

DECLARATION

**A SURVEY OF THE CHALLENGES FACING
INTERNET GROWTH IN KENYA.**

By

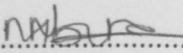
Margaret Nyambura Ndung'u

**A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENT FOR THE MASTERS OF
BUSINESS AND ADMINISTRATION DEGREE,
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October 2000.

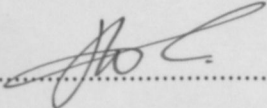
DECLARATION

This Management Research Project is my original work and has not been presented for a degree in any other University.

Signed  Date 21/03/2001

MARGARET NYAMBURA NDUNG'U

WITH LOVE,
DEDICATED TO MY DEAR MOTHER,
THIS MANAGEMENT RESEARCH PROJECT HAS BEEN SUBMITTED FOR EXAMINATION
YOUR LOVE, PATIENCE AND ENCOURAGEMENT HAS BEEN
WITH MY APPROVAL AS UNIVERSITY SUPERVISOR.
THE SOURCE OF MY INSPIRATION.

Signed  Date 23/03/2001

KARIUKI, JAMES THUO

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ACKNOWLEDGEMENT

I would like to express my gratitude to Mr. James Thuo Kariuki who was my supervisor. Thank you for continuously going through your email to retrieve my report during the harsh period of power rationing. Without your continuous help, this report would have still remained a dream.

I would also like to pass my appreciation to my family. I appreciated your support during my academic programmes.

To my friends specifically Mulandi, Adhiambo, Mutisya, Njuguna, Mugo, Coast, Wanjau, Githiga. Thank you for remaining my friends and lifting me up when things were unbearable.

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Finally, special thanks to my colleagues at EcoNews Africa, the entire MBA staff and my fellow students. I appreciated your help.

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transparently communicate and share services worldwide. The Internet is an enormously valuable tool for many people and organizations. It constitutes a shared global resource of information, knowledge, and means of collaboration and cooperation among countless diverse communities.

The Internet has revolutionized the computing and communications industry worldwide. The invention of the telegraph, telephone, radio, and computer set the stage for this unprecedented integration of capabilities. The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location. Since its inception in 1969 in the United States, there have been tremendous improvements. However, it is only in the early 1990s that the Internet was introduced to Africa. Since then, it has grown rapidly in the continent especially over the last four years.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Internet is a global network of networks enabling computers of all kinds to directly and transparently communicate and share services worldwide. The Internet is an enormously valuable tool for many people and organizations. It constitutes a shared global resource of information, knowledge, and means of collaboration, and cooperation among countless diverse communities.

The Internet has revolutionized the computing and communications industry worldwide. The invention of the telegraph, telephone, radio, and computer set the stage for this unprecedented integration of capabilities. The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location. Since its inception in 1969 in the United States, there have been tremendous improvements. However, it is only in the early 1990s that the Internet was introduced to Africa. Since then, it has grown rapidly in the continent especially over the last four years.

At the end of 1996 only 11 countries in Africa had local access, but by March 2000, 51¹ countries had achieved permanent connection. Unfortunately, access is mainly confined to the capital cities.

This campaign has not taken deep root in Kenya considering that the teledensity² still Considering how information and communication technology and in particular the Internet, has dramatically changed people's mode of operation, it is crucial to determine and weigh the challenges facing the spread of the technology in Kenya. With all the changes globally driven by these technologies, it is important for Kenya to become an information society² and to be part of the globalised world. According to Souter:

The Internet provides at least the prototype and perhaps more of what a global information society might offer. However, variable access to the Internet threatens to divide communities internationally, and within nations, into the information rich and the information poor (Souter, David 1998, pg.20).

1.2 STATEMENT OF THE PROBLEM

Currently, the information age, knowledge societies and the information economy pervade all aspects of every day life. What has become the central feature of modern society globally is hardly felt in Kenya. Universally, there is a campaign aimed at

¹ *African Internet Status*. By Mike Jensen. <http://demiurge.wn.apc.org/africa/afstat.htm> (Last updated August 2000)

² An information society according to *The Information Society journal* (Volume 16, Number 3, 2000) is defined as that which fulfills the following:

- Information lies at the core of the society's economic needs;
- The importance of current and timely information as an economic product will exceed that of other products such as goods, energy and services.

making the Internet available for everyone and ensuring equal access to the benefits derived from it.

This campaign has not taken deep root in Kenya considering that the teledensity³ still remain one of the lowest in the world, with relatively few computers. The Internet connection still remains very low, hence information and knowledge available fast and easily globally via the Internet is not available to majority of Kenyans.

In the 1990s there was a tremendous growth in the spread of the Internet in Africa with 90%⁴ of the growth being in South Africa. There are more than 100 Internet Service Providers (ISPs)⁵ in South Africa all distributed in the major towns unlike in Kenya where there are 23 ISPs with 21⁶ based in Nairobi.

A study by the United Nations Economic Commission for Africa (UNECA)⁷ found out that there were over 500,000 subscribers in Africa by August 1999. Each computer with an Internet or e-mail connection supports an average of three users. This puts current

1.4 SIGNIFICANCE OF THE STUDY

³ *African Internet Status*. By Mike Jensen. <http://demiurge.wn.apc.org/africa/afstat.htm> (Last updated August 2000)

⁴ *Ibid.*

⁵ An Internet Service Provider is a company which specializes in providing end-users and businesses with network access to the Internet.

⁶ Statistics from Telkom Kenya.

⁷ *The challenge to Africa of globalisation and the information age*. UNECA, October 1999.

estimates of the number of African Internet users at approximately 1.5 million. This works out at about one Internet user for every 1,500 people, compared to a world average of about one user for every 38 people, and a North American and European average of about one in every 4 people.

According to a paper presented at the World Telecommunication Day⁸, there were an estimated 30,000 Internet users in Kenya by May 1999. The population by then was estimated as 30 million. This translates to one user for every 1,000 people an indication that Internet use in Kenya is below world average.

This study intends to establish the main factors influencing this pattern of Internet growth in Kenya and determine the extent to which each factor affects the growth.

1.3 OBJECTIVES OF THE STUDY

- To identify factors hindering Internet growth in Kenya.

1.4 SIGNIFICANCE OF THE STUDY

The Internet empowers people in very new and important ways. It broadens the scope of the available information and knowledge, making information access quicker and affordable. From the research, the various uses of Internet shall be identified. With

⁸ *E-commerce: The trends, the status and the issues for Kenya*. By Muriuki, Mureithi. May 1999.

these facts, the country can strategically place the Internet in its national economic plan and explore the benefits that can be derived from the technology ranging from creation of employment, distance learning (virtual universities) to tele-medicine and e-commerce.

2.1 BRIEF HISTORY OF THE INTERNET

The research will be of specific significance to the government being the main player in policy formulation and regulatory issues. Issues related to policy and regulatory environment that are a challenge to the Internet growth will be determined. Having determined these, appropriate policies can then be incorporated into the national plan, creating an enabling environment for the spread of the Internet.

The research will also be substantially crucial to the ISPs since it will show them their shortcomings and give them an indication of what is expected from them by their clients. This will assist them in improving their services.

To the clients and potential clients, the research will be of considerable importance since it will show them the various services offered by the ISPs. It will also give them an indication of what to expect from them and the main issues to consider when selecting and evaluating an ISP.

CHAPTER TWO

LITERATURE REVIEW

2.1 BRIEF HISTORY OF THE INTERNET

The Internet resulted from United States of America (U.S.A) military research. The U.S.A was interested in developing a system that would allow them to communicate in the aftermath of a nuclear attack. America saw the need for the Advanced Research Project Agency (ARPA) after the Soviet Union's 1957 launch of Sputnik.⁹ As part of the activities, the USA hoped to launch a small Earth orbiting satellite. One of the immediate reactions was the creation of the Advanced Research Projects Agency (ARPA) within the Department of defence.¹⁰

ARPA became the technological think-tank of the American defence effort, directly employing top scientists and with a budget sufficient for sub-contracting research to other top American institutions. From the start, ARPA was interested in communicating between its operational base and its sub-contractors, preferably through direct links between its various computers.

⁹ The Soviet Sputnik program consisted of four satellites, three of which reached Earth orbit.

¹⁰ *The history of the Internet.* <http://www.media-awareness.ca/eng/indus/internet/history.htm>. (Last updated May 2000)

In 1962, ARPA opened a computer research program and appointed to its head an MIT scientist John Licklider to lead it. Within ARPA, Leonard Klienrock was already developing ideas for sending information by breaking a message up into 'packages', sending them separately to their destination and reassembling them at the other end.¹¹ By 1966/67 research had developed sufficiently for the new head of computer research, Leonard Roberts, to publish a plan for computer network system called ARPANET. When these plans were published it became clear that independently of each other, and in ignorance of each other's work, teams at MIT, the National Physics Laboratory (UK) and by RAND Corporation had all been working on the feasibility of wide area networks, and their best ideas were incorporated into the ARPANET design. The final requirement was to design a protocol to allow the computers to send and receive messages and data, known as an interface message processor (IMPs).

In 1969, IMPs was designed and installed in computers at both UCLA and Stanford. UCLA students would 'login' to Stanford's computer, access its databases and send data. By the end of 1971, ARPANET linked 23¹² host computers to each other.

¹¹ *About the Web: Brief History of the Internet and the World Wide Web.* <http://www.coursetools.com/cti/illustrated/wwwie/about1.html> (Last updated November 1999).

¹² *A Brief History of the Internet, version 3.31.* <http://www.isoc.org/internet-history/brief.html> (Last updated August 2000).

In October 1972 ARPANET was introduced to the public. At the first International Conference on Computers and Communication, held in Washington DC, ARPA scientists demonstrated the system in operation, linking computers together from 40 different locations. This stimulated further research in scientific community throughout the Western World. The Washington conference also set up an Internet Working Group (IWG)¹³ to coordinate the research taking place.

In 1974 Stanford released *telnet*, the first openly accessible public 'packet data service', which was a commercial version of ARPANET. In 1976 a Unix-to-Unix protocol was developed by AT&T Bell laboratories and was freely distributed to all Unix computer users. In 1979, *Usenet* was established, an open system focussing on e-mail communication and devoted to newsgroups. In 1982, a European version of the Unix network, *EUNET* was established linking networks in the UK, Scandinavia and the Netherlands.¹⁴

	Hosts	Websites
1994	3.2 million	3,000
1995	6.4 million	25,000
1996	12.8 million	250,000

In 1989, the World Wide Web (WWW) concept was designed. WWW is a network of sites that can be searched and retrieved by a special protocol known as a Hypertext Transfer protocol (HTTP). The protocol simplified the writing of addresses and

¹³ A Brief History of the Internet, version 3.31. <http://www.isoc.org/internet-history/brief.html> (Last updated August 2000).

¹⁴ The Internet's History and Development: From Wartime Tool to the Fish-Cam. <http://www.acm.org/crossroads/xrds2-1/inet-history.html> (Last updated February 2000).

automatically searched the Internet for the address indicated. Once the entire dial and retrieve language had been simplified, the next step was to design an improved browser, a system which allowed the links to be hidden behind text using a Hypertext Markup Language (HTML), and activated by a click with the 'mouse'. Although commercial exploitation of the Internet had started, its expansion continued to be driven by the government and academic communities. By 1989 the number of hosts surpassed 100,000 for the first time and had climbed to 300,000¹⁵ a year later.

In 1993 *Mosaic X* was launched as a web browser. The potential of HTML to create graphically attractive web-sites and the ease with which these sites could be accessed through the new generations of web-browsers opened the Web to many people. Due to friendly browsers and awareness, there was a tremendous growth as shown in table I.

Years	Hosts	Websites
1994	3.2 million	3,000
1995	6.4 million	25,000
1996	12.8 million	250,000
1998	36.8 million	4.2 million

Table 1. Internet hosts and websites growth from 1994 to 1998.

¹⁵ *About the Web: Brief History of the Internet and the World Wide Web.*
<http://www.coursetools.com/cti/Illustrated/wwwie/about1.html> (Last updated November 1999).

By the year 2000, the Internet had connected up to 45 million people around the globe and is growing by as much as 10% per month.¹⁶

2.2 INTERNET IN AFRICA

Internet in Africa began in the early 1990s. According to African Internet Status report, at the end of 1996 only 11 countries had Internet access, but by March 2000, 51¹⁷ countries had achieved permanent connectivity. Nevertheless Internet access in Africa has been largely confined to the capital cities, although a growing number of countries do have POPs in some of the smaller towns. These countries were Algeria, Angola, Botswana, DRC(Democratic Republic of Congo), Egypt, Ghana, Kenya, Madagascar, Morocco, Mozambique, Namibia, Nigeria, Tanzania, Tunisia, Zambia Zimbabwe and South Africa.¹⁸

The total number of computers permanently connected to the Internet in Africa (excluding South Africa)¹⁹ was 10,000 at the beginning of 1999 and in January 2000 it stood at almost 12,000, an increase of 20%.²⁰

¹⁶ Internet history-origin to commercial use. <http://www.mapsys.com/ma3hnews.htm> (Last updated September 1999).

¹⁷ African Internet Status. By Mike Jensen. <http://demiurge.wn.apc.org/africa/afstat.htm> (Last updated August 2000).

¹⁸ Ibid.

¹⁹ South Africa was excluded because it is responsible for 90% of Internet growth in Africa hence its inclusion will not reflect the actual situation in other countries.

²⁰ Internet Statistics: Growth and Usage of the Web and the Internet. <http://www.mit.edu/people/mkgray/net/> (Last updated July 2000).

By the beginning of 2000, there were about 28 countries with 1,000 or more dial-up subscribers, but only about 11 countries with 5,000 or more. These were Cote d'Ivoire, Egypt, Morocco, Kenya, Ghana, Mozambique, Nigeria, South Africa, Tunisia, Uganda and Zimbabwe.²¹ A number of countries such as those in North Africa and Southern Africa have more highly developed economies and better infrastructures which would naturally result in larger populations of Internet users. Most of these countries were also among the first on the continent to obtain Internet access and so have had time to develop the market.

Lower-cost e-mail services only have been launched by many ISPs and are continuing to attract subscribers. Similarly, because of the relatively high cost of local electronic mailbox services from local ISPs, a large proportion of African e-mail users make use of the free Web-based services such as Hotmail (www.hotmail.com), Yahoo (www.yahoo.com), or Excite (www.excite.com) most of which are in the US. These services are more costly and cumbersome than using standard e-mail software, because extra online time is needed to maintain the connection to the remote site. However, they provide the added advantages of anonymity and greater perceived stability than the local ISPs.

²¹ *African Internet Status*. By Mike Jensen. <http://demiurge.wn.apc.org/africa/afstat.htm> (Last Updated August 2000).

With the exception of some ISPs in Southern Africa, almost all of the international Internet circuits in Africa connect to the USA, with a few to the United Kingdom, Italy and France. However, Internet Service Providers in countries with borders shared with South Africa benefit from the low tariff policies instituted by the South African telecommunication operator for international links to neighboring countries. As a result South Africa acts as a hub for some of its neighboring countries namely, Lesotho, Namibia, and Swaziland.

The highest number of users surveyed belonged to non-government organizations, private
Incoming bandwidth is now starting to outpace outgoing bandwidth following the increasing use of data broadcasting services, which are now being installed by ISPs in Africa. This arrangement uses a standard digital KU-Band or C-Band²² satellite television antenna.

Universities were initially at the vanguard of Internet developments in Africa and most of
Most of the African Internet sites are hosted on servers that are in Europe or in U.S.A. This is because countries where ISPs operate their independent international links without local interconnections or peering, such as in Kenya and Tanzania, have traffic between the subscribers of two ISPs in the same city travelling to the US or Europe and back. This makes it more efficient and cost effective to host outside the country.

²² C/Ku Band are systems which allows business teleconferencing, distance learning, and access to many channels not delivered by small dish.

A survey done by the United Nations Economic Commission for Africa (UNECA, 1999, pg. 43) established that the average level of Internet use in Africa is about one incoming and one outgoing e-mail per day. The survey indicated that about 25 percent of the e-mail is replacing faxes, while 10 percent are replacing phone calls and the other 65 percent are communications that would not have been made in the absence of an e-mail system.

The highest number of users surveyed belonged to non-government organizations, private companies and universities. E-mail is used for general correspondence and document exchange, technical advice, managing projects, arranging meetings, and exchanging research ideas.

Universities were initially at the vanguard of Internet developments in Africa and most of them provide e-mail services, however in early 1999 only about 20²³ countries had universities with full Internet connectivity. Because of the limited resources and high costs of providing computer facilities and bandwidth, full Internet access at the universities where it exists is usually restricted to staff. Postgraduate students are often able to obtain access but the undergraduate student population has limited access.

²³ *African Internet Status*. By Mike Jensen. <http://demiurge.wn.apc.org/africa/afstat.htm> (Last updated August 2000)

In the area of Internet content development, the African web-space is expanding rapidly and almost all countries have some form of local or internationally hosted web server, unofficially or officially representing the country with varying degrees of comprehensiveness. While increasing numbers of organizations have a Web site with basic descriptive and contact information, many are hosted by international development agencies. Web presence is higher in some sectors, particularly those involved in tourism and foreign investment, and these often have more mature sites, aimed at developing an international market presence. While most ministries and national research centres have access to electronic mail, very few have website hosted locally or outside the country.

2.3 INTERNET IN KENYA

Kenya ventured into the Internet Industry in 1994. The service offered then was only email. In late 1995 full Internet services were established. The Spread of the Internet was slow due to control by the Kenya Post and Telecommunication Corporations (KPTC). In 1998, KPTC liberalized the market for third party services and since then, the Internet has spread rapidly.

Kenya has one of the largest Internet communities in sub-Saharan Africa, with some estimates as high as 30,000²⁴ users as by May 1999. The KPTC launched its national

²⁴ E-commerce: The trends, the status and the issues for Kenya. By Muriuki, Mureithi. May 1999.

Internet backbone service for leased line access (JamboNet) in 5 towns namely Nairobi, Mombasa, Kisumu, Eldoret and Malindi in December 1998. By May 2000, there were 23²⁵ licensed ISPs in Kenya.

The KPTC through Telkom Kenya, rolled out a nation-wide 2Mbps Internet backbone with a hub in Nairobi and extending to Nyeri, Mombasa, Nakuru, and Kisumu. A total of 315 domains had been registered by May 2000 under the .ke Top Level Domain (TLD). Kenya's telephone network has about 400,000 lines for almost 30 million people. The KPTC established a national and international digital leased line service *KenStream*.

It also rolled out a VSAT network called *KenSat* for outlying areas, which is able to connect to the public switched network. KPTC also has a GSM (Global System for Mobile Communication) mobile service called *Safaricom*. A second cellular license to Kencell was issued and its operations was launched in August 2000.

The ISPs charge fixed rates for the various categories of the e-mail services plus additional fee for extra login hours. The charge for the extra hours varies based on the time of login (peak hours or off peak hours). Fixed charges for dial-up full Internet accounts for randomly selected ISPs are shown in table II.²⁶

²⁵ Licensed ISP's as at 1st April 2000. Statistics from Telkom Kenya.

²⁶ Statistics from the marketing and sales brochures from the various ISPs

ISP	Cost in US \$/month inclusive of VAT.
AfricaOnline	\$143
Interconnect	\$122
Swift Global	\$118
Net 2000	\$126
NairobiNet	\$129
Insight Kenya:	\$100

Table II. Cost of full Internet dial-up for selected ISPs.

The KPTC International leased line of 64kbps to the United States costs \$10,030 for the Kenyan half-circuit plus \$5,000 carrier charges for the US half-circuit.

Local analogue leased lines across town cost about US\$120/month. Digital leased lines (64Kbps) are priced at about US1,200/month. KPTC's Internet services, JamboNet, charges are shown in table III.

Bandwidth in Kilobytes	Cost in US \$/month inclusive of VAT.
64K	\$2,577
128K	\$4,279
256K	\$6,279

Table III. Jambo net Bandwidth charges.

The total number of Internet Service Providers in Kenya is 23 and the total estimated clients as by 1999 is 30,000.²⁷

²⁷ E-commerce: The trends, the status and the issues for Kenya. By Muriuki, Mureithi. May 1999

CHAPTER THREE

DESIGN AND METHODOLOGY

3.1 POPULATION

The population of the study constituted of all the ISPs in Kenya and the Kenyan population who have access to the Internet. From the preliminary survey, it was established that there were 23 ISPs as by 1st April 2000. The total number of clients in all the 23 ISPs was 29,409. All the 23 ISPs and 29,409 clients formed the population.

3.2 SAMPLING

All the ISPs formed the sample. This was because they were few in number and within reach.

Two questionnaires were designed, one to the ISPs (Appendix II) and the other to the clients (Appendix III). The questionnaires were distributed via e-mail and follow-up was also done via e-mail. Telephone calls were also made to the ISPs as part of the follow up process. To get the sample of the clients, stratified random sampling was used. A database of the clients was obtained from all the ISPs to ensure they were represented. From each of the ISPs database, two strata were formed one representing the individual clients and the other representing the corporate clients. The strata were based on the amount of revenue the clients generated to the respective ISPs. All the clients who were generating a revenue of Ksh.10,000 and more were regarded as corporate clients while those generating a revenue of less than Ksh.10,000 were regarded as individual clients.

From each of the cluster, 2.5% of the clients formed the sample. The reason for using this percentage was to ensure that at least one client from each of the ISP received a questionnaire including the small ISPs, which had very few clients. appearing in the ISPs' database.

Of the 29,409 clients, 17,584 were individual clients while 11,825 were corporate clients. A 2.5% calculation of each of the categories brought the number of the individual clients and corporate clients to 439 and 298 respectively.

In total the sample consisted of 737 clients and 23 ISPs.

3.3 DATA COLLECTION METHOD

Two questionnaires were designed, one to the ISPs (*Appendix II*) and the other to the clients (*Appendix III*). The questionnaires were distributed via e-mail and follow-up was also done via e-mail. Telephone calls were also made to the ISPs as part of the follow up process.

Due to the nature of data required, two questionnaires were sent to each ISP. One to the sales/marketing manager while the other sent to the technical manager. The reason for two different questionnaires being sent to the ISPs was to get a technical view as well as marketing and sales view.

Data from the corporate clients was collected through a questionnaire addressed to the technical manager while that from individual clients was collected through a questionnaire addressed to the owner of the e-mail address that was appearing in the ISPs' database.

4.1 RESPONSE RATE

A total of 46 questionnaires were distributed to the ISPs and 737 were distributed to the clients. Of the 46 questionnaires distributed to the ISPs only 13 were returned fully completed. This constitutes a response rate of 28%. For the clients, 737 questionnaires were distributed of which 300 were returned. This constituted 41% response rate. The data analysed is based on these statistics.

The ISPs and the clients questionnaires were analysed separately. However, the responses from both the questionnaires complemented one another and this was maintained throughout the analysis.

4.2 INTERNET GROWTH

From the data collected, the earliest ISP started in 1994 with very few e-mail clients. They used Eudora²⁸ and First Class Client²⁹ to access e-mail. It was noted that there were about eleven ISPs started in the year 2000 and they were in the initial stages of

²⁸ Eudora is a network e-mail exchange tool and also via Modem using a proprietary protocol. The exchange is through a series of gateway servers that connect with the Internet via SMTP with underlying UNIX-based server to get which act as their MX records.

²⁹ First class client is an e-mail software which provides the client with features such as e-mail, e-commerce and file transfer.

CHAPTER FOUR

DATA ANALYSIS

4.1 RESPONSE RATE

A total of 46 questionnaires were distributed to the ISPs and 737 were distributed to the clients. Of the 46 questionnaires distributed to the ISPs only 13 were returned fully completed. This constitutes a response rate of 28%. For the clients, 737 questionnaires were distributed of which 300 were returned. This constituted 41% response rate. The data analysed is based on these statistics.

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From the data collected, the earliest ISP started in 1994 with very few e-mail clients. They used FidoNet²⁸ and First Class Client²⁹ to access e-mail. It was noted that there were about eleven ISPs started in the year 2000 and they were in the initial stages of

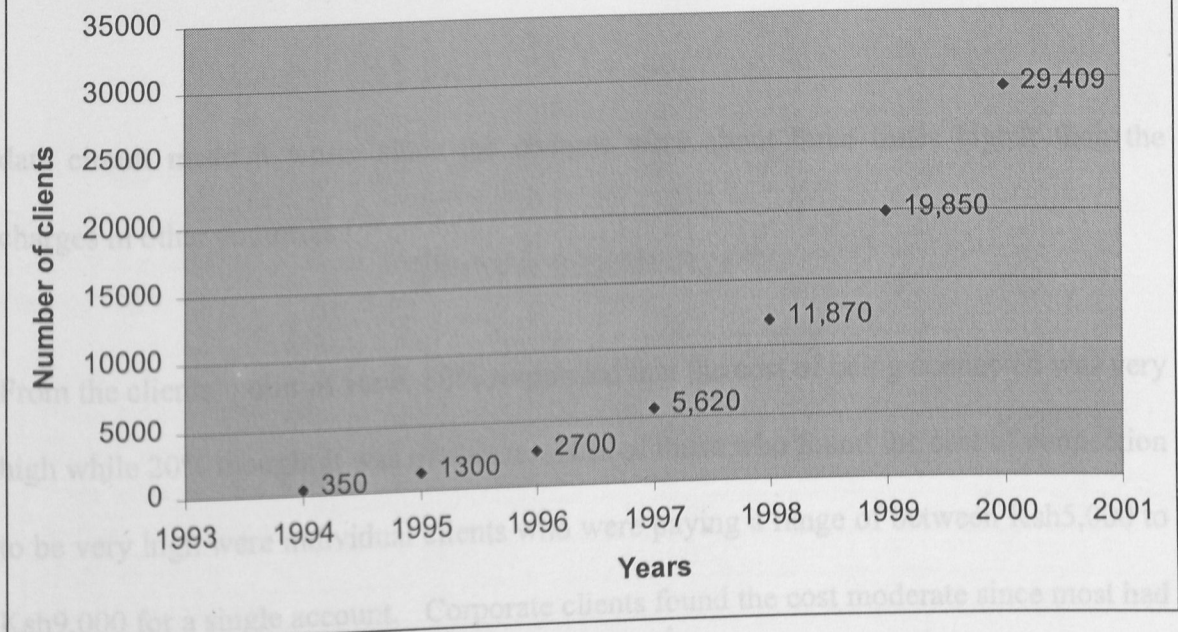
²⁸ FidoNet is a network, which exchanges mail and files via Modems using a proprietary protocol. The exchange is through a series of gateway systems that interact with the Internet via UUCP with cooperating UNIX-based smart-hosts which act as their MX-receivers.

²⁹ First class client is an e-mail software which provides the users with features such as e-mail, conferencing and file transfers.

development. At the time of the research, there were only nine well-established ISPs with a client base of more than 500. Table IV shows the situation as at May 2000.

ISPs	1994	1995	1996	1997	1998	1999	2000
A	200	800	1400	2,500	3,300	4,100	7,000
B				200	2,000	3,200	5,000
C				300	1,600	2,500	3,000
D				250	800	1,400	2,250
E		100	800	1,300	1,700	2,600	3,600
F				50	450	2,100	3,000
G				20	600	1,750	2,500
H					20	500	700
I	150	400	500	1,000	1,400	1,700	2,000
J	0	0	0	0	0	0	10
K	0	0	0	0	0	0	10
L	0	0	0	0	0	0	14
M	0	0	0	0	0	0	5
N	0	0	0	0	0	0	80
O	0	0	0	0	0	0	5
P	0	0	0	0	0	0	120
Q	0	0	0	0	0	0	60
R	0	0	0	0	0	0	10
S	0	0	0	0	0	0	25
T	0	0	0	0	0	0	20
Total clients	350	1300	2700	5,620	11,870	19,850	29,409

Table IV. ISPs clients status from August 1994 to May 2000.



(Figure I)

The table show how the clients number have grown from 1994 to 2000. Between 1998 and 2000, the growth rate is very high with 1999-2000 being as high as 67%. This shows that the number of clients in the Internet has been changing at an increasing rate.

Figure I show a graphical representation of the clients' growth curve from 1994 to 2000.

4.3 INTERNET ACCESS COST

The Information gathered from both the ISPs and the clients showed that the use of Internet is very expensive. 60% of the ISPs respondents said that the cost charged by Telkom Kenya was very high and the fact that use of VSAT was not allowed made the operations cost to be high. On monthly basis, 30% of the ISPs spend between US\$2,000 and US\$2,500 for the Bandwidth. 40 % spend between US\$2,500 and US\$3,500 while 30% spend over US\$3,500. The fact that there was only one provider of international

data circuit made it worse since the charges were about three times higher than the charges in other countries.

From the clients' point of view, 80% responded that the cost of being connected was very high while 20% thought it was moderate. 70% of those who found the cost of connection to be very high were individual clients who were paying a range of between Ksh5,000 to Ksh9,000 for a single account. Corporate clients found the cost moderate since most had a domain registered hence they could create many e-mail accounts without additional cost.

Of the respondents from the corporate clients, 90% had a domain registered. 50% of these domain were hosted outside the country. The reason given for this trend was that local hosting of domains was very expensive and costing was based on the size of the content measured in Kbps while elsewhere in the world (Europe and US) they could host domains much cheaper regardless of the size of the content.

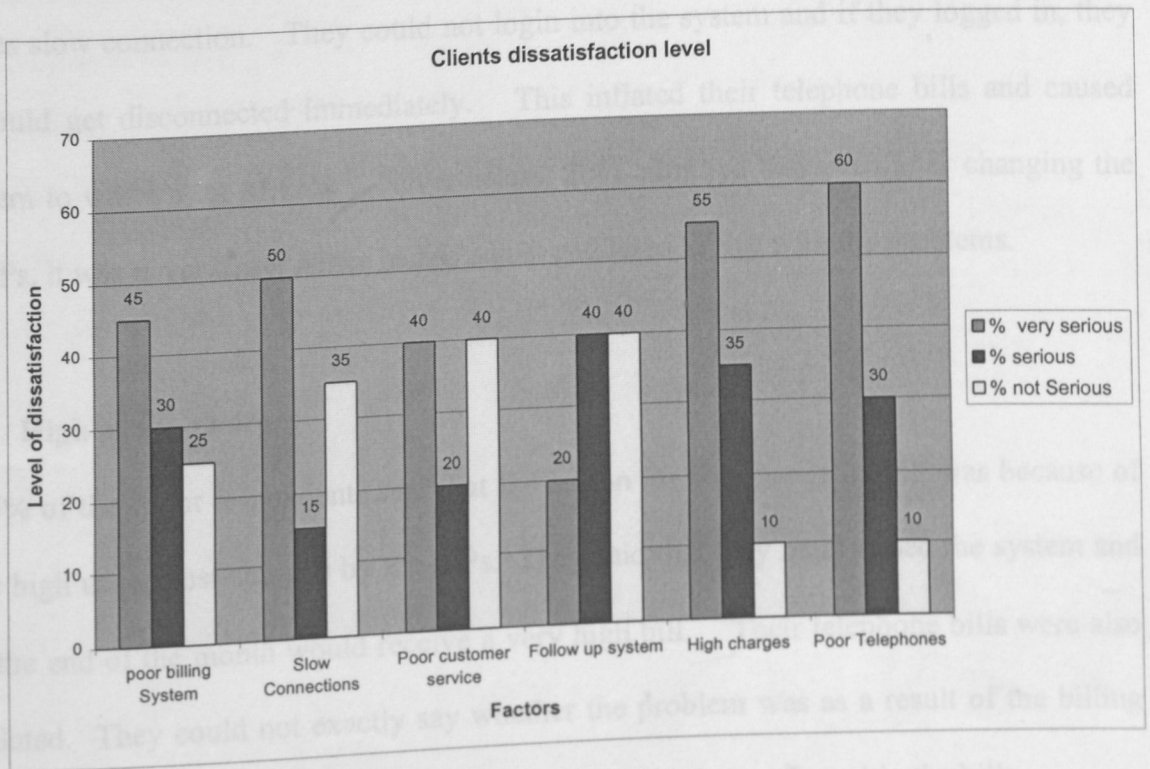
4.4 REASONS FOR CLIENTS CHANGE OF ISPs

The information gathered showed that 40% of clients had changed the ISPs at least once. Table V shows how serious the clients considered the various reasons that made them change ISPs.

Reasons	% very serious	% serious	% not serious
Poor billing System	45	30	25
Slow Connections	50	15	35
Poor customer service	40	20	40
Follow up system	20	40	40
High charges	55	35	10
Poor Telephones	60	30	10

Table V. Clients reasons for change of ISPs

Figure II shows a graphical representation of the responses in table V.



(Figure II)

As shown in figure II, the following two reasons were given as the main cause of the clients' change of ISPs.

- **Poor telephone exchange**

Of the respondents, 60% said that poor telephone exchange was a major problem that prompted them to change the ISP. Unfortunately, even after the change, the same problem persisted. This problem was very much linked to the slow connection whereby 50% of the respondents said that one of the main reasons that made them change the ISP was slow connection. They could not login into the system and if they logged in, they would get disconnected immediately. This inflated their telephone bills and caused them to waste a lot of time. Nevertheless, 20% admitted that even after changing the ISPs, it was never better hence had to adjust and learn to live with the problems.

- **High usage charges**

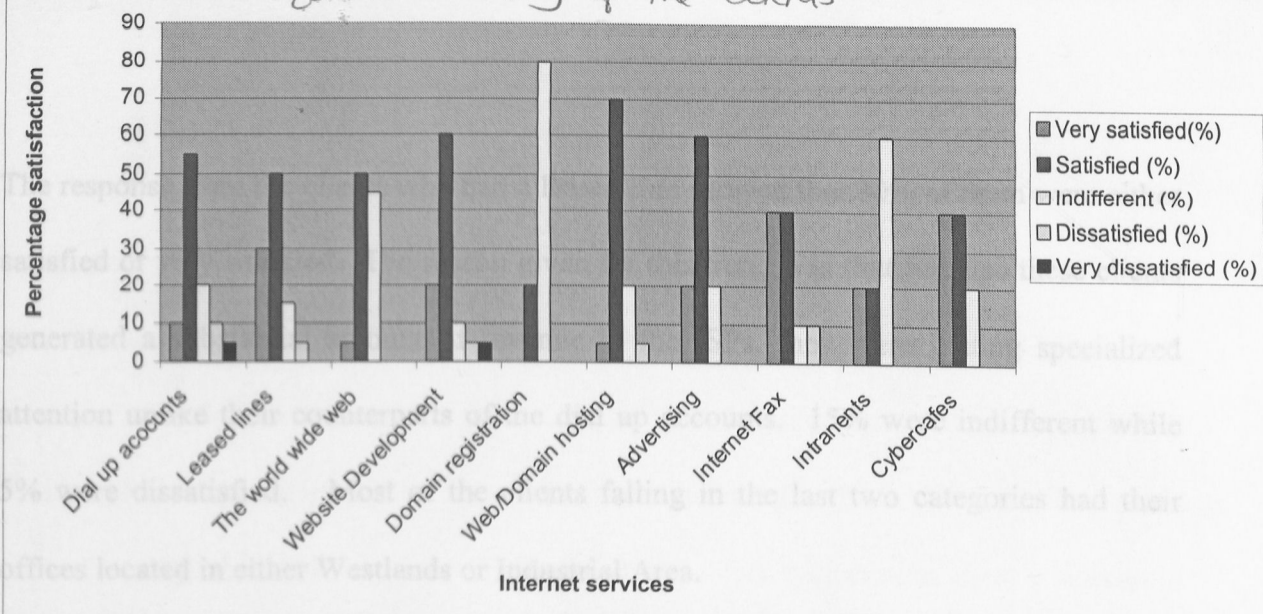
55% of the client respondents said that the reason for the change of ISP was because of the high usage cost charged by the ISPs. They said that they hardly used the system and at the end of the month would receive a very high bill. Their telephone bills were also inflated. They could not exactly say whether the problem was as a result of the billing system or the consumption charges were actually as high as reflected in the bills.

4.5 QUALITY OF THE INTERNET SERVICES

The clients gave different reactions to the various services offered by the ISPs. Table VI summarizes these reactions while figure III shows the graphical representation.

Services	Very satisfied (%)	Satisfied (%)	Indifferent (%)	Dissatisfied (%)	Very dissatisfied %
Dial up accounts	10	55	20	10	5
Leased lines	30	50	15	5	0
The world wide web (browsing)	5	50	45	0	0
Website development	20	60	10	5	5
Domain registration	0	20	80	0	0
Web/Domain hosting	5	70	20	5	0
Advertising	20	60	20	0	0
Internet Fax	40	40	10	10	0
Intranets	20	20	60	0	0
Cybercafes	40	40	20	0	0

Table VI. Clients satisfaction level from the various services offered by the ISP's.



(Figure III)

10% of the respondents were very satisfied with the dial up accounts. Incidentally most of these clients were located in the central business³⁰ area hence had good telephone exchanges. 55% of the respondents were satisfied with the dial-up accounts. The main reason given was that they had managed to establish the time when the traffic was low hence could access their e-mail at that time. However 20% were indifferent because they felt that though they had raised the issue with the ISPs about their dissatisfaction, there was no improvement hence they remained non-committal. 20% of the clients were dissatisfied. They said that login into the Internet was very hard. 5% of the respondents were very dissatisfied. They said that their business relied on Internet and what they were getting was poor service ranging from poor lines to high charges and slow connections. They made it clear that they did not mind spending more for better services.

³⁰ Location established through the clients telephone numbers.

The response from the clients who had a leased line showed that 80% of them were either satisfied or very satisfied. The reason given for this trend was that because these clients generated a substantial amount of revenue to the ISPs, they were getting specialized attention unlike their counterparts of the dial up accounts. 15% were indifferent while 5% were dissatisfied. Most of the clients falling in the last two categories had their offices located in either Westlands or Industrial Area.

For the clients who had access to WWW, 55% were either satisfied or very satisfied. 45% were indifferent. The reason given by most of the respondents for this feeling was that they did not need to browse the Internet due to their work demand.

Of the client respondents who had a website, 80% were in the category of either satisfied or very satisfied. These clients had in-house web development and majority of them had the site hosted outside the country for free or for a very small fee. 10% were indifferent. The reason given was that they did not have a website and were not planning to have one. However 5% were dissatisfied. The reason given for this was that they relied on the ISP to develop the website for them and the end product was not meeting their needs hence had to pay expensively for the website development.

The responses from the clients who had domain registered were in two definite categories. 20% of the respondents were satisfied. They said that domain registration was fast and efficient and they were able to do it without going through the ISPs. 80% however were indifferent and the reason given was that the domain registration had a standard fee and it did not matter how it was done or through which ISP since all of them were charging relatively the same amount of money. A very similar trend was seen in the Web/domain hosting whereby 70% were satisfied while 20% were indifferent. Of the 70% who were satisfied, 40% had their domain hosted outside the country.

For the Internet fax, 40% of the client respondents were very satisfied while 40% were satisfied. They said that Internet fax had greatly reduced their operational costs. However 10% were indifferent and incidentally were not using this service. 10% were dissatisfied. Of the dissatisfied, 8% were from Industrial Area. They said that due to the poor telephone exchange and lines, it was very difficult to connect to the Internet in the first place let alone sending faxes via Internet.

Of the clients who had their Intranet designed by the ISPs, 20% were very satisfied while 20% were satisfied. 39% of these respondents were working with big firms and they said that the Intranet was a very useful tool for planning and getting data distributed to all the

staff members. However, 60% were indifferent and in fact about 50% of them did not understand what Intranet was.

35% of the clients who used the cybercafe were very satisfied while 40% were satisfied.

The respondents said that with the cybercafe, they could access their e-mails without a

need to have a reliable telephone line at home or in the office. However, 20% were indifferent and they said that they hardly used the cybercafe while 5% said the cost of using cybercafe was not justifiable.

	60	20	20
Cost of the Internet connection	70	30	0
Regulation and policy issues	30	20	0

Finally, 90% of the ISP respondents agreed that the competition was very high and there

is need to improve their services and look for alternative way through which they could

lower their operational cost. Competition was threatening their market share. The well-

established ISPs felt threatened by the new entrants to the market since their costs were

regarded as high and the new ISPs were charging much lower. However, they said that

their services were better hence did not expect customers to leave and go for cheaper and

most likely inefficient services from the newly established ISPs.

4.6.1 Telecommunication Infrastructure

95% of the respondents said that the telecommunication infrastructure was a very critical

4.6 FACTORS CHALLENGING INTERNET GROWTH IN KENYA

The results showed that there has been a high rate of Internet growth in Kenya especially

linked to the telecommunication infrastructure since the majority of them were using an

in the last two years. However, this rapid growth was still faced by challenges, which to analogue exchanges, which was quite unreliable. They said that getting a telephone line an extent lowered it significantly. The ISPs had massive services to offer to the clients,

but the challenges were creating a gap between the ISPs and the clients, which was becoming harder and harder to bridge.

Table VII shows how critical the ISP's considered the various factors to be a challenge to the growth of Internet in Kenya.

Factors	(%) Critical	(%) Somewhat Critical	(%) Not Critical
Telecommunication infrastructure	95	5	0
Availability of human technical	60	20	20
Cost of the Internet connection	70	30	0
Regulation and policy issues	80	20	0
Duty and taxation	10	70	20
Customer awareness and training	80	15	5
Internet content	50	30	20
Competition among the ISP's	10	70	20
Capital investment	80	20	0
Cooperation among the ISP's	85	10	5
Security concerns	70	20	10

Table VII. Extent of challenge to Internet growth by various factors.

4.6.3 The cost of Internet connection

On the cost of Internet connection, 70% of the respondent said it was very high. They

4.6.1 Telecommunication infrastructure

95% of the respondents said that the telecommunication infrastructure was a very critical challenge to the growth of the Internet. They said that most of the clients' problems were linked to the telecommunication infrastructure since the majority of them were using an analogue exchange, which was quite unreliable. They said that getting a telephone line

was hard and getting one that could sustain data connection for long periods of time was even harder. Though there were initiatives to improve the telecommunication infrastructure, they would only cover key network components e.g. inter-exchange facilities.

4.6.2 Availability of human technical resources

On availability of human technical resources, 60% of the respondents agreed that this was a very critical challenge based on the rate at which the various Internet applications were being developed and also the rate at which the technology was becoming obsolete. 20% said it was somehow a problem but added that it was not a very serious one since most of the people working in the ISP industry were young hence could read and work for extra hours to expand their knowledge. However, 20% of the respondents said that based on the massive information on the Internet, it was easy to train people to be technical experts hence did not see it as a challenge at all.

4.6.3 The cost of Internet connection

On the cost of Internet connection, 70% of the respondent said it was very high. They noted that they were paying a lot of money for the bandwidth and there were still restrictions on the use of VSAT, which could have been a cheaper alternative. 30% said it was a challenge but not a very serious one. All the respondents said that full liberalization of the telecommunication industry was likely to make the situation better.

4.6.4 Internet regulations and policy

About Internet regulations and policy issues, 80% of the respondents agreed that this was a very critical challenge. They pointed out that within the country, there was no National Information and Communication Policy or Plan. They said that the government was not keen on using the technology hence was not creating a supportive environment for the ISPs to operate. 70% of these respondents said that the government was looking at the Internet technology with a lot of suspicion.

4.6.5 Duty and taxation on Internet communication related equipment

On the duty and taxation on Internet communication related equipment 10% of the respondents said that it was a very critical challenge. They emphasized that taxation of these equipment should not be there at all. However 70% said it was somewhat a challenge. They said that the government had reduced custom duty to about 5% though VAT still remains. They however said that to encourage the spread of the technology, there should be zero taxation. 20% of the respondents however did not see it as a critical challenge and they were comfortable with the taxation.

4.6.6 Customer awareness and training

On the issue of customer awareness and training, 80% of the clients considered it as a very critical challenge. They said that most of the clients did not know the varied services that could be offered by the ISPs. They said that a lot of training was required

for the customers to understand what exactly the Internet could do. 15% considered this to be somehow a challenge and further said that clients did not know what to expect from the ISPs and incidentally even the staff in the ISPs were learning about the Internet. Nevertheless, 5% of the respondents said that customers knew what to expect and the awareness level was increasing hence not a challenge anymore.

4.6.7 Internet content

On the Internet content, 50% considered it to be a very critical challenge. The reason given for this was that people would want local useful information, which was current and reliable. Unfortunately this was not the case because there was very little documented information about Kenya by Kenyan's. They said that getting information to put in the web was a problem and most of the time they had to send their researchers to the field to collect information which even though did not generate revenue, attracted traffic to their website. However 30% saw it as a somewhat critical challenge. The reason given was that people were more concerned with outside information, which could not be found locally. 20% of the respondents did not see it as a challenge at all.

4.6.8 Initial financial set-up resources

For the financial resources, 80% of the respondents said that this was a very critical challenge since high cost was reducing the number of entrants into the market. They however said it was good for them since the competition was manageable that way. 15%

of the respondent saw it as a somewhat critical challenge while 5% did not see it as a challenge at all.

4.6.9 Co-operation among the ISPs

85% of the ISPs said that lack of cooperation among them was a very critical challenge to the growth of the Internet. They said that due to lack of cooperation the cost of the Internet was slightly higher than it should and clients were getting more frustrated since getting information from one ISP to another was very slow. There was lack of roaming services from one ISP to the other. As a result, messages had to go through either Europe or USA before going to the other ISP. 10% considered it to be somehow a challenge while 5% did not see it as a challenge at all.

4.6.10 Internet security

On the security concerns, 70% of the respondents said that security was a very critical challenge to the growth of the Internet. They said that the reason as to why much business was not done via the Internet was because the security concerns were not yet adequately addressed. They stressed that E-commerce and E-banking could only take root if the security issues are addressed. 25% of the respondent considered it to be somehow a challenge while 5% did not consider it to be a challenge at all.

From the findings, a conclusion can be drawn that the telecommunication infrastructure has been a backbone to most of the clients' and the ISPs' problems. Due to the poor telecommunications infrastructure and the monopoly in the industry, the ISPs paid highly to the telecommunications' company. To cover their costs, they charged their clients highly. On the other hand, the clients after paying heavily experienced problems due to the poor telephone lines and exchanges. The data transmission rate is very low due to low bandwidth and congested lines. This increased the connection time to the ISPs as well as inflated the telephone bills. To the clients, all this amounted to poor and unreliable services.

4.7 PREDICTED KENYA'S INTERNET STATUS IN 2002.

The status of the Internet in Kenya was seen to be changing with new emerging trends. 1997 was characterized by the emergence of many ISPs. The emerging vibrant market space was populated by a large number of commercial start up ventures. The end of 1990s and beginning of 2000 had seen the startups continue. The entry cost to the service market was increasing as the market itself matured requiring larger initial investments in service infrastructure as a precondition to gaining a foothold in the market.

One of the critical factor in the ISP industry was that of the level of availability of individuals with the skills set to support the ISP's technical, operational and business imperatives. The industry was certainly expanding faster than the expansion of a skilled

labor force to drive the industry. The staff turnover in the ISP industry was very high. In addition, the skill set was becoming more demanding, with increasing complexity in the operational environment.

	(%) Improved	(%) Somewhat Improved	(%) Not Improved
Cost of access	70	30	0
Internet usage	80	20	0
Human technical resources	80	20	0
Duty and taxation on equipment	90	10	0
Competition by the industry	70	30	0
Duty and taxation on equipment	90	10	0
Competition by the industry	70	30	0

Another new trend seen in the Internet market was the entry of the telecommunication firms such as Telkom Kenya. These large players entering the market are established telecommunication firms enterprises, who were seeing competition in terms of other enterprises from their sectors as well as the largest of the established ISP's. Their motivations for entering the market were a combination of risk coverage and exploitation of opportunity.

This entry to the Internet service industry by large players with significant established market presence and investment capability who already had significant portfolios of carriage assets would have a profound impact on the emerging ISP's industry profile. The visible attributes of this shift were strong pressures to aggregate established ISP entities into larger service operations. This was well demonstrated when AfricaOnline merged with Net2000. Acquisition allowed an enterprise to acquire expertise and staff as well as other business assets.

From the ISPs' response, the state of the Internet is expected to have improved by the year 2002 in all aspects ranging from the cost of access, human technical services to

customer awareness. Table VIII shows the response regarding Kenya's Internet shift in challenges by 2002.

Factors	(%) Improved	(%) Somewhat Improved	(%) Not Improved
Cost of access	70	30	0
Internet usage	80	20	0
Telecommunication infrastructure	65	25	10
Policies and Regulations	60	20	20
Human technical resources.	60	20	20
Internet security	70	20	10
Competition in the industry	70	30	0
Initial capital investment	10	70	20
Customer awareness and training	80	20	0
Duty and taxation on equipment	90	10	0
Cooperation among the ISPs	10	70	20

Table VIII. Predicted Internet status in 2002

Over 80% of the ISPs and clients were optimistic about positive changes in the Internet services by the year 2002. However the rate at which the telecommunication services are improving was questioned.

75% of the client respondents said that customer service would be better in future. They said that considering that the ISPs were coming up at a very high rate, they were likely to offer quality services to their clients or else they were bound to loose their market shares. Of the client respondents, 80% said that the cost of access was likely to go down with time. This was supported by the fact that some of the newly established ISPs were

charging as little as Ksh. 12,000 for a whole year of full Internet access. To them this was a very positive move. As a result of the cost being down, usage was expected to be high.

FINDINGS, RECOMMENDATIONS AND LIMITATIONS

5.1 FINDINGS

70% of the client respondents said that the telecommunication infrastructure was going to become better. Of the 70%, 50% said that plans were underway to change their exchange from analogue to digital, which was going to give them better services. However, 30% were not convinced that the telecommunication infrastructure was going to be any better.

According to 95% of the clients, Internet technical support was improving. They said that in future technical support would be widely available and gave examples of the ISPs which had already set up sites for customer support offering solutions to the frequently asked questions.

- There is no stable Internet service in the country.
- Lack of competition among ISPs.
- Customer training and awareness is low.
- There is a high rate of equipment failure.
- There is a need to improve the quality of service provided by ISPs to match the demand with the emerging market.

CHAPTER FIVE

FINDINGS, RECOMMENDATIONS AND LIMITATIONS.

5.1 FINDINGS

The growth and spread of the Internet has been challenged by various factors. These challenges includes:

- Telecommunication infrastructures. The Internet relies heavily on the telecommunication infrastructure and its current state has been a hindrance to the growth of the Internet. Most of the subscribers are still using the analogue exchange whose quality of data exchange is very poor. Poor telecommunication infrastructure has been the main source of the clients' and the ISPs' problems.
- Lack of Information and Communication policy. There is still no policy on Information and Communication Technology especially the Internet.
- There is no standardized cost structure for Internet services.
- Lack of cooperation among the ISPs.
- Customer training and awareness is still very low.
- There is a high rate of clients movement from one ISP to the other.
- There is a need to continuously train and retrain staff in the ISPs to enable them cope with the emerging new technologies.

5.2 RECOMMENDATIONS

The following are some of the suggested recommendations from the research.

- Full liberalization of the telecommunication industry, which will result to high quality services and low charges to both the ISPs and the clients.
- ISPs should be allowed to use VSAT for both data upload and download.
- ISPs should cooperate and start roaming services for the clients.
- National information and communication policy should be established and incorporated into the existing policies. The government and the private sector should be involved in developing the policy. The policy should be subjected to periodic evaluation and the feedback used to update the policy framework and implementation strategy.
- Customer training and seminars should be organized by the ISPs' through which they can sell their services to the clients.

5.3 LIMITATIONS

The research focused on Internet service providers operating in Kenya on commercial basis. Therefore any generalization should take this into account.

Ownership as opposed to rate of use was used. The use of some free web-based accounts such as yahoo.com, justice.com, hotmail.com and usa.net was not determined.

Potential customers did not form part of the population despite the fact that they might have had useful information that would have been of importance.

The response rate to the questionnaires was very low. Despite a continuous follow up, only 28% of the ISPs and 41% of the clients returned the questionnaires fully completed.

The limitations are likely to affect the outcome of the research and therefore generalization should be done bearing them in mind.

5.4 SUGGESTION FOR FURTHER STUDY

The research study concentrated on the ISPs operating on commercial basis in Kenya. A research focusing on ISPs operating on non-commercial basis is suggested.

Appendix I

GLOSSARY OF TERMS

- ARPA:** United States Advanced Research Projects Agency.
- ARPANET:** The Internet (network of networks) established, controlled, and paid for by ARPA.
- Bandwidth:** The size of the data pipeline. The higher the bandwidth, the faster data can flow.
- KBPS:** Kilo bits per second. The rate that data is transferred between two modems. A bit is the basic unit of data.
- Browser:** A program, such as Netscape, that allows download and display of Web documents from the Internet.
- DARPA:** Defense Advanced Research Projects Institute under the auspices of the United States Department of Defense (DOD).
- DNS:** Domain Name System. This is the system that locates the numerical IP address corresponding to a host name.
- Domain:** A part of the DNS name that specifies certain details about the host such as its location and whether it is part of a commercial, government, or educational entity.
- Download:** Transfer a file from one computer to another.

E-mail address: The unique private Internet address to which e-mail is sent. Takes the form, user@host.

FTP: File Transfer Protocol. The standard method of transferring files over the Internet.

Host: The computer contacted to get on to the Internet.

IP: Internet Protocol. The technology which the Internet is based. It defines how packets of data are transferred from source to destination.

ISDN: Integrated Services Digital Network. An international standard for digital communications, over telephone lines, that allows for the transmission of data.

Internet: According to a resolution passed by the Federal Networking Council (FNC) In October 24, 1995, Internet refers to the global information system that:

- is logically linked together by a globally unique address based on the Internet Protocol (IP) or its subsequent extensions/follow-ons;
- is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and

- Provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure.

ISP: An Internet Service Provider is a company, which specializes in providing end-users and businesses with network access to the Internet. Among the largest national and regional ISP's are AT&T WorldNet, MCI, and UUNet. The ISP's in Kenya includes AfricaOnline, Interconnect, Form-net, Insight technologies, ISP Kenya and ARCC.

Leased line: A dedicated telecommunication connection between two points.

Modem: MODulator /DEModulator. A device that allows a computer to communicate with another over a standard telephone line, by converting the digital data into analog signals and vice versa.

NSF: National Science Foundation. A US government agency that provides federal assistance on a variety of science and education arenas.

NSFNet: The new name for the ARPANET named after the NSF.

POPs: Points of Presence. An access provider's range of local dial-in points.

Protocol: An agreed way for two network devices to talk to each other.

PTOs: Post and Telecommunications Office.

Server: A central computer that makes services available on a network.

TCP/IP: Transmission Control Protocol /Internet Protocol. It is the protocol stack that drives the Internet. It regulates how data is transferred between computers.

Telnet: An Internet protocol that allows login to a remote computer and act as a dumb terminal.

UCLA: University of California at Los Angeles.

UNIX: An operating system used by most service providers and universities.

WWW: World Wide Web also referenced to as the Web refers to integrated text, graphics, color, sound, pictures, moving pictures, etc. into a single computer document; must be viewed with a graphical browser. They are interconnected through hypertext links.

Towns	1995	2000
Nairobi		
Mombasa		
Nakuru		
Eldoret		
Kisumu		
Nyeri		

4. What operating system(s) do you use in your servers? (tick where appropriate)

- Windows 95 Windows 98 Windows NT
 Unix MacOS
 Any other (e) _____

5. What browser(s) do you use?

- Communicator
 Internet Explorer
 Netscape
 Other(s). Please specify _____

Appendix II

A Questionnaire to be filled by the ISPs.

1. In which year did your ISP start its operations? (tick where appropriate)

- 1993 - 1994
- 1995 - 1996
- 1997 - 1998
- 1999 - 2000

2. Approximately how many clients in total did you have in the following years?

- | | |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> 1993 ----- | <input type="checkbox"/> 1994 ----- |
| <input type="checkbox"/> 1995 ----- | <input type="checkbox"/> 1996 ----- |
| <input type="checkbox"/> 1997 ----- | <input type="checkbox"/> 1998 ----- |
| <input type="checkbox"/> 1999 ----- | <input type="checkbox"/> 2000 ----- |

3. What percentage of your total clients were in the below towns in the following years:

Towns	Years					
	1994	1995	1996	1997	1999	2000
Nairobi						
Malindi						
Nakuru						
Mombasa						
Eldoret						
Kisumu						
Nyeri						

4. What operating system(s) do you use in your servers? (tick where appropriate)

- Windows 95 Windows 98 Windows NT
- Unix MacOS
- Any other (s) _____

5. What browser(s) do you use?

- Communicator
- Internet Explorer
- Netscape
- Other(s). Please specify _____

6. What services do you offer to your clients?(tick the appropriate services)

- Dial up accounts
- Leased lines
- Domain registration
- Web Site Development
- Web/domain hosting
- E- commerce
- Advertising (banners)
- Internet Fax
- Intranets
- Cybercafes
- Others _____

7. Approximately, how many customers do you have for each of the services below?

Services	Number of Customers
Dial up accounts	
Leased lines	
Web site Development	
Web/Domain hosting	
E- commerce	
Advertising (banners)	
Internet Fax	
Intranets	
Cybercafes	
Other(s)	

8. What percentage of total revenue is generated by the following services:

Services	Percentage revenue (%)
Dial up accounts	
Leased lines	
Domain registration	
Web site Development	
Web/Domain hosting	
E- commerce	
Advertising (banners)	
Internet Fax	
Intranets	
Cybercafe	
Other(s)	

9. Of your total current clients, what percentage is from the following sectors:

Sector	Percentage (%)
Private organizations	
Government	
Individuals	
Non governmental organizations	
Academic Institutions	
Others	

10. Do you get any queries from the customers?

- Yes No

11. If yes, what kinds of queries are common?

- Technical Information search
 Updates
 Others (please list them) _____

12. Approximately, what percentage of clients asks technical support questions per day?

- 0 - 20% 21 - 40%
 41 - 60% 61 - 80%
 81 - 100%

13. What kind of technical questions do they ask? (Tick where appropriate)

- Hardware related
 Software related
 Other (s) _____

14. If it is a hardware problem, how do you go about solving it?

15. If it is a software problem, how do you go about solving it?

16. On average, how long do you take to solve?

- Hardware related problems _____ (hrs)
 Software related problems _____ (hrs)

17. Do you consider the duration appropriate?
 Yes No

18. What difficulties do you encounter when solving the problems?

24. If No, what are the main reasons for not marketing?

19. Are there times when you get clients from other ISPs?
 Yes No

25. What kind of Internet connection(s) do you have? (tick the most appropriate)

20. If yes, what are the major reasons given for changing loyalty? (*tick where appropriate*)

Services	Least common	Common	Most common
Poor billing systems			
Harsh and unfair treatment			
Poor follow up system			
Bad connections			
High charges			
Other(s)			

21. How did your clients come to know of your existence?

Connection Type	Monthly Payments(₹) in 30S
<input type="checkbox"/> Personal contacts <input type="checkbox"/> Recommendations	<input type="checkbox"/> Walk - in <input type="checkbox"/> Marketing

22. Do you market your services?
 Yes No

23. If yes, how do you market the services? (*Tick where appropriate*)
 Print media
 Radio

29. If No, what are the main reasons for not marketing?
 () Television
 () Seminars
 () Internet
 () Other(s) _____

24. If No, what are the main reasons for not marketing?
 () Cost of advertising
 () Nature of the service
 () Others (*Please specify*) _____

25. What kind of Internet connection(s) do you have ? (*tick the most appropriate*)
 () Jambo Net
 () Half circuit
 () VSAT
 () Other(s) _____

26. What size of Bandwidth do you have with each of the following Internet connections?

Connect	Download Bandwidth	Upload Bandwidth
Jambo Net		
Half circuit		
VSAT		
Other(s)		

27. On average, how much do you pay for the bandwidth per month for each of the Internet connections?

Connection Type	Monthly Payments(s) in \$US
Jambo Net	
Half circuit	
VSAT	
Other(s)	

28. How many incoming lines do you have for your dialup customers?

29. How do you rate the Telkom Services provided to the ISPs (*Please tick where appropriate*)

Services	Very Low	Low	Moderate	High	Very high
Dial up accounts					
Leased lines					
Domain registration					
Web site development					
Web/Domain hosting					
E-commerce					
Advertising					
Internet Fax					
Intranets					
Cybercafes					
Other(s)					

30. How do you rate duty and tax tariffs for information and communication equipment in Kenya compared to other countries in Africa?

- Very high High Fair Low
 Very low

31. How do you rate competition in the ISP industry with regard to the following services?

Services	Very good	Good	Average	Poor	Very poor
Quality of lines					
Customer service					
Services					

32. Does the level of competition threaten you market share ?

() Yes () No

33. What are you doing to maintain/increase the market share?

() _____

() _____

() _____

34. How important do you consider the following factors to be a challenge to the growth of Internet in Kenya?

Factors	Very Important	Somewhat Important	Not Important
Telecommunication Infrastructure.			
Availability of human technical resources			
Cost of the Internet connection			
Internet regulations and policy issues			
Duty and taxation on Internet communication related equipment			
Customer awareness and training			
Internet content			
Financial resources (capital investment)			
Taxes on PCs and software			
Competition			
Lack of cooperation among ISPs			
Security concerns			

35. Considering the above challenges, which is the best way to address them?

(a) Telecommunication infrastructure

(k) Lack of cooperation among ISPs

(b) Availability of human technical resources

(c) Cost of the Internet connections

(d) Internet regulations and policy issues

(e) Duty and taxation on Internet communication related equipment

(f) Customer awareness and training

(g) Internet content

(h) Financial resource (Initial capital investment)

(i) Taxes on PCs and software

(j) Competition *What will be the position of Kenya in relation to the Internet in the year 2001 under the following headings.*

	Improved	Somewhat improved	Not improved
(k) Lack of cooperation among ISPs			
(m) Security concerns			
(n) Other(s)			
Services			
Cost of Access			
Internet services			
Government policies and regulations			
Human technical resources			
Internet security			
Competition in the industry			
Awareness on internet services			
Initial capital investment			
Customer awareness and training			
Internet content			
Duty and taxation on Internet communication related equipment			
Cooperation among ISPs			

36. What do you think will be the position of Kenya in relation to the Internet in the year 2001 under the following headings.

Services	Improved	Somewhat improved	Not improved
Cost of Access			
Internet usage			
Internet services (general)			
Telecommunication infrastructures			
Government policies and regulations			
Human technical resources			
Internet security			
Competition in the industry			
Awareness on internet services			
Initial capital investment			
Customer awareness and training			
Internet content			
Duty and taxation on Internet communication related equipment			
Cooperation among ISPs			

7. Rank the following services in the order of importance. (tick where appropriate)

Appendix III

A Questionnaire to the Clients.

Services	Very Important	Somewhat Important	Not Important
Dial up accounts			
Basic line			
Web site Development			
Advertising			
Domain Name			
Internet			

Section A

1. Name of the respondent (optional) _____
2. Position (optional) _____

Section B

1. What is your primary business?

8. How satisfied are you with the following services provided by the ISP. (rank

2. Do you have offices outside Nairobi?
() Yes () No

3. If YES where are the other offices located?
() _____
() _____

4. Which year did you come to know about the Internet?
() _____

5. Through which media did you come to know about the Internet for the first time?
(tick where appropriate)
() Radio
() Television
() School
() College
() Friends
() Office
() Others Specify _____

6. Which year were you connected to the Internet?

7. Rank the following services in the order of importance. (*tick where appropriate*)

Services	Very Important	Somewhat Important	Not Important
Dial up accounts			
Leased line			
The world wide web			
Web site Development			
Web/Domain hosting			
Advertising			
Information searches			
Internet Fax			
Intranets			
cybercafes			

8. How satisfied are you with the following services provided by the ISP. (*rank your satisfaction by ticking appropriately*).

Services	Very Satisfied	Satisfied	Indifferent	Dissatisfied	Very dissatisfied
Dial up accounts					
Leased line					
The world wide web					
Web site Development					
Domain Registration					
Web/domain hosting					
Advertising					
Internet Fax					
Intranets					
cybercafes					

9. Please give reasons for your feeling(s) in No 8.

() Dial up accounts

() Leased line

10. () The world wide web

11. () Web site Development

12. () Domain Registration

13. () Web/Domain hosting

14. () Advertising

15. () Internet Fax

() FTP

() Intranets

17. Cybercafe ISP adequately addressed your needs?
 Yes No
-
18. On average, how much do you pay for the Internet (in Ksh.) per month.
10. Do you have a Website? 2,001 - 5,000
 Yes No 10,001 - 15,000
 15,001 - 20,000 20,001 - 25,000
11. Approximately, what percentage of your customers are aware that you have a Website.
 75% - 100% 50% - 75%
 25% - 50% 0% - 25%
12. Where is it hosted? Moderate Low
 Locally Outside the country (Please specify)
-
13. How often is it updated?
 Daily weekly
 Monthly Quarterly
14. From the time you were first connected, have you changed ISPs?. (If NO go to No. 18)
 Yes No
15. If YES how many times?
16. How serious did the following factors contribute to your change of loyalty? (tick where appropriate).?

Services	Very Serious	Serious	Not Serious
Poor billing system			
Poor customer service			
Poor follow up system			
Bad connections			
High charges			
Unreliable Telephone exchange			
Other(s)			

17. Has your current ISP adequately addressed your needs?
 Yes No
18. On average, how much do you pay for the Internet(in Ksh.) per month.
 1,000 - 2,000 2,001 - 5,000
 5,001 - 10,000 10,001 - 15,000
 15,001 - 20,000 20,001 - 25,000
 25,001 - 30,000 30,001 - 40,000
 40,001 - 50,000 over 50,000 (please specify) _____
19. How do you rate the cost of being connected to the Internet per month in relation to other operational costs.
 High Moderate Low
20. Is the Internet a reliable source of information for you?
 Yes No

Please explain

21. How do you foresee the following factors affecting the growth of Internet in Kenya?

Factors affecting Internet	High effect	No effect	Low effect
Internet Charges from the ISP(s)			
Telephone charges for Internet access			
Security for Internet data transfer			
Taxes on PCs and software			
Demand and awareness of Internet			
Competition among the ISP(s)			
Other(s)			

22. Give reasons for your prediction?

23. Where do you think Kenya will be in relation to the Internet in the year 2002 under the following headings.

() Training and Internet awareness

() Customer Service(s)

() Cost of Access

() Usage

() Telecommunication infrastructure

() Internet Human Technical Support

Appendix IV

List of registered ISPs in Kenya as at 1st April 2000.

1. NairobiNet Ltd.
2. Net2000 Ltd.
3. Insight Technologies
4. Swiftkenya (SwiftGlobal)
5. AfricaOnline
6. Abacus Computer Systems
7. Form-Net
8. Gateway Online
9. I-Kenya Mombasa
10. Interconnect
11. Alphanet
12. Onlinekenya
13. Communication Solutions
14. ISPkenya
15. Comtec
16. Global Telecomms
17. Mitsumi
18. Skyweb
19. Geopath
20. Integrated Tech. Systems
21. Today's Online
22. Mwananchi Online
23. ARCC

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