An Examination of the Contributions of Digital Technology Growth in Kenya on Access to Tourist and Travel Markets

Angela Mungai[1] and Silvia K. Vundi[2]

[1]Masinde Muliro University of Science and Technology
School of Business and Economics
P.O. Box 190 – 50100 KAKAMEGA
mungai@gmail.com

[2]Masinde Muliro University of Science and Technology
Faculty of Education and Social Sciences
P.O. Box 190 – 50100 KAKAMEGA
vsilviakanyaa@gmail.com

Abstract

The world is in the midst of an all-purpose technological revolution based on information communication technology (ICT) which includes computers, computer software and telecommunications equipment. The rapid progress in ICT and its impact in 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 economic opportunities and challenges imposed by ICT on the developing world. The objective of the study was thus to examine the contributions of digital technology growth in Kenya on access to tourist and travel markets. The study was based on the hypothesis that: ICT penetration in Kenya significantly contributes to tourism and air travel market growth. Descriptive and econometric approaches were used.The study utilized time series data covering seven years collected from local and international sources. A series of regression equations were applied to test the hypothesis that: ICT penetration in Kenya significantly contributes to tourism and air travel market growth. The ordinary least squares method of regression was used to estimate the model and linear regression estimated the results. The study findings revealed that, digitally advanced tourist destinations like South Africa and Tunisia have better access to the global tourism and air travel market than Kenya which is less advanced in digital technology. Further, 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 ICT can open up the international travel market, thereby providing a strong potential for tourist market access. The study result shed light on strategic policy choices and initiatives that can be put in place to reduce the digital gap and open up tourist markets in Kenya.

Keywords: Information Communication Technology, Tourism Market Access, Travel Market Access, Econometrics, Time Series.

Introduction

Background to the Study

In recent years there has been criticism of the role of information communication technology (ICT) in the development policy. In developing countries, concerns have particularly been raised on whether to

promote information technologies when they are struggling to provide food, clean water education and healthcare (Tubman, Mclean and Wetherbe, 1996). Access to information networks has however been viewed as one of the features of being competitive and has direct impact not only on market access but the quality of service delivery. The world is in the midst of an all-purpose technological revolution based on ICT which includes computers, computer software and telecommunications equipment. Any society not ready to integrate new technology risks being even more excluded, widening the gap even further (UNCAD, 2000).

Tourism plays a leading role in Kenya's economy in general and in external trade (Ikiara & Nyandemo, 2002). 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 (WTO Statistics, 2002). 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 fifth most important tourist destination in Africa behind South Africa, Morocco, Tunisia and Mauritius by the end of 1999 (Ikiara & Nyandemo, 2002). Tourist services provided in Kenya include car hire services, tour firm operations, hotels and lodges, game viewing and cultural activities. The tourism is heavily dependent on Europe with about 60% of tourists coming from this region (Christie & Crompton, 2002). In 1980, 62.6% of tourist flow came from Europe, rising to and 64% in 2000 (WTO Statistics, 2002). Given that, the set in of the millennium saw a change of tact to embrace ICT in tourism and travel marketing, this study sought to establish ICT's contribution.

Statement of the problem
The rapid progress in ICT and its impact in the global economy have intensified in the recent years leading to a new economic system that has attracted a great deal of interest (Tubman, Mclean and Wetherbe, 1996). It has also raised debate on the extent of ICT diffusion and economic opportunities and challenges imposed by ICT on the developing world (Caseli and Colemen, 2001). 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.

The World Bank Report (2002) study showed that, lack of knowledge is a major factor behind stagnation and economic growth in Africa. A developing country such as Kenya risks further exclusion because of the dangers arising from lack of access to ICTs, especially in the rural areas. Cognizant of this possibility, this study avers that, examination of the contribution of digital technology growth in Kenya on access to tourist and travel markets is significant to reviewing the contribution of the knowledge based economy to tourist and travel markets.

Objective of the study
The aim of this study was to examine the contribution of digital technology growth in Kenya on access to tourist and travel markets.

Hypotheses
The study was based on the hypothesis that: ICT penetration in Kenya significantly contributes to tourism and air travel market growth.

Literature Review
Effects of 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 ICT investment due to falling prices of existing ICT 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, 1996). Micro-economic evidence suggests that ICT is likely to boost cross-border financial flows and facilitate technology transfer (Fortes, Richard & Ray, 1999).

Electronic commerce has increased competition between tourist destinations. According to Pohjala (2000), many of the vast growing numbers of internet users are also tourists. Industry sources suggest that travel and tourism rates second only to computer related sales in e-ecommerce. The World Wide Web sites are increasingly providing on-line 'virtual reality' previews of a variety of destinations, hotels facilities, costs and related services to tourists (UNCTAD, 2000). This provides greater information about current prices and frequency of travel services to different tourist destinations. The 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.

According to UNCTAD (2001) studies, the Internet is progressively making scheduled airline reservation 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 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 the assumption that e-commerce is not viable in developing countries, UNCTAD (2001) 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 the important message that the principle of comparative advantage continues to apply in the digital era. Sectors in the least developed countries (LDCs) do have a comparative advantage in certain sectors and sub-sectors, ranging from tourism to commodity exports. The current study therefore sought to establish whether ICT penetration in Kenya has had a significant contribution to tourism and air travel market growth.

Study Methodology
The study objective was assessed using both descriptive and econometric approaches. It adopted the ICT index proposed by Onyeiwu (2002) which computes the inter-country levels of digitalization, namely, penetration of Internet services, computers, fixed, and mobile telephone services. He proposed the following index for computing the inter-country levels of digitalization:

ICT Index = [1/10 (A + B) + 10 (C +D + E)/50(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

A series of regression equations were applied to test the hypothesis which states that: 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 study adopted Gujarati (1979) linear regression models depicted below:

ICT Index = [1/10 (A + B) + 10 (C +D + E]/50 (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
Tourist Arrivals = f (ict, gdp per capita, air arrivals)
SO:

$$Y_i = i + (3_2\ X_iT + (33X21 + (3_4X3i + £i)$$ (Equation 1)

WHERE

Y_i = Tourist Arrivals
X_iT = ICT index (equation 1)
$X2i$ = GDP per capita
X_sT = Air passenger arrivals
$£i$ = Unexplained variations by explanatory variables in the model
Equation (2) can be written as:

$$Y_i = P_i + S\ \overset{k}{3kiXk\text{-}i} + e_i$$
K=3

i = 1.2….N

Where X | and Y | is the independent and dependant variable respectively, combined with N observations in cross- section data .The constant term is $1, while e is assumed to be a random error with 0 mean and O^2 variance.

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

SO:

$$Y_i = p_i + p_2\ X_i, + p_3X_2t + £4X3T + £i$$ (Equation 3)

WHERE

Y_J = Air passenger arrivals
X_{ii} = ICT index (see equation 1)
$X2i$ = CDP per capita
$X_s\ i$ = Tourist arrivals
$£_T$ = Unexplained variables
Equation (3) can be written as:

$$Y_i = P_i + S\ \overset{k}{pkiXk\text{-}i} + e_t$$
K=3

i = 1.2....N

Where X | and Y j is the independent and dependant variable respectively, combined with N observations in cross- section data .The constant term is PI , while e is assumed to be a random error with 0 mean and O^2 variance.

The t distribution was used to test the hypotheses where; Ho: Pi =0 Ho: Pi   ^0

The ordinary least squares method of regression was used to estimate the study model, because of its fairly, compact, simple, straightforward ability to explain the ICT determinants (Ikiara & Nyandemo, 2002). Time series secondary data on ICT, tourism and travel market growth was 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 UNCTA. This was because, 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 & Crompton, 2002). Data analysis was done by computing the weighted average and IT index on ICT penetration in Kenya between 1995 and 2002. Three variables, namely, the ICT penetration index, GDP per capita and passenger arrivals by air were estimated. The dependant variable was tourist arrivals.

Results Analysis and Discussion

Regression analysis of the study variables was done and data presented descriptively using tables.

ICT penetration in Kenya
Table 4.1 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.

Table 1: ICT Penetration in Kenya 1995-2002

Year	No. per	10000 People		No. per 100 people		Cell	Weighted	IT Index
	Internet Hosts	Internet Users	PC's	Fixed Tel. Lines		Phones	Sum	
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)
(Weighted average and IT index computed by author, 2005)

From Table 1, statistics on the numerical values of the ICT development indicators in Kenya reveal significant and rapid growth in ICT penetration from an index of 0.216 in 1995 to 1.469 in 2002.

Analysis of tourist arrivals
The hypothesis stated that: ICT penetration in Kenya significantly contributes to tourism market access. Table 4.2 regresses data on tourist arrivals in Kenya between 1995 and 2002.

Table 2: 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 inc	1.175945	4.119

Adjusted R^2 = 0.73572
Standard Error = 49.41933   F   statistic = 9.35162

Source: Author (2005)

The regression model is statistically significant at the 0.5 level of significance. On the basis of the multiple determinations R, we note that the three variables jointly explain 74% of the factors that influence Tourist Arrivals in Kenya.

Discussion
On ICT penetration in Kenya, the coefficient for the ICT variable is -1.83544 (Table 2). 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.

Table 2 puts the coefficient for arrivals by air at 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 airports 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. Lastly, the coefficient for per-capita GDP in Kenya is 1.175945 (Table 2). 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.

The 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.

Conclusion
The main objective of this study was to examine the contribution of digital technology growth in Kenya on tourist and travel market access. The study concluded that ICT development in Kenya does not have a significant influence on tourism development. 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.

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 1997. This implies that more local and international flight passengers are booking their

flights using e-commerce. There are also strong indications that the air travel industry is more responsive to advertising through the internet and television.

Policy Implications

General policies for the accelerated use of information communication technologies in Kenya should be adopted as implied by the study 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 (Dasgupta, Somic & Wheeler, 2001). Liberalization of the telecommunication markets to remove monopoly control of this sector is necessary. The monopoly 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 (Hodge, 2000). A competitive telecommunication market will support the free flow of information across the borders.

Consumer's welfare also needs to be considered by reducing 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.

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

Brynojofsson, E. (1996) *'The contribution of Information Technology to Consumer Welfare'* Information Systems Research

Caselli, F. and Colemen, W. (2001) *"Cross Country Technological Difussion: The case of Computers'* NBC Working Paper No. 8130 (Cambridge Mass. National Bureau of Economic Research)

Christie, I. and Crompton, D., (July 2002). *Tourism in Africa,* World Bank Africa Region Working Paper Series, No. 12.

Dasgupta, S., Somic, L. and Wheeler, D. (2001). *'Policy Reform Economic Growth and the Digital Divide: An Econometric Analysis'* Development Research Group Working Paper No. 2567 (World Ban Washington).

Gujarati. D. (1979). *Basic Econometrics,* McGraw-Hill.

Hodge, J. (2000). *Liberalising Communication Services in South Africa*

Ikiara, K. and Nyandemo, S. (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.

Kayani, R. and Dymond, A. (1997). *'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

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

World Bank Discussion Paper No. 432 Telecom Journal January-February 2002.

Tubman, a., Mclean, C. and Wetherbe, N. (1996) 'Information Technology for Management', John Wiley   and Sons.

UNCTAD (2000) World Investent Report, Geneva and New York: United Nations.

UNCTAD's E-commerce and Development Report 2001. November 2001

World Bank (2002) 'Information Communication Technologies' (Washington DC) vvwvv.worldbank.org/povertv/strategies/sourcetoc htm

World Tourism Organization (WTO) Statistics, June 2002