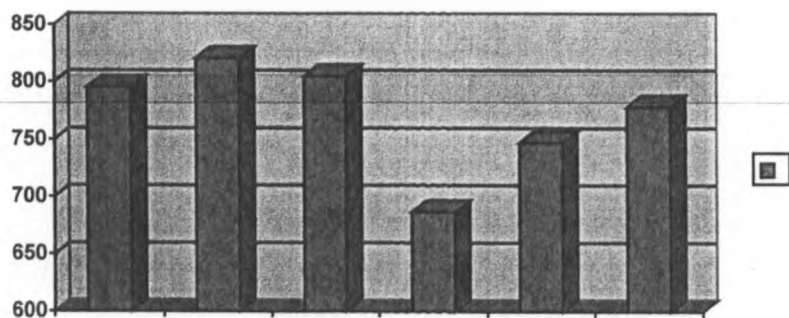
Table 1 KENYA'S TOURISM BASIC PERFORMANCE INDICATORS 1995-2000

VISITS TO KENYA	1995	1996	1977	1998	1999	2000
For holiday '000	795.7	820.8	804.8	686.9	746.9	778.2
All visitors (holiday, business, transit	973.6	1002.9	1000.6	894.3	969.3	1036.5
Average length of stay(days)	15.2	11.8	11.8	9.6	9.4	8.7
Hotel bed occupancy rate (%)	43.1	45	51	35.3	33.9	39.3
Visitors to national parks and game						
Reserves (000)	1527.5	1530.1	1403	1073.2	1533.1	1644.9
Visitors to museums, snake parks and						
Historical sites	842.5	758.8	588.1	494.2	573.1	585.1
Conference tourism occupancy rate (%)	34.4	6.6	0.8	7.1	10.7	9.3
Hotel bed nights by Kenyan residents	689.3	782.6	776.8	696.9	656.8	794.1

Source: Economic Survey 2003, Kenya Bureau of Statistics

From table 1 it can be seen that tourist growth in the international and domestic front has been in decline from 1997 due to a combination of factors, namely, insecurity, poor infrastructure and adverse global economic conditions. Following the disruption of tourism in various parts of the country due to insecurity caused by tribal clashes of 1991 to 1992 and later, 1997, the share of tourism earnings total exports went through a prolonged slump. However prospects for tourism growth remains high as evidenced by the positive trend in 2000.

Fig. 1 Tourist arrivals from 1995-2000



1.1.4 Air Transport

Kenya's air transport facilities are relatively well developed in the region. The country has four international airports at Nairobi, Mombasa, Eldoret and Wilson Airports. The first three has capacity to handle large aircraft while the fourth handles small aircraft for both regional and domestic flights. Jomo Kenyatta airport in Nairobi has gradually enhanced its status as an air transport hub, with more than 15 commercial airlines have their regional offices in Nairobi and another 30 operating regular flights in the country.

Rapid growth of the Kenya Airways airline in the last decade has been one of the factors behind the revitalization of the country's air transport.³ The privatization of the airline and the merger with the Dutch airline KLM, is generally credited for the impressive performance of Kenya Airways which has made the airline the fastest growing airline in the region

³ Ikiara G and Nyandemo S. (November 2002) Kenya's Service Sector: Emerging National, Regional and Global Issues University of Nairobi

**TABLE 2 AIR PASSENGER ARRIVALS AT THE JOMO KENYATTA
AND MOI INTERNATIONAL AIRPORT ('000)**

Year	Arrivals	Departures	In transit	Total
1995	1104.8	1186.4	383.5	2674.7
1996	1137.2	1158	395.8	2691
1997	1259.6	1275.1	300.5	2835.2
1998	1312	1306.4	256	2874.4
1999	1664.4	1628.8	264.5	3557.7
2000	1848.4	1841.2	300.2	3989.8

Source: Economic Survey (various issues) Kenya Bureau of Statistics

Between 1995 and 2000, total commercial passenger traffic handled at Nairobi and Mombasa airports rose by almost 49% from 2.6 million in 1995 to 3.9 million in 2000. (Table 2) Other indicators showing the impressive growth in air transport include the growth in cargo handled at the two airports, as well as foreign exchange earnings and employment generated in the air transport sub-sector.

1.2.0 Statement of the problem

The rapid progress in ICT and its impacts on the global economy have intensified in the recent years leading to a new economic system that has attracted a great deal of interest. It has also raised debate on the extent of ICT diffusion and the economic opportunities and challenges imposed by ICT on the developing world.

Studies have shown that lack of knowledge is a major factor behind stagnation and economic growth in Africa (World Bank Report 2002). A developing country such as Kenya risks further exclusion because of the dangers posed by lack of access to ICTs, especially in the rural areas.

Computer illiteracy also prevents Kenyans from taking advantage of the increased globalization of trade, investment and the exchange of services. For example:

- Kenya will not experience the possible dynamo for growth and job creation that ICTs could deliver.
- Industries in Kenya risk being excluded from the new value chain and may be dramatically excluded from the increased global competition.
- New international capital will go to countries with the necessary facilities to support the modern economy

Rapid growth of the Internet in Kenya is being constrained by inadequate and inefficient telephone networks. Information technology infrastructure also relies on the widespread use of electricity as the medium for the transmission of information, which is limited in supply, especially in the rural areas.

Telephone costs are high in Kenya, since the telecommunication industry is highly regulated. Lack of a competitive ICT environment has created upward pressure on fixed and cellular telephone charges.

Kenya's tourism sector faces many challenges in the form of rising insecurity, declining competitiveness due to poor infrastructure and increasing regional and global competition. Tourist sector growth has faced several constraints including negative publicity regarding terrorist threats, rising environmental degradation and inadequate marketing of Kenya's tourist facilities.

Financial constraints in the marketing of tourist resorts have caused Kenya to concentrate on traditional tourism markets. Of the 744,000 tourists who came to Kenya last year, 593,000 were from Europe, 52,000 from North America and 33,500 from Asia. (Economic Survey 2003)

The aim of this study is two-fold, to assess the extent of the ICT investment in Kenya and address information strategies to enhance tourist sector market access.

1.3.0 Objectives of the study

The specific objectives are:

- To evaluate the inter-country variations in access to digital technology between Kenya, South Africa and Tunisia, key competitors in the tourist market.
- To examine the contribution of digital technology growth in Kenya on access to tourist and travel markets.
- To assess the determinants of ICT growth in Kenya

1.4.0 Hypotheses

The following hypotheses will be made:

- 1.4.1 Digitally advanced tourist destinations in Africa have a greater market share in tourism.
- 1.4.2 ICT penetration in Kenya significantly contributes to tourism and air travel market growth.
- 1.4.3 ICT penetration in Kenya is determined by per capita income, stock of human capital, openness of the economy and electrical infrastructure.

1.5.0 Significance of the study

In recent years there has been criticism of the role of ICT in development policy. Why promote information technologies when developing countries are struggling to provide food, clean water, education and healthcare?⁴

There is little doubt that information communication technology is a key policy consideration for an economy since it is considered an enabler or supporter of strategic development actions. The global economy is undergoing a profound shift towards a networked and knowledge-based economy, a process that Kenya needs to be part of. Otherwise the existing gap may be widened.

As with other development challenges the responsibility of sustained tourism development belongs to Kenya itself. This study aims to provide more efficient and affordable solutions to tackle a number of problems in Kenya's tourism and travel market.

⁴ Erkki Liikanen (2002) The Courier ACP-EU

A comprehensive review of strategic ICT policy on Tourist and travel sector development in Kenya is lacking, hence this paper will add to the existing literature. The study will also contribute to the field of Economic research.

Lastly, from the study, we will make possible recommendations and address strategic economic policy decisions that are crucial to the capacity of a region to exploit IT for trade development objectives.

Chapter 2 Literature review

2.1.0 Evolution of information systems

The first computers were designed to compute formulas for scientific and military application, during and immediately after World War II (Tubman 1996).⁵ The first applications involved large volume transacting computers, which processed large volumes of numbers and organized data.

In addition to the growth of cheaper, better and friendlier technology in the 1990's, people became more computer literate and the cost of computing decreased. In the early 1970's computers were used for Airline systems. At about the same time computers were introduced to manufacturing environments.

The microcomputer evolution in 1980 changed the situation. Desktop computers began the beginning of end-user computing. Managers, analysts and many other professionals began operating their own computer systems and computers became more affordable.

2.1.1 The Information Technology Revolution

The world is in the midst of an all-purpose technological revolution based on information technology. Previous studies have shown that the effects of such revolutions have generally occurred in three main stages. First, technological change raises productivity growth in the innovating sector; second, falling prices encourage capital deepening, a result of increased IT investment due to falling prices of existing IT products; and finally, there can be significant reorganization of production around the capital goods leading to higher productivity (IMF 2001)

Prospects for the information technology revolution remain high. There is already microeconomic evidence of productivity gains associated with the invention of new processes, procedures and organizational structures (Brynjolfsson and Hitt, 2000).

⁵ Tubman, Mclean and Wetherbe, Information Technology for Management, John Wiley and Sons 1996

Micro-economic evidence suggests that IT is likely to affect not only the organization of workplaces, but, by reducing communication costs, IT has the potential to raise international trade, reduce domestic market bias, boost cross-border financial flows and facilitate technology transfer. (Portes and Ray 1999)

The rate of diffusion of IT to developing countries such as Kenya has been rapid compared to earlier all purpose technologies. Just 10 years after the 'start' of the IT revolution, developing countries already had about 10% share of Internet subscribers in 2000. (ITU Statistical Yearbook 1999)

What explains the patterns of diffusion of new technologies? According to a recent analysis, several important factors have been pointed out (Dasgupta, Lall and Wheeler, 2001), countries with relatively high growth rates, greater urbanization and a superior economic policy environment have expanded their use of cell phones and internet connections at a faster pace than others. Once these factors are controlled for, those with low usage have caught up. Other studies, such as those by Caselli and Coleman (2001) and Lee (2000), reinforce these findings. High levels of human capital are strongly correlated with the rate of adoption of information technology.

Since the new technology is typically embodied in new equipment, high investment rates speed up adoption. Therefore, a policy regime that is open to imports and foreign investments raises the likelihood of opening up global markets through information communication technologies.

Strong growth and effective policies raise the rate of IT adoption, which, in turn, has long-term beneficial growth effects; this implies the likelihood of a 'virtuous circle', with growth, policies, urbanization, education, trade and information technology reinforcing each other. People on the margins of domestic and international markets can be brought into the mainstreams through the provision of better information and the reduction of transport costs.

Despite the many specific examples of IT benefits in developing countries, the aggregate impact has thus far been limited (Pohjola 2000). This in part reflects some fundamental constraints,

including the lack of complimentary human capital, telecommunication sectors that are not yet sufficiently responsive, and policy or organizational rigidities.

2.1.2 Declining Costs

Low cost wireless solutions are now available to urban and rural areas of Kenya. Advantages of wireless systems over traditional wired solutions is that they can be relatively easy to deploy, avoiding the complex problems of laying cables, and managing them properly (Sabater,Dymond and Juntunen 2002).

Satellite systems, particularly very small aperture terminals (VSATs) are now reaching more remote areas. Investment in VSAT technology is affordable, with the cost of the equipment ranging as low as \$3000 to \$4000 (Sabater et al 2002).

2.1.3 The Tourism Industry

Tourism is one of the world's largest and fastest growing industries (Brandon 1993:33). Travel and tourism are said to have generated 5.9% of the world's GNP in 1990, equivalent to US\$ 1.1 trillion⁶. Of this, it is estimated that 62.5bn went to developing countries. It is claimed that tourism is the only industry in the world that alters a 'North-South' flow of wealth from industrialized to developing countries. Unlike the trade of commodities that incur transport costs, tourists bear their own travel costs. The tourism industry is not subject to protectionist barriers frequently imposed by developed countries (Brandon K. Bellagio 1993)

2.1.4 Constraints to Competitiveness and Market Access

According to Ikiara and Nyandemo (2002) inadequate telecommunication services, poor infrastructure, inadequate public sector support, lack of financial support and negative image of Kenya's services from the overseas media have had adverse effects on the demand and competitiveness of professional services in the country.

⁶ Brandon K. Bellagio, Conference on Ecotourism: briefing book, Rockefeller foundation Conference February 1993

Other constraints includes low capacity for regional and international networking, leading to insufficient access to essential market information, a weak base in information technology, an adverse macro-economic environment and insecurity concerns, which have a negative impact on fair competition in the tourism industry.

Competition in tourism is strong. Over-construction of beach hotels in Mombasa has created a downward pressure on prices. Yet despite the low prices, ethnic clashes in 1995 and terrorist strikes in August 1988 and November 2002 caused European tour operators to withdraw from the market. Travel advisories imposed against non-essential travel to Kenya in May by the United States and UK, have further compounded the problem.

2.1.5 Prospects for tourism and travel growth through e-commerce

Electronic commerce has further increased competition between tourist destinations. According to Tourism Talk (1998),⁷ many of the vast and growing numbers of Internet users are also tourists. Industry sources suggest that travel and tourism rates second only to computer related sales in e-commerce. The World Wide Web sites are increasingly providing:

- Availability of on-line 'virtual reality' previews of a variety of destinations, hotel facilities, costs and related services to tourists.
- Greater information about current prices and frequency of travel services to different tourist destinations.

Therefore, destinations that can convince tourists on-line that their product provides the best quality within a specific price range have a competitive edge over destinations that are not yet on-line. Similarly, the prices of packages offered by rival tour operators are becoming more competitive as consumers' knowledge improves through the internet.

On-line Travel Reservations

According to studies⁸, the Internet is progressively making scheduled airline reservations systems more efficient. Currently global distribution systems (GDS) can check airline availability and make bookings on behalf of customers. New software has made the system more

⁷ Thornton, G and Feinstein K, Tourism Talk, Southern Afric , September 1998

⁸ Christie I. And Crompton D.(July 2002) Tourism in Africa, World Bank Africa Region, Working Paper series No 12

efficient, user friendly for tour agents and opened up direct access to customers and diversified the range of products offered to include cruise ship, car-rental, and even railway travel services.

To expel assumption that e-commerce is not viable in developing countries, UNCTAD (2001)⁹ conducted a survey of ten nations, Ethiopia, Madagascar, Mozambique, Togo, Uganda and Tanzania. The survey discovered a wealth of opportunities and potential available for enterprises even in the most disadvantaged countries with the least developed ICT infrastructure. A good number of enterprises have been identified as having achieved tangible success in using ICT to achieve their economic goals. This carries thimportant message that the principle of comparative advantage continues to apply in the digital era. Sectors in the LDCs do have a comparative advantage in certain sectors and sub-sectors, ranging from tourism to commodity exports.

2.1.6 Determinants of Tourism Competitiveness

The flow of tourists to a specific destination is to a considerable extent determined by the world wide tourism industry, represented by tour operators, travel agents and transport services in the countries of tourist origin (Christie and Crompton 2002)

The creation of a highly competitive tourist product through the management of natural and built tourist assets is most likely to promote one country over another in the global market place. Security is a strong element in the tourist product, and tourism can decline rapidly if physical security is absent.

Electronic marketing also increases competition between market destinations, as vital on-line information about tour destinations, costs and airline travel is made available to foreign and domestic tourists.

Value of the Tourist Product is critical to the success of a tourist destination. A destination is competitive if it can provide products and services in a way that creates value to the tourist. Local, cultural and natural assets, sustained environmental conservation and a receptive local population, can be the principle elements in creating value of the tourist product.

⁹ UNCTAD's *E-commerce and Development R*

Price of the tourism package. Competition in the tourism industry is driven mainly by price in the tourist's decision to choose one destination over another. A holiday package includes transport as well as lodging and tourist services. The total cost of the package plays a significant role in the selection of a tourist destination for all but the high-income tourist.

Airline pricing. In Eastern and South Africa, airfares on scheduled carriers are said to be among the highest in the world on dollar per km basis. Charter flights offer more economical prices for vacationing tourists, and are usually offered at discounted prices.

Chapter 3 Model specification and Data sources

3.1.1 Measures of ICT

In trying to decipher inter-country variations of access to IT, one is faced with the problem of the appropriate measures of IT to be used. There appears to be a lack of universally accepted measures of IT, for instance, the International Institute for Management Development (IMD), has developed the **World Competitiveness Index** (WCI) which uses IT and other indicators to ascertain the extent to which countries have provided firms with 'an environment that sustains the domestic competitiveness of firms operating within their borders' (Rosslet 2001)¹⁰

Rouvinen (2002) has also constructed a comprehensive E-Competitiveness Index that uses the following four categories of ICT indicators: diffusion and use of information and communication technology, provision of ICT, human capabilities and organizational capabilities.¹¹

A major problem with some of the existing IT indexes is that they include indicators that cannot be measured objectively. Furthermore, data on many of the indicators are often unavailable for African countries making it difficult to determine the levels of digitalization.

This study will use an ICT index proposed by Steve Onyeiwu, (2002)¹² which computes the inter-country levels of digitalization, namely, penetration of Internet services, computers, fixed, and mobile telephone services.

3.1.2 The model and data collection

The research objectives will be assessed using both descriptive and econometric approaches consistent with the theory available and previous empirical study literature.

Steve Onyeiwu, (2002) proposes the following index for computing the inter-country levels of digitalization:

¹⁰ Rosslet P. Methodology and Principles of Analysis, *The Competitiveness Year Book*, Lausanne: Switzerland International Institute for Management Development 2001

¹¹ Rouvinen, P. *Competitiveness in the New Economy*, Discussion Papers No.786. Helsinki: ETLA (The research institute of the Finnish Economy)

¹² Steve Onyeiwu, *Inter-Country Variations in Digital Technology in Africa, Evidence, Determinants and Policy implications*, Wider Institute of Development Economics Research, Discussion Paper No. 2002/72, 2002

$$\text{ICT Index} = [1/10 (A + B) + 10 (C + D + E)]/50 \quad (1)$$

Where

A = number of Internet hosts per 10,000 of the population

B = Internet users per 10,000 of the population

C = number of personal computers per 100 of the population

D = telephone lines per 100 of the population

E = cellular phones per 100 of the population

The first hypothesis states that: Digitally advanced tourist destinations in Africa have a greater market share in the tourist market. The ICT index will be used as a base for measuring the digital gap between Kenya, South Africa and Tunisia, key competitors in the regional tourist market. It has an upper bound of 100 and a lower bound of zero. A completely digitalized economy would have an IT index of 100, implying that there is an Internet host for every person in the country and also that everyone in the economy owns a personal computer, that there is a telephone line for every person, and also that everyone in the country owns a cellular phone. This is obviously a highly idealized and utopian scenario, but it does provide a useful benchmark for assessing the level of digitalization between Kenya and its trade competitors.

A series of regression equations will be applied to test the second and third hypotheses which state that:

- ICT penetration in Kenya significantly contributes to tourism and air travel market growth.
- ICT penetration in Kenya is determined by per capita income, stock of human capital, openness of the economy and electricity infrastructure.

To estimate the results, the following linear regression models ¹³ are used:

¹³ Gujarati D. *Basic Econometrics*, McGraw-Hill, 1979

Tourist Arrivals = f (ict, gdp per capita, air arrivals)

so:

$$Y_i = \beta_1 + \beta_2 X_{1i} + \beta_3 X_{2i} + \beta_4 X_{3i} + \varepsilon_i \quad (\text{Equation 2})$$

WHERE

Y_i = Tourist Arrivals

X_{1i} = ICT index (equation 1)

X_{2i} = GDP per capita

X_{3i} = Air passenger arrivals

ε_i = Unexplained variations by explanatory variables in the model

Equation (2) can be written as :

$$Y_i = \beta_1 + \sum_{k=3}^k \beta_k X_{k-1} + e_i$$

$i = 1, 2, \dots, N$

Where X_i and Y_i is the independent and dependant variable respectively, combined with N observations in cross- section data .The constant term is β_1 , while e_i is assumed to be a random error with 0 mean and σ^2 variance.

Air passenger Arrivals = f (ict, gdp per capita, tourist arrivals)

so:

$$Y_i = \beta_1 + \beta_2 X_{1i} + \beta_3 X_{2i} + \beta_4 X_{3i} + \varepsilon_i \quad (\text{Equation 3})$$

WHERE

Y_i = Air passenger arrivals

X_{1i} = ICT index (see equation 1)

X_{2i} = GDP per capita

X_{3i} = Tourist arrivals

ε_i = Unexplained variables

Equation (3) can be written as :

$$Y_i = \beta_1 + \sum_{k=3}^k \beta_k X_{k-1} + e_i$$

$i = 1, 2, \dots, N$

Where X_i and Y_i is the independent and dependant variable respectively, combined with N observations in cross- section data .The constant term is β_1 , while e_i is assumed to be a random error with 0 mean and σ^2 variance.

ICT penetration = f (per capita GDP, tourist arrivals, stock of human capital, electricity consumption)

so:

$$Y_i = \beta_1 + \beta_2 X_{1i} + \beta_3 X_{2i} + \beta_4 X_{3i} + \beta_5 X_{4i} + \varepsilon_i \quad (\text{Equation 3})$$

WHERE

Y_i = ICT penetration variable

X_{1i} = GDP per capita

X_{2i} = Air passenger arrivals

X_{3i} = Stock of human capital (high school enrolment)

X_{4i} = Consumption of electricity

ε_i = Unexplained variables in the equation

Equation (3) can be written as :

$$Y_i = \beta_1 + \sum_{k=1}^k \beta_k X_{k-1} + e_i$$

$i = 1, 2, \dots, N$

Where X_i and Y_i is the independent and dependant variable respectively, combined with N observations in cross- section data .The constant term is β_1 , while e_i is assumed to be a random error with 0 mean and σ^2 variance.

The t distribution will be used to test the hypotheses where;

$H_0: \beta_i = 0$

$H_0: \beta_i \neq 0$

3.2.0 Estimation procedure

The ordinary least squares method of regression¹⁴ will be used to estimate the model, because of its fairly, compact, simple, straightforward ability to explain the ICT determinants.

3.3.0 Data type and Sources

Time series secondary data on ICT, tourism and travel market growth will be extracted from Kenya Statistical Surveys, United Nations Statistical Website Database, International Telecommunication Union's Website Database, and economic surveys from the World Bank, World Tourism Organization (WTO) and UNCTAD

3.4.0 Foreseeable limitations

There are certain limitations to the study. On the issue of strategic policy recommendations, the paper will not be conclusive, owing to the dynamism of ICT developments.

3.5.0 Expected results and policy applications

The study results will provide an explanation as to the significance of digital technology on Tourism and travel promotion in Kenya. Further light will be shed on strategic policy choices and initiatives that can be put in place to reduce the digital gap and open up tourist markets in Kenya.

¹⁴ Damodar Gujarati, *Basic Econometrics*, McGraw-Hill, 1979

Chapter 4 Data Analysis

4.1.1 Descriptive data analysis

Table 3 ICT PENETRATION IN KENYA 1995-2002

Year	No. per 10000 People		No. per 100 people			Weighted Sum	IT Index
	Internet Hosts	Internet Users	PC's	Fixed Tel. Lines	Cell Phones		
1995	0	0	0.07	1.01	0	10.8	0.216
1996	0.05	1	0.19	1.03	0	12.305	0.2461
1977	0.16	4	0.28	0.99	0.03	13.516	0.27032
1998	0.24	5.17	0.36	0.99	0.04	14.441	0.28882
2000	0.56	62.21	0.49	1.05	0.42	25.877	0.51754
2001	0.86	159.78	0.56	1.04	1.92	51.264	1.02528
2002	0.93	159.78	0.56	1.03	4.15	73.471	1.46942

Source: United Nations Statistical Division (2003) www.unstats.un.org
(Weighted average and IT index computed by author)

Table 3 shows the numerical values of each of the ICT development indicators in Kenya. This displays the number of internet hosts and internet users per 10000 people, and number of computers, fixed and mobile telephone lines per 100 people in Kenya. Statistics reveal significant and rapid growth in ICT penetration from an index of 0.216 in 1995 to 1.469 in 2002.

4.1.2 Inter country comparison of ICT development

Table 4 shows the numerical values of each of the ICT indicators and the corresponding indexes for 3 African Tourist Destinations, namely Kenya, South Africa and Tunisia. Using the computed ICT indexes, these countries were ranked from the highest index to the lowest (see table 5).

Table 4**ICT INDEX OF SELECTED AFRICAN COUNTRIES 2000-2002**

	<u>No. per 10000 People</u>		<u>No. per 100 people</u>				
	Internet Hosts	Internet Users	PC's	Fixed Tel. Lines	Cell Phones	Weighted Sum	IT Index
KENYA							
2000	0.56	62.21	0.49	1.05	0.42	25.877	0.51754
2001	0.86	159.78	0.56	1.04	1.92	51.264	1.02528
2002	0.93	159.78	0.56	1.03	4.15	73.471	1.46942
SOUTH AFRICA							
2000	42.95	549.38	6.64	11.36	19.09	430.133	8.60266
2001	53.51	648.55	6.96	11.05	24.21	492.406	9.84812
2002	53.51	682.01	7.26	10.77	26.58	519.652	10.39304
TUNISIA							
2001	0.03	260.8	2.29	9.96	1.24	160.983	3.21966
2002	0.12	260.8	2.63	10.89	4.01	201.392	4.02784
2003	0.35	515.03	2.63	12.23	4.01	240.238	4.80476

Source: United Nations Statistical Division (2003) www.unstats.un.org

Table 5**ICT RANKING OF SELECTED AFRICAN COUNTRIES 2000-2002**

	2000	2001	2002
1.SOUTH AFRICA	8.60	9.85	10.39
2.TUNISIA	3.21	4.03	4.80
3.KENYA	0.52	1.03	1.50

It can be observed from table 5 that South Africa ranks first, in digital development, with an index of 10.39 in 2002, followed by Tunisia (4.8), and Kenya (1.50).

A further inter-country analysis is made to compare tourism earnings in each of the three African States, Kenya, South Africa and Tunisia. This will enable us to assess if digitally advanced tourist nations have a greater market share

TABLE 6: RANKING OF TOURIST RECIEPTS IN SELECTED AFRICAN COUNTRIES
(US\$ million)

Country	1995	1998	1999	2000
1. South Africa	2125	2738	2526	-
2. Tunisia	1393	1557	1563	1496
3. Kenya	486	290	304	-

Source: United Nations Statistical Division (2003) www.unstats.un.org

(Ranking done by the author)

The first hypothesis states that digitally advanced tourist destinations in Africa have a greater tourist market share. According to table 6, South Africa is the leader in Tourism earnings, followed by Tunisia and Kenya, which ranks third among the selected tourist destinations. This confirms the above hypothesis that, leading tourist destinations such as South Africa and Tunisia, which are digitally more advanced than Kenya, are more competitive in terms of market access to global tourism.

4.2.0 Analysis of Regression Results

The parameters were derived by regression analysis from equations fitted to 1990-2000 data by OLS. The parameter estimates can be analyzed as follows:

4.2.1 Analysis of tourist Arrivals

The second hypothesis states that ICT penetration in Kenya significantly contributes to tourism market access. Three variables have been estimated, namely, the ICT penetration index, GDP per capita and passenger arrivals by air. The dependant variable is Tourist Arrivals.

Table 7 : Tourist Arrivals in Kenya

Variables	Measure	Coefficients	T values
Constant			-3.325
ICT	ICT index	-1.83544	-1.788
AIRARRIV	Arrivals by air	2.071584	2.119
GDPCAP	Per Capita income	1.175945	4.119
Adjusted R ² = 0.73572			
Standard Error = 49.41933		F statistic = 9.35162	

The regression model is statistically significant at the 0.5 level of significance. On the basis of the multiple determination R^2 , we note that the three variables jointly explain 74% of the factors that influence Tourist Arrivals in Kenya. The findings of each of the three variables in the equation are explained below:

ICT Penetration in Kenya

The coefficient for the ICT variable is -1.83544 . The sign is negative and the results indicate that ICT development is not statistically significant at the 0.5 level of significance. We therefore do not reject the null hypothesis, namely, ICT development does not influence tourism arrivals in Kenya.

Arrivals by air

The coefficient for arrivals by air is 2.071584 . It has a positive sign as expected and the coefficient is not statistically significant at the 5 % level. We thus do not reject the null hypothesis and conclude that air passenger arrivals at Jomo Kenyatta and Moi International airport are not a significant factor influencing tourist market access in Kenya. However air passenger arrivals do reveal a positive effect on the tourist market at the 10% level of significance, which concludes that there is a strong potential for expanded tourist access through air passenger arrivals.

Per Capita GDP

The coefficient for per-capita GDP in Kenya is 1.175945 . It has a positive sign and the coefficient is statistically significant at 5% level. We thus reject the null hypothesis and conclude that Per-capita GDP is a significant factor influencing tourist market access in Kenya.

Results indicate that among the variables in the equation for tourist market access, per-capita GDP is the most significant variable. This means that tourist development in Kenya is not responsive to information communication technologies. This may be due to prevailing adverse factors, such as relative global decline in the tourism market, insecurity concerns in Kenya and lack of effective infrastructure to support the tourist market.

4.2.1 Analysis of the Air Travel Industry

According to observations, Tourism in Kenya is an industry in decline. However, according to findings below, there is strong evidence of growth in the air travel industry, which is closely linked to tourism.

The third hypothesis states that ICT penetration in Kenya significantly contributes to Air Travel market access. To assess the responsiveness of Air Travel to ICT, the following Regression equation has been constructed (Table 7)

Table 8 : Passenger Arrivals by Air

Variables	Measure	Coefficients	T values
			-3.325
Constant			4.752
ICT	ICT index	0.970027	14.972
GDPCAP	Per capita GDP	-.327428	-3.737
ARRIVALS	Tourist Arrivals	0.206584	2.119

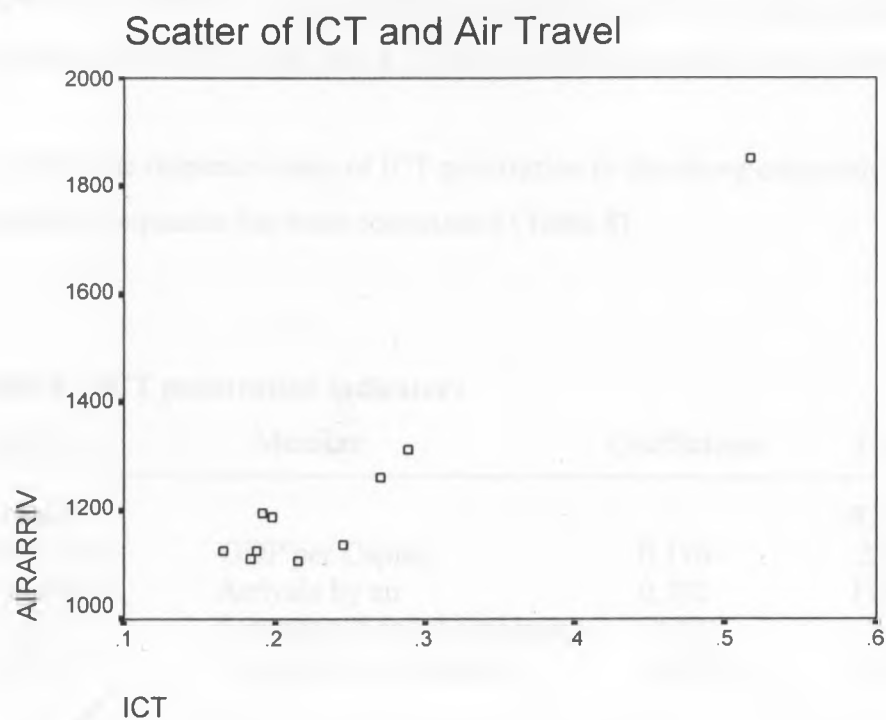
Adjusted R² = 0.96862
Standard Error = 59.16168
Degrees of freedom = 6
F statistic = 111.831

The regression model is analyzed at the 0.5 level of significance. On the basis of the multiple determination R², we note that the three variables jointly explain 96% of the factors that influence Air passenger arrivals. Results can be observed as follows:

ICT penetration

The coefficient for ICT is 0.970027. It has a positive sign as expected and the coefficient is statistically significant at the 5% level. We thus reject the null hypothesis and conclude that ICT penetration is a significant factor influencing passenger arrivals by air to Kenya

Fig 2



GDP PER CAPITA

The coefficient for GDP per capita is -3.27428. It has a negative sign, however, the coefficient is statistically significant at the 5 % level. We thus reject the null hypothesis and conclude that Per Capita GDP is a significant factor influencing passenger arrivals by air. This may suggest that many of the passengers arriving to Kenya are Kenyan immigrant workers, entrepreneurs and students studying abroad.

Tourist Arrivals

The coefficient for Tourist Arrivals is 0.206584. It has a positive sign and the statistic is not significant at the 5% level. We thus accept the null hypothesis and conclude that Tourist Arrivals does not have a significant influence on Air Travel

4.2.2 ICT penetration indicators

According to previous empirical studies, it was found that ICT diffusion in Africa was affected by openness of the economy to the rest of the world. However, this survey builds on the following hypothesis: ICT penetration is affected by the following indicators- Openness of the economy, GDP per Capita, Stock of Human Capital and electrical consumption.

To assess the responsiveness of ICT penetration to the above economic indicators, the following Regression equation has been constructed (Table 8)

Table 9 : ICT penetration indicators

Variables	Measure	Coefficients	T values
Constant			-4.036
GDPCAP	GDP per Capita	0.176	2.406
AIRARRIV	Arrivals by air	0.792	11.943
SECSCH	Secondary School enrolment	0.221	2.824
ELECON	Electricity consumption	-0.043	-0.503

Adjusted R² = 0.982
Standard Error = 1.382
Degrees of freedom = 5
F statistic = 124.241

The regression model is analyzed at the 0.5 level of significance. On the basis of the multiple determination R², we note that the three variables jointly explain 98% of the factors that influence ICT development. Results can be observed as follows:

GDP PER CAPITA

The coefficient for GDP per capita is 0.176. It has a positive sign. However, the coefficient is not statistically significant at the 5 % level. We thus accept the null hypothesis and conclude that Per Capita GDP is not a significant factor influencing ICT development

Stock of Human Capital

Stock of human capital, which is represented by secondary school enrolment has a coefficient of 0.221. The coefficient is significant at the 5% level. Thus we reject the null hypothesis and conclude that an educated population is a significant factor in ICT growth.

Passenger arrivals by air

The co-efficient for passenger arrivals is 0.792. It has a positive sign as expected. The co-efficient is significant at the 5% level. Thus we reject the null hypothesis and conclude that openness of the economy to the outside world through air travel, is a significant factor influencing tourist growth.

Electricity consumption

This indicator does not have any relationship with ICT growth as evidenced by its negative coefficient of -0.043 . Thus, at a 5% significance level, we accept the null hypothesis and conclude that ICT growth is not determined by electricity infrastructure in Kenya.

To summarize our analysis, the following facts can be concluded:

- That digitally developed tourist destinations, such as South Africa and Tunisia, have better access to the global tourism market than Kenya due to the prevailing digital gap.
- That ICT development in Kenya has a significant statistical effect on Air passenger arrivals, but no significance on Tourist Arrivals in Kenya. Since air travel is closely related to tourism, this implies that ICTs can open up the international travel market , thereby providing a strong potential for tourist market access.
- That ICT growth is stimulated by air passenger arrivals, making the country more open to foreign technology transfer, and the development of stock of human capital.

Chapter 5 Conclusions and Policy Implications

5.1.1 Conclusions

The main objectives of this study are: to assess the digital gap between Kenya and its trade competitors in the tourism industry, namely South Africa and Tunisia.

The second objective to be discussed in this chapter is to examine the contribution of digital technology growth in Kenya on tourist and travel market access.

It was found that in the area of inter-country competitiveness in the tourism sector, African tourist destinations, which are digitally advanced, such as South Africa and Tunisia, have correspondingly greater tourist market access. This means that efforts by Kenya to close the digital gap can enhance tourism growth.

Information Technology development in Kenya does not have a significant influence on tourism development. This is possibly due to the fact that the tourism market in Kenya is more responsive to factors such as per-capita income, security issues and pricing of tourism services.

However, ICT penetration in Kenya has a strong influence on the air travel industry, both of which have been experiencing significant growth since 197. This implies that more local and international flight passengers are booking their flights using e-commerce (internet bookings). There are also strong indications that the air travel industry is more responsive to advertising through the Internet and television.

As air travel provides a strong potential for market access to tourism in Kenya, factors causing the decline of tourism in Kenya should be addressed to make the sector more responsive to Kenya's growing air travel industry. This includes security issues, pricing of tourism services and infrastructure development.

ICT penetration in Kenya is dependant upon a high level of openness to the global economy, represented in this survey by air passenger arrivals, as it promotes technology transfer across the

borders. An educated work force is also important for the rapid adoption of information communication technologies.

5.2.0 Policy implications

General policies for the accelerated use of information communication technologies in Kenya should be adopted as implied by empirical results. This will stimulate growth in the air travel industry, which in turn, opens up the Kenyan market to spillover effects, which include, tourism, foreign direct investment and employment. The following strategies can be adopted:

5.2.1 Liberalizing the Telecommunication Markets

Telecommunications is an indispensable infrastructure for e-commerce. Monopoly control of this sector has retarded the entry of private institutions into the Internet. The state monopoly adversely affects a wider adoption of the Internet and e-commerce in the country. Liberalization of telecommunication services will also put downward pressure on communication costs to ICT users. A competitive telecommunication market will support the free flow of information across the borders.

5.2.2 Proposals to increase consumer welfare

One strategy is to reduce tariffs on the purchase and use of digital communication equipment. In addition, the Internet can be made a tariff-free zone for key industries such as tourism and travel. Lowering the tariff barrier induces more competition that will benefit the consumer. A tariff-free Internet zone can also stimulate domestic tourism as Kenyans can book holiday tours through e-commerce.

Another strategy to increase user accessibility to mobile phone services, is to increase the licensing of more cellular operators and internet service providers. This will have an effect of reduced prices and competitive telephone service provision. Another advantage of cellular telephony is that remote tourist lodges, which cannot be reached through the landline, can be connected to the expanded mobile phone networks.

5.2.3 Marketing Promotion Policy

Tourist promotion and air travel can be enhanced using the multi-media, namely the Internet and television. On-line marketing reduces marketing costs and reaches across international borders. Computer links with international tour agents should be fostered, to re-enforce international tour and travel market access. Many of the vast and growing numbers of Internet users are also tourists, thus providing them with information about current prices and airline timetables. This means that destinations that can promote their tourist products on-line at affordable prices, have a competitive advantages over destinations that are not on-line.

5.2.4 Aviation policy

Infrastructure development should be done to upgrade the international airports. This includes technologically advanced security infrastructure to assure the foreign market that Kenya is a secure tourist and travel destination. Air licensing policies that reduce airfares and increase accessibility to remote parts of this country, such as Lamu should be pursued. Open skies policies to attract more carriers to our airports can be encouraged. This will enhance market access to the Kenyan tourist and travel sector.

5.2.5 E-commerce

Tour and travel operators, to maximize economic benefits, can exploit electronic commerce.¹⁵ By offering direct on-line services to international customers through the internet, air ticket sales and hotel revenue can be generated, thus Kenya can substantially increase its share in the travel market. E-commerce can also be used to tap into unexploited tourist markets such as the Far East.

However, these and other opportunities have not been fully exploited. Often e-commerce is given low priority on the national development strategy. This may result in missed opportunities and policy choices that will leave the country lagging further and further behind.

¹⁵ UNCTAD's *E-commerce and Development Report 2001*, published in November 2001

5.2.3 Skill Development

Transfer of technology to this country from advanced nations can be done through networks linking Kenyan expatriates and students abroad. ICT skill training should also be provided to trainees, employees and entrepreneurs in the tour and travel industry.

5.3.0 Limitations of the study

The study suffers several limitations, which may affect the accuracy of the research. Firstly, caution should be exercised in the interpretation of statistics due to discrepancies in tourism estimates (between local and international statistics). The most recent international tourist statistics are also unavailable for interpretation.

Secondly, information communication technologies, a fairly recent development in Kenya, cannot be analysed conclusively since we are covering a brief time span.

Finally, a more diversified sector analysis of other sectors affected by ICTs, such as agriculture and education, was not possible due to scarcity of funds and time limitation.

5.4.0 Suggestions for further research

Further research on factors affecting ICT development in Kenya is necessary. A comprehensive ICT impact analysis can be carried out to assess the social welfare benefits of information technology to this economy.

Conducting a comprehensive sector-by-sector analysis and extensive field study can achieve interesting results. Poverty reduction strategies can also be developed using ICT models. This will ensure that resources are not wasted on ICT projects, which are not viable.

References

- Abramovitz** Moses and Paul David (1996), *'Convergence and Deferred Catch-up: Productivity Leadership and the waning of American Exceptionalism'* (Stanford University Press)
- Brynojofsson**, E. (1996) *'The contribution of Information Technology to Consumer Welfare'* Information Systems Research
- Caselli** Francesco and Coleman W.J. (2001) *'Cross Country Technological Difussion: The case of Computers'* NBC Working Paper No. 8130 (Cambridge Mass. National Bureau of Economic Research)
- Christie** Ian and Crompton Doreen, (July 2002), *Tourism in Africa*, World Bank Africa Region Working Paper Series, No.12
- Dasgupta** Susmita, Somic Lall and David Wheeler (2001) *'Policy Reform Economic Growth and the Digital Divide: An Econometric Analysis'* Development Research Group Working Paper No. 2567 (World Bank Washington)
- Didier** Lomabard et al, 2001 *'Report on the statistical observation of development of NICTs and their impact on the economy'*. Conseil National de l'information Statistique, no 63, February 2001
- Dublin Consultancy Report** www.nua.com September 2001
- Grossman G. and E.Helpman**, 1991, *Innovation and Growth in the World Economy*, MIT press, Cambridge Mass.
- Gujarati. D** *Basic Econometrics*, McGraw-Hill, 1979
- Hodge J.** (2000) *Liberalising Communication Services in South Africa*
- Ikiara K and S. Nyandemo**, Nov 2002, *Kenya's Service Sector: Emerging National, Regional and Global Issues*, University of Nairobi
- IMF** World Economic Outlook (October 2001) *'The Information Technology Revolution'* International Monetary Fund, Washington DC
- International Telecommunion Union** (2000) *'World Telecommunication Development Report'*
- Kayani R. and A. Dymond** *'Options For Rural Telecommunications Development'* World Bank Technical Paper N. 359, Washington DC 1997
- Pohjola, M.** (2000) *'Information Technology and Economic Growth: A Cross-Country Analysis'* WIDER Working Paper

Portes, Richard and Helene Ray (1999) '*The determinants of Cross-Border Equity Flows*' NBER Working Paper No.7336 (Cambridge Mass. National Bureau of Economic Research)

Rosslet P. Methodology and Principles of Analysis, 2001 '*The Competitiveness Year Book*', Lausanne: Switzerland International Institute for Management Development

Rouvinen, P. 2002. '*Competitiveness in the New Economy*'. Discussion Paper No.786. Helsinki: ETLA (The research institute of the Finnish Economy)

Sabter J, Dymond A. And Juntunen N. (2002) '*Telecommunications and Information Services for the Poor*' World Bank Discussion Paper No. 432
Telecom Journal January-February 2002

Tubman, Mclean and Wetherbe, (1996) '*Information Technology for Management*', John Wiley and Sons UNCTAD (2000) *World Investment Report*, Geneva and New York: United Nations

'*The Courier*' ACP-EU May -June 2002

UNCTAD's *E-commerce and Development Report 2001*, November 2001

United Nations Statistical Division (2003) www.unstats.un.org

United Nations 2002 '*International Standard Industrial Classification*,
UNIDO 2002 *Yearbook on Industrial Statistics*', Vienna

World Bank (2001) '*World Development Indicators*' p14-17

World Bank (2002) '*Information Communication Technologies*' (Washington DC)
www.worldbank.org/poverty/strategies/sourcetoc/htm

World Tourism Organization Statistics, June 2002

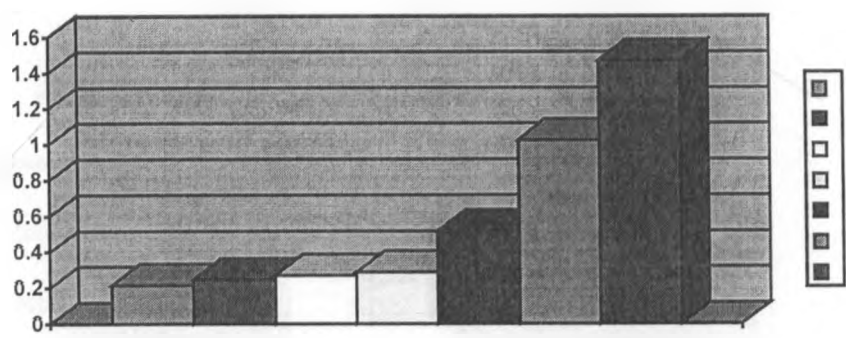
APPENDIX

Appendix1

ICT INDEX OF KENYA 2000-2001

	No. per 10000 People		No. per 100 people		Cell Phones	Weighted IT Index sum	
	Internet Hosts	Internet Users	PC's	Fixed Tel. Lines			
KENYA							
1990	0	0	0.04	0.79	0	8.3	0.166
1991	0	0	0.04	0.88	0	9.2	0.184
1992	0	0	0.05	0.89	0	9.4	0.188
1993	0	0	0.06	0.9	0	9.6	0.192
1994	0	0	0.06	0.93	0	9.9	0.198
1995	0	0	0.07	1.01	0	10.8	0.216
1996	0.05	1	0.19	1.03	0	12.305	0.2461
1977	0.16	4	0.28	1.03	0	13.516	0.27032
1998	0.24	5.17	0.36	0.99	0.04	14.441	0.28882
2000	0.56	62.21	0.49	1.05	0.42	25.877	0.51754
2001	0.86	159.78	0.56	1.04	1.92	51.264	1.02528
2002	0.93	159.78	0.56	1.03	4.15	73.471	1.46942

ICT growth 1995-2000



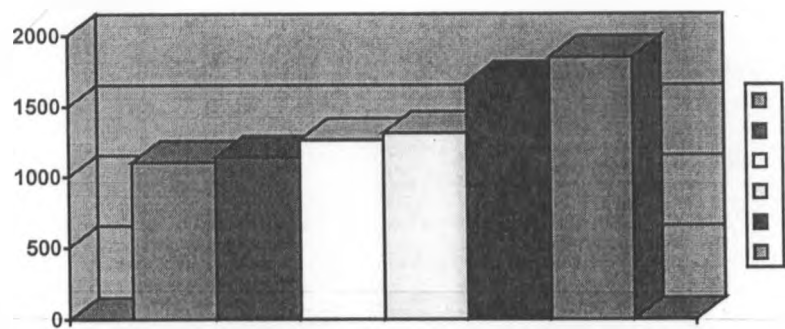
Source: United Nations Statistical Division (2003) www.unstats.un.org

Appendix II

Commercial traffic at JKIA and Moi international Airports

<u>Year</u>	<u>Arrivals</u>	<u>Departure</u>	<u>transit</u>	<u>Total</u>
1990	1122.9	1056.4	474.2	2653.5
1991	1109.2	1119.2	388.5	2616.9
1992	1125.9	1147.8	308.1	2581.8
1993	1193.7	1190.4	336.6	2720.7
1994	1187.4	1214.4	370.8	2772.6
1995	1104.8	1186.4	383.5	2674.7
1996	1137.2	1158	395.8	2691
1997	1259.6	1275.1	300.5	2835.2
1998	1312	1306.4	256	2874.4
1999	1664.4	1628.8	264.5	3557.7
2000	1848.4	1841.2	300.2	3989.8

Arrivals by Air 1995-2000



Source: Economic Survey (various publications) Kenya Bureau of Statistics

Appendix III

KENYA ECONOMIC PERFORMANCE INDICATORS (SELECTED) 1990-2000

	1990	1992	1994	1996	1998	2000
Population (millions)	22.2	23.7	25.4	26.3	27.9	28.7
GDP per capita (international \$)	997	985	1004	1048	1015	1022
GDP Growth rate (%)	4.3	0.5	3	4.6	1.8	0.3
Tourism earnings (ksh.million)	533	713	1405	1280	1750.9	21553
Electrical consumption (GWH)	2732	2915	3205	3478	3601.8	3320.7
Exchange rate against US\$	21.601	32.216	44.809	55.021	61.9056	78.0361
Secondary school enrolment (000)	618	629	620	658	700.5	759.6

Source: Economic Survey (various publications) Kenya Bureau of Statistics

EAST AFRICANA COLLECTION